

A university in transition

Analysis of Erasmus University Rotterdam in its struggles to respond to a society in transition and a way forward

Written by: J. Garst & the Design Impact Transition (DIT) platform

About DIT

The Design Impact Transition (DIT) Platform at Erasmus University Rotterdam aims to transform the university by empowering radically new ways to do research, education and engagement for a just and sustainable future.

As a platform, we bring together academics, students, non-academic staff and external stakeholders around complex and persistent societal challenges. We aim at building a strong and engaged community and a collaborative, experimental and design-based culture of transdisciplinarity. DIT is at the heart of the EUR Strategy, living the Erasmian values of global

citizenship, social commitment, an open and critical mindset, cooperation and entrepreneurial spirit.

Our team consists of dedicated Erasmians that work on building the DIT platform and transforming the university from the ground up. The core team consists of three quartermasters, an organisational and an academic lead, complemented by affiliated academics from different Schools and Institutes. You can always contact the core team if you have questions, remarks, or want to contribute to the platform. For more information and contact details, please visit our [website](#).

Suggested citation

J. Garst & Design Impact Transition platform (2023). A university in transition. Analysis of Erasmus University Rotterdam in its struggles to respond to a society in transition and a way forward. Rotterdam, Design Impact Transition Platform, Erasmus University Rotterdam.

This document has been licensed under a [Creative Commons Attribution 4.0 International License](#).

Contact

Jilde Garst

garst@ese.eur.nl

DIT team

dit@eur.nl

A university in transition

Authors

J. Garst

Contributors

Design Impact Transition (DIT) platform – L. Baunker, O. Bream McIntosh, F. Coops, Y. Hendlin, S. Koevoets, M. Lavanga, D. Loorbach, N. van Roessel, A. Vasques, M. de Wal, & J. Wittmayer.

Executive summary

What is the role of a university in a society that is in transition? How do we as academic researchers and teachers act upon or shape these transitions? How do we support our students and other community members in navigating the tensions and conflicts that these transitions bring?

Whether it concerns the transition to a renewable energy system, a circular economy, a food system that supports (or restores) biodiversity, an equal and just division of wealth and wellbeing, an inclusive and safe digital environment, a health system aimed at preventing instead of curing disease, we as academics are part of these fundamental changes in the fabric of our society. We impact them in positive or negative ways; locally in the communities where we live and work but also globally through our research, our education, and other exchanges of our ideas. How do we ensure that this impact is doing good and no harm? How do we ensure that our work supports the transition to a sustainable and just future and is not obstructing it? If society changes, do our academic practices, values, and norms also need to change?

Many universities are currently struggling to answer these questions and so is Erasmus University Rotterdam (EUR). Tensions are increasing in our academic communities as well as the sense of powerlessness in handling them. As individual academics, we feel a sense of duty and a sense of urgency to help society to tackle the challenges that are threatening its existence. At the same time, our contributions feel small and insignificant, unable to create the systemic change needed. As an institute, the university is struggling to set a course, torn between guarding the existing practices and norms that have shaped our identity as an academic institute, and opening up to new values and ideas that allow us to better support our communities. Furthermore, we have to come to terms with the uncomfortable truth that our past and current activities contribute to not just the solutions but also the causes of societal grand challenges. Can we change our academic ways without losing our legitimacy as knowledge creators and diffusers of society?

In their Midterm Review of EUR's Strategy 2024 – published in 2022 – the review panel observes the struggles of the EUR's leadership and asks them to take clear action to “clarify the strategic course and to adjust it where necessary” (1). While the Midterm Review report identifies some gaps in the strategy and recommends some rough outlines of what action could look like, the report does not provide insight into the origins of these gaps. Without identifying the underlying tensions and acknowledging how they are shaped by both EUR's organizational structure and changes in the wider academic landscape, EUR's leadership risks acting on these gaps in an ad hoc and ineffective way.

In this report, we support the review panel's call for action but also acknowledge the complex task ahead for the EUR's leadership. To support them in this task, we offer in the report a more in-depth analysis of the strategic gaps identified by the Midterm Review. To conduct this analysis, we build on our combined expertise as the team of the Design Impact Transition (DIT) platform at EUR. Using the diverse disciplinary backgrounds of our team, our analysis builds upon a broad spectrum of academic discourses that investigate the tensions in our academic system. We hope that this analysis will, thus, not only serve the EUR and its community but also provides guideposts for academics at other universities that are looking to facilitate the transformation of their institute and the academic environment at large.

To make sure that our analysis connects to the particular characteristics of the EUR university, we also draw upon many documents, conversations, and other exchanges of ideas within our university. We are, therefore, grateful to

the EUR leadership for providing us with the mandate and resources to create the DIT platform but more importantly for having open conversations with us about their goals and struggles. Additionally, we want to emphasize that the ideas expressed in this report are built on the wealth of expertise of our EUR colleagues and the wider EUR community. As this expertise cannot always be captured in scientific references, we want to thank all people that have shared their thoughts in formal and informal conversations.

The results of our analysis

The results of our analysis have been captured in four sections:

Creating a long-term vision

Following the panel's recommendation to look beyond the current strategic period, we argue that a long-term vision is needed. This vision should explain how the university plans to be adaptive to the changes that the societal transitions bring (2), how the university provides spaces for research and education that supports or even accelerates transitions towards a sustainable and just society (3,4), and how the university will adjust its own norms, rules, and activities when they hinder such transitions (4–8).

Four barriers to creating positive societal impact

In aiming “to be a force for good”, the university's leadership should tackle the barriers to creating societal impact:

- a) The emphasis on academic integrity and relevance has snowed under the duty of an academic institute to create and teach socially robust knowledge, which considers how the knowledge is used, is oriented towards action on changes the existing systems, and is co-created with other actors in society (4-6) (9-15).
- b) The focus on individual performance and providing a single pathway to success not only cause unhealthy work pressure and misconduct (16-19), but it also ignores the fact that academic work is teamwork and places its trust in unreliable and incomplete evaluation metrics that disconnect effort from performance and outcome (20–25).
- c) The marginalization of our education activities compared to our research activities leads to diminishing our role as providers of academically educated members of society (9). In this role, universities should consider the changing educational needs of a transitioning society, both in the content of our education (26–29) as well as how we evaluate it (30–33).
- d) The other roles of the university in society – e.g., an employer, a consumer of resources, an ecological space for flora and fauna – are easily forgotten and not acted upon when the university aims to have a positive impact.

Competencies for socially robust knowledge

Creating and teaching socially robust knowledge requires specific academic competencies that currently do not receive enough support in the EUR:

- a) Cross-disciplinarity = to tackle the complex, interconnected grand challenges of society, cross-disciplinary knowledge creation and education with a systems perspective should be facilitated (6,13,34–36);
- b) Anticipation = to create a positive impact and to detect unintended, negative consequences of our work – i.e., do good and do not harm – anticipatory techniques should be included in our research and education (37,38);
- c) Reflexivity = to become aware of how our academic activities influence and are influenced by values, norms, and emotions, a reflexive attitude and reflexivity exercises should be included in our research and education (39-42);
- d) Engagement = to create a common understanding of grand challenges and ensure science for society, with society, engagement with societal actors should be included in our research and education (43-48).

Enable all modes of cross-disciplinarity

In cross-disciplinary research and education, there are three modes: a) in multi-disciplinarity the disciplinary scientists complement each other but their methods and discourses remain separated; b) in inter-disciplinarity the scientists create cross-disciplinary discourses and methodologies; c) in post-disciplinarity (or trans-disciplinarity) the scientists choose methods and discourses from the full scientific spectrum without claiming disciplinary ownership (49). The ability of the university to enable all three modes depends on the flexibility of disciplinary

practices and procedures, whether performance indicators are purely disciplinary, and the existence of spaces for post-disciplinary research and education (12).

Two steps towards the governance of social robustness

Besides the results of our analysis, we would like to also offer the EUR leadership support in taking clear action. This report, therefore, concludes with two concrete steps to tackle the barriers and tensions that we identified for governing the creation and teaching of socially robust knowledge:

Step 1. Set up a cross-school working group on evaluating academic excellence.

The working group - consisting of academics in relevant fields from each of the EUR's schools - will develop policy recommendations a) for assessing the competencies at the team level; b) for evaluating the performance of an individual in a team setting; c) for recognizing and rewarding teamwork within and between departments and schools. This working group will not only revitalise the implementation of the Dutch national Recognition & Reward programme but ensure that the implementation leads to the development of bottom-up initiated, evidence-based policies that account for the EUR's governance structures.

Step 2. Set up a Cross-school Institute for Social Robustness.

The DIT platform was given by EUR's leadership the strategic assignment to investigate and initiate new institutional structures for creating and teaching socially robust knowledge. With the lessons learned, we recommend that the EUR leadership develop a Cross-school Institute for Socially Robustness to serve four purposes:

- i. Facilitate reflexive dialogues and strategies on social robustness;

While our university acknowledges the need for socially robust knowledge, tensions are perceived between the requirements for creating and teaching such knowledge and the traditional ways we conduct academic research and education. For example, the desired neutrality of science in the political arena conflicts with research calling for specific policy action. To create awareness among the academic and non-academic staff about these tensions and the strategies to handle them, dialogues between EUR's leadership and the staff of the ten schools and the professional services. The Cross-school Institute could provide a safe and neutral space for such dialogues.

- ii. Coordinate cross-school collaborations in research and education;

While in its activities the DIT platform enabled sharing of best practices and creating collaborations between the EUR's schools (e.g., in the new interdisciplinary master's Societal Transition), differences between the policies, structures, and services at the school level hampered the DIT team in their cross-school education and research activities. A central institute in which governance is shared among schools and cross-school structures - such as an examination board and an ethical committee - will streamline the collaborations between schools for socially robust knowledge creation and teaching.

- iii. Develop training and innovation platforms for the competencies for social robustness;

While training and innovation in multiple scientific competencies are covered by the EUR's professional services, the four competencies for socially robust knowledge are not structurally supported. To stimulate cross-disciplinarity, two portfolios would be developed for cross-school collaborations on research and education, both for existing projects (e.g., Convergence Alliance projects and the Erasmus Initiatives) and new projects. Each of the other three competencies – Anticipation, Reflexivity, and Engagement – would have its own training programme for staff, and an innovation platform would allow experimentation with new tools, instruments, and configurations for these competencies in research and education.

- iv. Set up a transformational, cross-disciplinary program on sustainability for students.

In contributing to sustainable development, we should also support our students in becoming the changemakers needed for a sustainable and just future. To provide them with the knowledge and skills to do so, a cross-school programme would be developed for education on sustainable development and transformational skills, both at the bachelor's as well as master's levels.

Although we tried to be as concrete as possible in describing these steps, action is easier said than done. We, therefore, offer the EUR leadership both our minds and our hands as the DIT team to further develop and implement these steps. Furthermore, in the spirit of our analysis, this action requires cross-school collaboration. Thus, this report is also an invitation to our EUR colleagues and the wider community to share their expertise and capabilities in acting upon these steps and support the EUR leadership in shaping our institute to contribute to a just and sustainable future.

Purpose of this report

In 2022, the Board of Erasmus University Rotterdam (EUR) commissioned an external review of their Strategy 2024. This Midterm Review provided five points for improvement considering the implementation of the strategy: 1) continue the priorities of Strategy 2024 beyond 2024; 2) make impact the central theme of the strategy; 3) refine the strategy to decrease the number of priorities; 4) utilize the interdisciplinarity of EUR; 5) strengthen the governance of the implementation of the strategy (1).

While describing their reasons for concern and why these five points are important, the review does not provide a clear plan for how to achieve them. Although at first, the five points might seem simple to follow up, the decentralized structure of the EUR and the complexity of the societal issues that the university aims to tackle make this a very complex task with many obstacles and pitfalls. The team of the Design Impact Transition (DIT) platform, therefore, wants to offer their expertise to support the EUR's leadership. This report offers a deeper analysis of the concerns raised in the Midterm Review and draws out a plan for implementing the EUR strategy. The report has five sections. Each section provides a deeper analysis of the five points of the Midterm Review, mentioned above. In the fifth and final section, after discussing the governance challenges, two concrete steps are suggested that move the strategy forward and support the EUR in contributing to a sustainable and just society.

Creating a long-term vision

The Midterm Review indicated that the ambitions of Strategy 2024 are too large to be completed within this strategic period. The review panel recommends building the next strategy on the ambitions and priorities of Strategy 2024. We agree that with the importance of looking beyond the current strategic period: a long-term vision is required. We believe this vision should not simply extend the ambitions of the University further into an unknown future but aim to understand the future more thoroughly and attempt to provide useful answers to questions: what ongoing changes in society are most relevant for our strategic vision; what are the possible future roles of our university in that changing society; and which decisions can EUR take today that will ensure its continued leadership and resilience in the unpredictable, and likely volatile, times ahead?

To assist organizations in such foresight exercises, academics and not-for-profit organisations have

developed tools and instruments, such as the Framework for Intergenerational Fairness to uncover unfairness where it exists in policy and clarify the 'hard choices' to be made (50); the Delphi method to synthesise diverse expertise on the future patterns and trends most relevant to our policy decisions (51); morphological analysis, which is a structured method for ensuring consistency and relevance in scenario development in developing useful understandings of how the various dimensions of our operational context might evolve (52); and Policy Wind Tunnelling to assess policy assumptions against knowledge about possible future scenarios (53). In conducting these exercises, leveraging the wealth of in-house expertise, both academic and non-academic, is not only more efficient than hiring external expertise but also ensures internal commitment to the outcomes of these exercises. However, to avoid a solely inside-out perspective – as warned by the Midterm Review – the university shouldn't be afraid to ask its direct and indirect stakeholders for their views (see the section on engaged academia).

The development of such a long-term vision is not a one-time exercise. As the future unfolds, the vision and thus the strategy of the university needs to be adjusted to emerging insights. A reflexive attitude towards its strategy is thus a must for an academic institute that wants to be resilient in the turbulent times of societal transitions (2). Next to such an attitude, the organization also requires structures that facilitate dialogues within the EUR and outside in its local and global communities and help it to anticipate and respond to changes in society (2).

The strategic initiatives were created to establish such structures, but a lack of focus in their scope and limited collaboration between these initiatives and the Schools has prevented these structures from being woven into the EUR's organizational fabric. Without these structures, EUR's goal, indicated in Strategy 2024, "to be a force for good" and support society in the transitions needed to tackle grand challenges is being compromised.

One sign that there is urgency in developing better reflexive and anticipatory capacities is the response to and aftermath of the recent OccupyEUR protests. In transition thinking, behaviour in society is directed by sets of rules, practices, and narratives (i.e., regimes). These regimes are not stable. At any time, small networks of actors exist (i.e., niches) that question and challenge the rules, their assumptions, and dogmas (3,4). Traditionally, the university is perceived as a safe space for these niches to develop, experiment with

alternative rules, and learn by doing (4). However, after the abrupt ending to the OccupyEUR protest by the police, the EUR staff and students wonder whether this space for niches is still being safeguarded and whether the EUR leadership is open to reflecting on and adjusting its strategy. This event made clear that among our staff and students, a sense of urgency is felt to act upon the concerns over sustainability and the increasingly urgent scientific warnings. The event and the discussions that followed show there is a clear need for spaces where societal grand challenges can enter our discussions and work, and where transformative work can be done.

To create and support these spaces, the university's strategy should acknowledge that the university has path dependencies in its way of working. To a large extent, our university remains focused on and organized around economic innovation, and the tradition of a disciplinary and distanced academic role. Similar to the conversations currently happening in organizations around the world, our path dependencies need to be openly discussed, challenged, and re-designed if they hurt our university's mission to have a positive societal impact (4–8).

Four barriers to creating positive societal impact

Following the recommendations of the Midterm Review, the board aims to clearly define what 'societal impact' means for the EUR and how to ensure this impact is 'positive'. In general, an impact can be considered positive if it contributes to a sustainable and just future for our global society. There are many frameworks and definitions of a sustainable and just future for our global society. While the UN Sustainable Development Goals give direction, they are time- and space-sensitive and they do not show the relationship between the conditions they describe. The Donut economics framework by Kate Raworth does show that the conditions of human survival are interconnected (54). In her framework, the space for humankind to survive and thrive is defined by a) a ceiling created by the nine planetary boundaries and b) a social foundation created by twelve dimensions to be met for every human being on the planet. Staying 'within the doughnut' seems straightforward, but currently, our global society is overshooting multiple planetary boundaries – with climate and ecological crises being the most prominent – and falling short on all the social dimensions.

To support society to get 'within the Donut', the role of the university is clear: "the production of

knowledge with actions that both meet human needs and preserve the planet's life-support systems" (55). This role is granted to the scientific community by society. In other words, "[t]he political community agrees to provide resources to the scientific community and to allow the scientific community to retain its decision-making mechanisms and in return expects forthcoming but unspecified technological benefits" (56). This quote points to two conditions for the legitimacy of science: a) scientific integrity; b) societal benefit (9). Unfortunately, DIT's analysis of the Midterm Review and other strategy documents has revealed that the EUR struggles to fulfil the second condition. Four barriers can be identified. In the next sections, we described them in detail. A summary can be found in the table below.

<i>Four barriers to creating societal benefit</i>	
The lack of attention to social robustness	The lack of attention and capability to ensure that the knowledge we create in research and use in education a) considers how the knowledge will be used; b) is action-oriented, and c) is co-created.
Focus on individual performance with one pathway to success	The focus on individual excellence, providing only one pathway to success and using incomplete, and invalid proxies for performance have undermined teamwork within and between departments, which is necessary to tackle grand societal challenges.
Marginalizing our education activities	The provision of knowledge through academic education is perceived as undervalued compared to research activities.
Ignoring our other societal roles	The other roles of our university in society are not clearly defined, meaning that potential avenues for negative societal impact are not on the leadership's radar.

Barrier 1: The lack of attention to social robustness

The relationship with society can be described as a contract between the academic community and society. In this contract, society provides resources to the scientific community and permits the scientific community the power to self-regulate. In return, the scientific community is expected to produce benefits for society with its research and education (9). While this self-regulation to ensure research integrity is well-

defined in the Netherlands Code of Conduct for Research Integrity (10), the code includes societal benefit only as one optional condition: “2. Conduct research that can be of scientific, scholarly and/or societal relevance”. This lack of attention to societal benefit has caused accusations of scientific detachment, depicted by the metaphor of the ‘ivory tower’ (12). Drawing on decades of research (11,12), three characteristics of socially robust scientific knowledge can be identified:

1. **Considerations of knowledge use.** Traditionally, science is divided into a) basic science driven by a quest for the fundamental understanding of the world, and b) applied science driven by questions raised in a specific context of the application (9,12). However, as often is the case with dichotomies, our reality is not black and white. A research project that considers how the resulting knowledge can be used, can still contribute to fundamental understanding. Therefore, some scholars identify a third category of use-inspired basic research, while others see it more as a spectrum with no clear borders between basic and applied science (12). As the causes and consequences of grand challenges are very context-dependent, the production of contextualized knowledge is important for tackling these challenges (13).
2. **Action-oriented.** Traditionally, the researcher is an observer who systematically collects, analyzes, interprets, and reports objective (or intersubjectively recognizable) results (5). On the one hand, this role is important in creating an understanding of the current state of our society and the path dependencies that cause its grand challenges. On the other hand, to create societal benefit, we shouldn't only describe the problem and causes. Going beyond a description of the status quo, action-oriented research proposes alternative norms, rules and institutions to organize social life and puts them into practice with experimentation (6). Thereby, this type of research feeds the development of niches that can challenge the regime (4).
3. **Co-created.** As mentioned previously, universities should acknowledge that they are not the only creators of knowledge in society. To create socially robust knowledge, the university needs to invite other societal actors to share their knowledge and together co-create an understanding of our world and the alternative routes for the future (6,14). This co-creation goes beyond ‘translating science into practice’ and new

communication channels to send our knowledge ‘out into the world’ (5,6). It is also more than asking stakeholders to provide input for the research agenda or which topics to be discussed in class. To conduct science with society means involving them in the design and execution of academic research and education (15). This co-creation process will, however, bring conflicting views and values to the surface. Training will need to be provided on how to handle such conflicts while ensuring both scientific integrity and an inclusive process.

Barrier 2: Focus on individual performance with one pathway to success

How we evaluate performance in academia and its effects on the mental health of academics also deserves a critical review (16). In 2019, the national survey on labour conditions in the Netherlands indicated that 24% of teachers in higher education experienced burnout complaints (17). A similar mental health survey among US-based academia showed that in 2019, 32% of respondents felt stressed and in 2020, due to the COVID-19 pandemic, this number increased to 70%. More than half of the respondents in 2020 “were seriously considering changing their career or retiring early” (18). Another route for scientists to alleviate the pressure is to compromise on research integrity. While several systems are in place to enforce this integrity, the consistent manifestation of fraud and misconduct (19) has caused scholars to raise questions about these systems’ effectiveness.

While the dynamics in the scientific publishing industry might aggravate these issues (57–59), we should start by looking at the cause of this work pressure: our evaluation processes. The academic performance in our university is based on the quality of two activities: education and research. For individuals to be motivated to perform well, there needs to be an obvious connection between the person’s effort, the person’s performance, and the outcome of the evaluation process (20). In this section, we will argue that in our current evaluation system for research quality, all three connections are inadequately represented.

First, regarding the connection between effort and performance, the evaluation of academic performance is solely based on individual effort. Promotion and tenure criteria are based on the “belief that the typical faculty member can simultaneously achieve high or at least above average levels of productivity in both research and teaching” (16,60). However, this idea of the ‘complete faculty member’ is unrealistic ideal for

two reasons. First, when given two objectives – excellent research and excellent education – but not enough time to achieve both, a person needs to choose which one to focus on. More time spent on keeping teaching material current and up-to-date, innovative instructional techniques, and student contact hours will mean less time for running additional analyses, preparing for conferences, developing new research ideas, and applying for external grants. Second, academia is teamwork. While in some disciplines an academic can publish a single-author paper, building a research portfolio is never done in isolation. Similarly for education: while one faculty member can be responsible for developing the curriculum of a course, making sure that course runs smoothly requires efforts from other staff members, both academic and non-academic. Reducing the performance of a team to the individual effort will not only be demotivating for the other team members that are not being recognized but also for the individual whose success is interdependent on other staff who might be low performing (20).

Second, the adequacy of the indicators for research quality to connect effort and performance is questionable. In the next section on barrier 3, we will discuss the issues with our evaluation of educational performance. For research performance, the number of publications and journal rankings based on citation scores are currently the indicators used. These indicators are based solely on the publication of the research output. The peer review system depends on editors and reviewers to evaluate all aspects of research quality just by reading the paper. Investigations of this peer review system show reasons for concern regarding its ability to ensure scientific novelty (21,22), the ability to evaluate the substantiation of the paper’s claims (25), and the overall reliability and validity of these reviews (23,24,61). As a response, the open science movement advocates for transparency in all research steps to aid editors, reviewers, and the general scientific community in their evaluation of a paper (58). However, studies showed that lower quality of reviews might not be caused by missing information but by the inability of reviewers to process this information and detect errors (23–25). This dependence on editors and reviewers also disconnects evaluating research performance from the outcome of the evaluation. Our research performance is evaluated by multiple persons external to the university – i.e., the editors of journals – and the outcome of the evaluation is determined by another set of people internal to the university – i.e., the promotion committee – and the high level of

discretion of both parties creates ambiguity on what aspects research performance is assessed.

Barrier 3: Marginalizing our education activities

Academic education is not only a way to share our scientific knowledge but also ensures the provision of academically educated members of society (9). That role asks for other design requirements of our educational programs than when you regard it solely as a dissemination channel, such as stimulating autonomous thinking instead of knowledge reproduction, emphasizing self-reflection on normative and emotional aspects instead of only cognitive ones, and integrating knowledge of different disciplines instead of a mono-disciplinary view (26–29). The evaluation criteria of our educational programs and academic teachers are, however, not monitoring all these design requirements. Most of our education evaluations are based on student evaluations. This data is questionable for both its validity (i.e., do students have the expertise to evaluate all relevant aspects of educational quality?) (30), its reliability (i.e., are the evaluation results representative of the whole student body if less than 20% of the students fill in the survey?), and its proneness towards unconscious bias and discrimination (31–33). As the use of these education evaluations is openly questioned, it is questionable that in evaluations of our academic staff, these educational criteria are given the same priority as the research criteria. This trade-off is also seen in resource allocation: the time and resources spent on training our academics as teachers are perceived to be small compared to budgets for research training.

Barrier 4: Ignoring our other societal roles

Although academic research and education are our main activities, the university also has other roles in society. Our university is also an employer, a consumer of resources, a producer of materials, a user and producer of digital data, and a citizen of Rotterdam. Additionally, the university's physical spaces are part of an ecological system, promoting or hindering the survival of flora and fauna. Currently, there is no complete overview of the impact the university has on society through these roles nor of the risks associated with these roles, both inside-out and outside-in.

Competencies for socially robust knowledge

As indicated by the review, the EUR's seven strategic objectives need to be consolidated and better defined. We suggest that the board focuses on the type of knowledge that is currently snowed under in its organization: socially robust knowledge. Creating socially robust knowledge is not an easy feat. This knowledge needs to help society with tackling large issues, also referred to as grand challenges (13) or wicked problems (62). These grand challenges are complex, uncertain, and evaluative (13), three characteristics that need to be taken into account in our knowledge creation and teaching processes. We, therefore, advise the EUR board to strengthen four academic competencies that are necessary for socially robust knowledge but are lacking prominence in our organization: I) cross-disciplinary academia; II) anticipatory; III) reflexive academia, and IV) engaged academia.

Figure 1 provides an overview of the competencies for academic teams needed for research and education of scientifically and socially robust knowledge, which in turn contributes to a global society that is built on a solid social foundation and stays within the boundaries of our planet.

Cross-disciplinary academia

The complexity of grand challenges is caused by the interconnectedness of societal issues, the big number of people involved or affected by them, and how they affect behavior on the individual, organizational, regional, and global levels simultaneously (13). To tackle this complexity our theories and models need to use a multi-level perspective or systems thinking (35,63). Additionally, these challenges cannot be categorized as solely environmental, social, economic, or governance issues and thus cannot be tackled by one scientific discipline. The philosopher Latour once rhetorically asked how to create an adequate understanding of the hole in the ozone layer if only investigating it from one scientific discipline (64). COVID-19 also showed that pandemics are not just a medical matter but require attention from every scientific discipline, as shown by many of our colleagues (e.g., 65–72). Therefore, the scientific and socially robust knowledge required for tackling grand challenges needs to be created and educated in a cross-disciplinary manner with a systems perspective (6,13,34–36).

Anticipatory academia

The second ‘wicked’ characteristic of grand challenges is that the causes and consequences are fundamentally uncertain (63). This uncertainty is created by the non-linear causal chains, characterized by tipping points, punctuated equilibria, sudden shocks, and feedback loops (4,13,73). This uncertainty does not only mean that the theories and models we create and teach require non-linear relations, but also that we as academics cannot always predict the consequences of our activities. As Guston (37) indicated, “Innovation policy should encourage a dynamic scientific enterprise to contribute to identifiable social outcomes, such as in the areas of health, energy and the environment. But research occasionally generates radical changes that are unpredictable and often not associated with those pre-defined social goals.” To create a positive impact and prevent a negative impact – i.e., do good and don’t harm – academics should include anticipatory techniques in their research designs and teach these techniques to their students (38). These techniques ‘what if...’ questions are central: “what is [un]known, what is likely, what is plausible and what is possible” (38). Following design thinking, the answers to these questions should then be followed up by rethinking the design of our research or education or even a redirection of the complete academic portfolio (38). In the case of grand challenges, anticipatory academic research might require new methodologies, such as participatory scenario development, backcasting, and urban or living lab approaches (6). Similarly, in our academic education, students should be enabled to develop futures-thinking competencies (36,74).

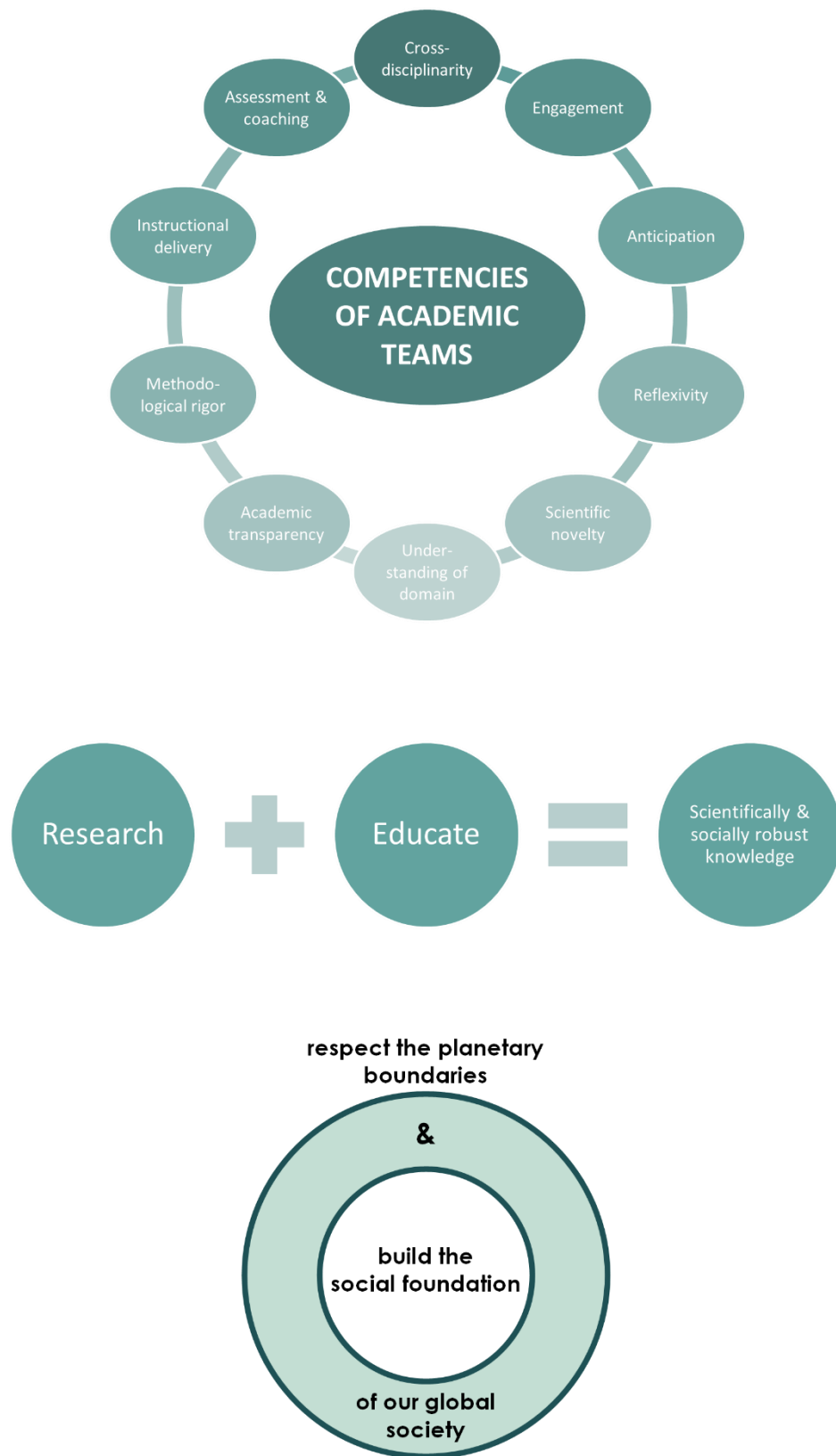


Figure 1 Visualization of the EUR's mission, as suggested in this report.

Reflexive academia

The third and final characteristic of grand challenges is their evaluative nature (13). In our society, there are multiple views of what our future world should look like (13), which are determined by each person's prioritization of values (39). While academics like to portray their activities as rational and value-free (40), any research or education activity has normative elements. Scientists underestimate the importance of normative and emotional expressions in tackling societal challenges. On the one hand, the process and results of research and education can influence the values, norms and emotions in society (39). For example, the knowledge that the COVID-19 virus was spread through the air has made wearing facemasks in public much more acceptable, but the formalization of this norm also caused anger in communities because of a fear of losing their autonomy. On the other hand, every design choice in research and education is based on a set of values and norms prescribing what is considered ethically acceptable, scientifically rigorous, and a relevant contribution to the existing (theoretical) understanding of our world (41). Reflexivity exercises (e.g., participatory evaluation, reflexive monitoring, participatory rural appraisal) as well as an overall reflexive attitude will help academics to become aware of the societal consequences of their work (12). Their values, norms, and emotions influence the knowledge created and taught, and thus which rules of the regime are upheld or challenged (5,42). Values-thinking and empathy are, therefore, also key competencies in teaching sustainability in higher education (74).

Engaged academia

Another aspect of the evaluative nature of grand challenges is the existence of multiple problem definitions. How these grand challenges impact a person's life depends on their location, social position, and age (75). Due to the diverse ways in which grand challenges are experienced, “[d]ifferent actors have different views about what the problem actually “is” and therefore what constitutes an acceptable solution” (13). Continuous stakeholder engagement is, therefore, crucial for creating a shared understanding of the challenge and its solutions (13,34).

When asking about their communication with society, academics often refer to their non-academic publications, education materials, and other media. Making scientific results accessible to audiences outside the scientific community is an important activity for universities (9). However, creating a shared understanding requires more than one-way communication. Stakeholder engagement should be

about “*opening up* visions, purposes, questions, and dilemmas to broad, collective deliberation through processes of dialogue, engagement, and debate, inviting and listening to wider perspectives from publics and diverse stakeholders” (43).

Engagement practices can be implemented with three motives (44,45). The first motive is instrumental, i.e., building trust for continuing a predetermined route and thus avoiding adverse public reactions (44). In these dialogues, societal actors are given a platform to speak, but this does not mean that their concerns are taken into consideration in decision-making (45). The dialogue is seen as an end and not as a means to an end. If stakeholders suspect the university to only have this instrumental motive, they will likely decline the invitation for the dialogue. Secondly, dialogues can be conducted with a substantive motive. By acknowledging that they do not have a monopoly on expertise, universities start seeing stakeholder engagement as an instrument for mutual learning and co-creation between academia and society (6,44,55). Without engagement, academic institutions run the risk of falling into the competency trap. New societal demands are then either undetected or perceived as irrelevant (46). The final motive for stakeholder engagement is normative: opening up is “the right thing to do for reasons of democracy, equity, and justice”(44). Our academic activities affect the lives of societal actors. This influence is both direct – in the case of our students and the participants in our studies – and indirect – for example, the citizens affected by the policies that we recommend or help to design (6). Involving them in the design of our research and education is thereby justified.

To reach the substantial and normative objectives of stakeholder engagement, it is important that the (invited) participants trust the process: they should perceive procedural justice (47). The level of inclusiveness, openness and quality of the dialogues are important for this trust (48). This engagement goes beyond opening the mic for them to voice their concerns. Instead, tackling grand challenges requires science and innovation *for society, with society* (15). This means inviting societal actors to be involved in the design and execution of our research and our education. These participating processes require not only interpersonal competencies (e.g., communication skills) but also strategic-thinking competencies (e.g., skills for designing innovative products, policies and governance structures) (74). These competencies should not just be educated to our

students but require training for our academic and non-academic staff.

Enable all modes of cross-disciplinarity

To stimulate cross-disciplinary research and education, the university needs to acknowledge that there are three modes of cross-disciplinarity (adjusted from Lykke et al. (49)):

- a) Multi-disciplinary = scientists of multiple disciplines collaborate in a research project or education program that uses methodologies and theoretical discourses from either discipline in a way that allows the disciplines to complement each other but maintains a boundary between them. The methods and theories maintain their original form and are used to explain a subject.
- b) Inter-disciplinary = scientists of multiple disciplines collaborate in a research project or education program that combines methodologies and theoretical discourses from both disciplines in a way that creates a bridge between the disciplines to start a cross-disciplinary dialogue. Adjusted or new methods and theories resulting from these cross-disciplinary collaborations are welcomed.
- c) Post-disciplinary = scientists collaborate in a research project or education program choosing methodologies and theoretical discourses from the full scientific spectrum that help answer their research question without being bounded by disciplinary traditions and norms, also referred to as transdisciplinarity. None of the disciplines can claim ownership for the research questions answered and the methods used in these cross-disciplinary collaborations. “The interaction of scientific disciplines is much more dynamic. Once theoretical consensus is attained, it cannot easily be reduced to disciplinary parts. In addition, research results diffuse (to problem contexts and practitioners) during the process of knowledge production.” (12)

Although cross-disciplinarity has long been on the agenda of the EUR, facilitating and stimulating such activities is not easy. The EUR is not the only institute struggling with this assignment, as explained by Hessels & Van Lente: “Research programs may formulate interdisciplinary or even transdisciplinary problems, but the research carried out under their headings is often of a disciplinary or multi-disciplinary kind” (12). Whether multi- and inter-disciplinary activities can be conducted within our disciplinary structured university depends on a) how flexible the practices and procedures within the disciplinary faculties are for facilitating new methodologies or

novel theoretical discourses, and b) if the performance indicators reward academics for research and education outside their discipline. However, for most of the inter-disciplinary and all of the post-disciplinary activities, new structures need to be created that cross the boundaries of the disciplinary faculties and invite EUR staff into a space without the disciplinary rules and restrictions. These spaces will have their policies for ensuring scientific integrity, research quality and social robustness. While some EUR staff might feel uncomfortable (at first), these spaces are ideal for stimulating creativity and experimenting with innovative ideas that call out the systemic flaws in our societal structures and provide alternative pathways towards a just and sustainable future for humankind.

Two steps towards the governance of social robustness

The Midterm Review recommended strengthening the governance of the execution of the strategy. The review panel indicated that there is a clear need for more central steering in the implementation of the strategy. Two elements of our university’s governance need to be considered when acting upon this recommendation. First, central steering is complex in a university with a decentralized governance structure. Our university has ten schools, of which seven faculties (ESE, ESL, ESHCC, ESSB, ESPhil, Erasmus MC, and RSM), two institutes (ISS and ESHPM) and one University College (see organogram below). These schools differ considerably in their institutional history, culture, and the number and background of students. While Strategy 2024 is a central strategy, each school also has its own strategy and objectives. Implementation of the central strategy will need to balance the need for collective action with the autonomy of the schools. Second, most of our staff are social scientists that study human behavior in some form or shape. To convince these scientists of the necessity of organizational change, the policies should be designed based on robust scientific evidence. Considering these two elements, we recommend that the board executes two steps: setting up a 1) cross-school working group on the evaluation process for academic excellence; 2) a cross-school institute for social robustness.

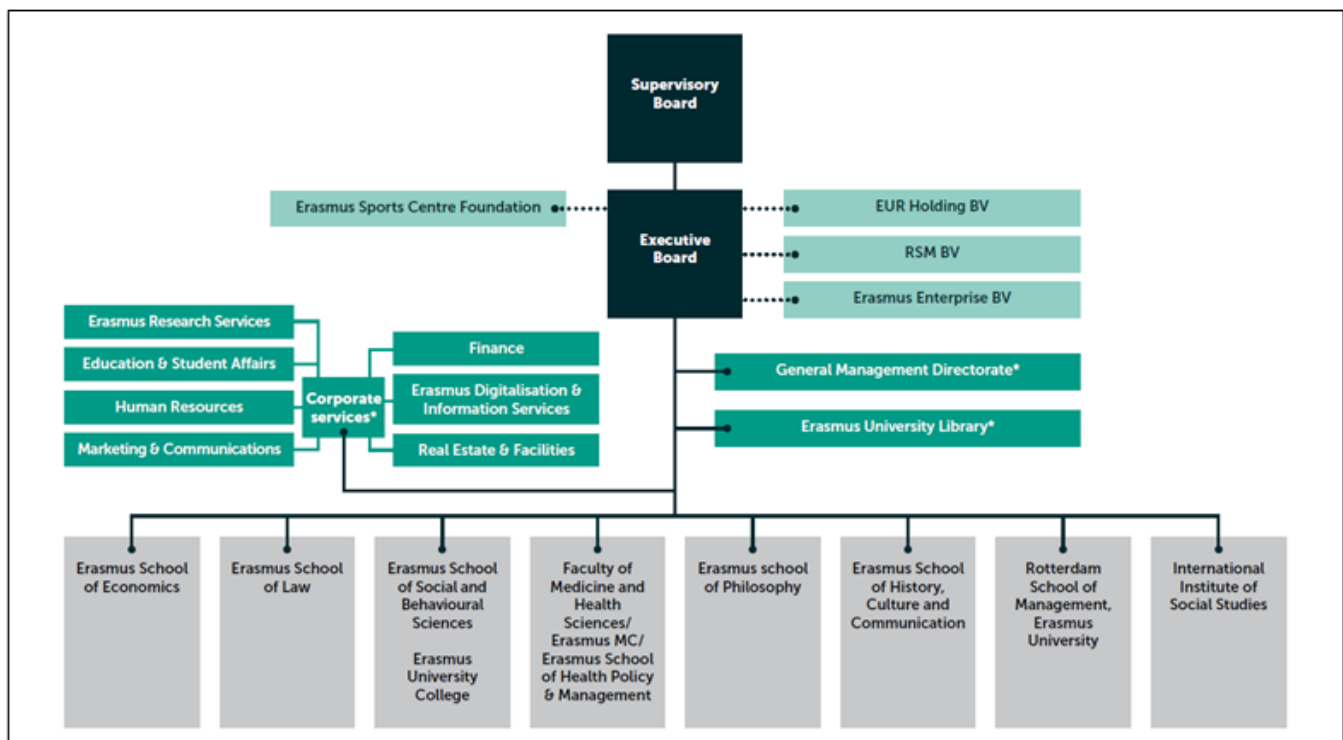


Figure 2 Organogram of Erasmus University Rotterdam

Step 1. Cross-school working group on the evaluation process for academic excellence

To ensure academic excellence that incorporates social robustness, Erasmus University will need to reflect on a) how its evaluation policies can recognize all ten competencies of academic work and b) can reward success as a result of teamwork within and between departments. While the Dutch national Recognition & Reward program has initiated reflection in our schools on the meaning of academic excellence and the idea of the ‘complete academic’, the implementation of this program has been slow. To revitalize the implementation, evaluation policies and processes need to be developed using bottom-up initiatives that are substantiated with scientific evidence. Therefore, EUR should set up a cross-school working group that utilizes its extensive in-house expertise, such as academics from RSM’s Department of Organization and Personnel Management, ESE’s department of Behavioral Economics, ESL’s experts on labor law, ESSB’s department of Work and Organizational Psychology, and ESPhil’s team on Structure of Science and Reality. Researchers from ESHCC’s cluster on Cultural Boundaries and Power, and ISS’s Social Protection and Inequality team need to be invited to make sure that the recommendations are built on notions of equality and inclusion. The working group will develop a set of recommendations for the management of the schools and will guide the schools in implementing and evaluating new recognition and reward policies. The working group will provide

policy recommendations for three purposes: a) for assessing the competencies at the team level; b) for evaluating the performance of an individual in a team setting; c) for recognizing and rewarding teamwork within and between departments and schools.

Step 2. A Cross-school Institute for Social Robustness

To implement a central strategy in a decentralized organization, there is a need for a space where people from the ten schools can meet and collaborate to build the four competencies for socially robust knowledge. The DIT platform was developed to experiment with such a cross-school space. This experiment is still ongoing, but already several lessons can be drawn from it. One overall conclusion that can be drawn is that while the informal platform provided space for cross-school activities, only a formal institute will remove the organizational restrictions hindering the development of durable cross-school collaborations. In this report, we will refer to it as the Cross-school Institute. See figure 3 below for a suggested structure of such a school. This Cross-school Institute could serve four purposes that are needed to implement the strategy and act upon the recommendations from the Midterm Review. Below we will provide a description of each of these four purposes and how the Cross-school Institute can be organized to achieve them.

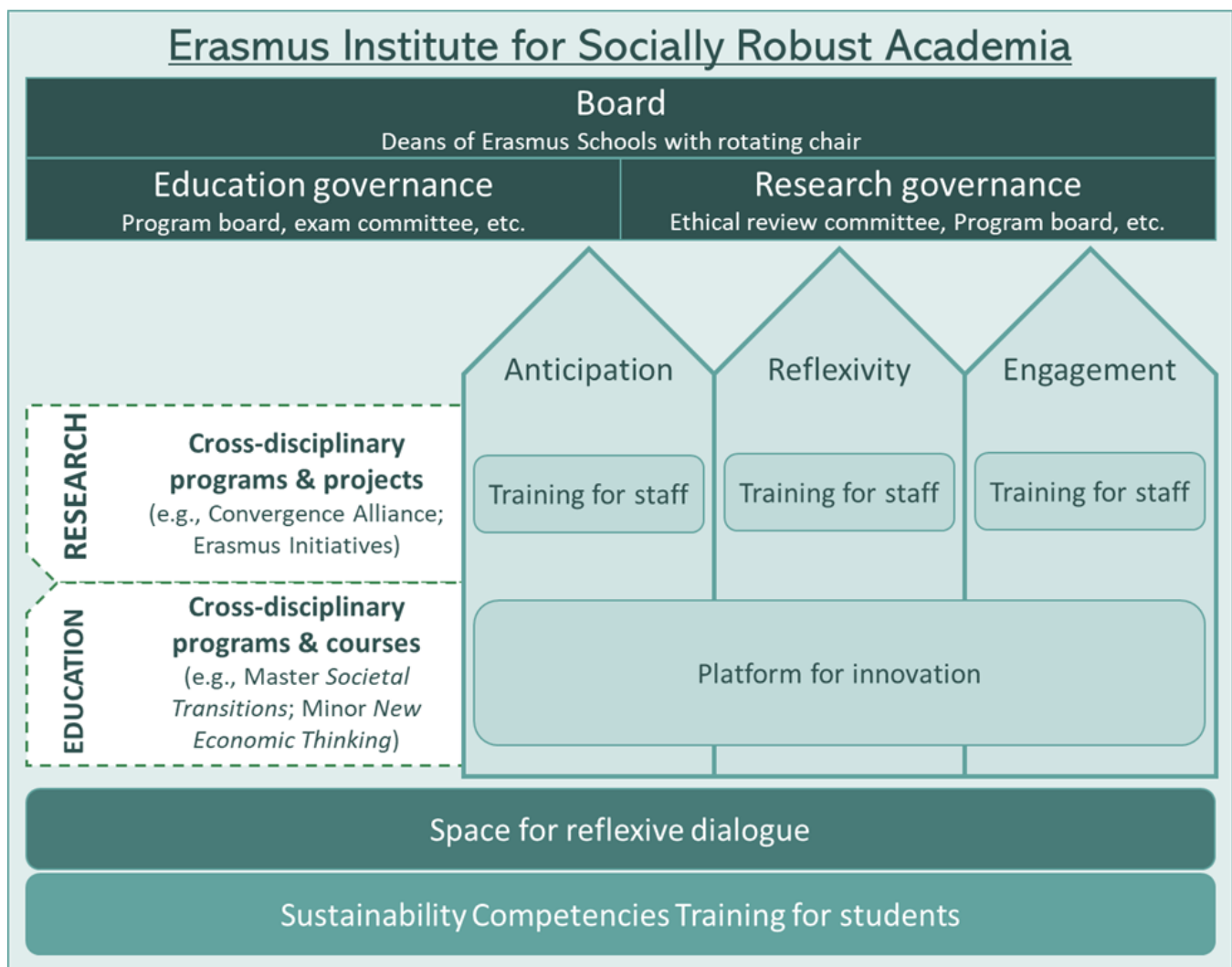


Figure 3 Structure of the Cross-school Institute

Purpose 1. Reflexive dialogues and strategies on social robustness

While in our university many scholars will acknowledge the need for socially robust knowledge, several tensions are perceived between the requirements for creating and teaching such knowledge and the traditional ways we conduct academic research and education. Some examples of such tensions are:

- a) The desired neutrality of science in the political arena conflicts with research calling for specific policy action (6).
- b) The need for autonomy in decision-making to ensure scientific integrity creates tension with the shared decision-making promoted by co-creation (6).
- c) The need for a controlled environment to produce generalizable results on the effectiveness of interventions contradicts the need for immersed research practices that experiment with interventions in a specific context or that facilitate the scaling up of effective interventions (76,77).
- d) The focus on disciplinary academic excellence hinders the institutionalization of cross-disciplinarity (76).
- e) The drive towards individual excellence and competition stifles the search for collaboration and co-creation (76).
- f) The emphasis on rationality and logic drowns out the importance of normative considerations and experiences of emotion in decision-making (78–80).
- g) The focus on knowledge-driven, academic scholarship in our education leaves not much time for developing competencies needed for tackling sustainability challenges (74,81).

The academic and non-academic staff needs to become aware of these tensions and the strategies that empower them to handle such tensions.

This awareness can be achieved by organizing dialogues between EUR's leadership – i.e., CvB and the Deans – and the staff of the ten schools and the professional services. In these dialogues, the academic

and non-academic staff will together discuss the meaning of socially robust knowledge. The two questions to answer are a) how socially robust knowledge is created and educated by their research and education activities, and b) which factors enable or hinder these activities. For professional services, a third question can be added on the other roles of the university (e.g., employer, consumer, etc., see Barrier 4 above).

To maintain this awareness among existing and new staff, we recommend that these dialogues are repeated annually or bi-annually. The Cross-school Institute could provide a safe and neutral space for such dialogues. The greatest challenge of such dialogues is that the participants are guided into a meaningful reflection and are provided with concrete strategies to follow up on these reflections. The DIT platform has facilitated similar conversations in the last years – such as recently an event on engaged research in collaboration with ERIM and the Round Table on Academic Freedom and Sustainability – and is happy to facilitate such dialogues in the future, for example, in collaboration with Studium Generale. Also, the experts in other strategic initiatives, such as ErasmusX and Impact at the Core, could be asked to share their experiences with these tensions and their strategies to handle them.

These dialogues should not just provide support for the individual employees in their goal for social robustness, they should also be input into school-level plans for social robustness. The four competencies for socially robust knowledge – cross-disciplinarity, anticipation, reflexivity, and engagement – should be present in each school. The management of each school should thus be asked to develop a plan for how they want to support the development of four competencies for social robustness in their teams, discussing the resources and structures required in their school and at the central level. The DIT platform has experts for each of these competencies and can support the management of the schools to make a customized plan. Additionally, experts from the Community for Learning & Innovation (CLI), Erasmus Research Services (ERS), and graduate schools could be consulted. In providing advice to the schools, the DIT team can make an inventory of which resources and capabilities should be available at the central level.

Purpose 2. Cross-school collaborations in research and education

To become a cross-school unit, the DIT platform recruited academic staff from several of the schools as DIT academics. By compensating the schools for the

academics' time, these academics were able to collaborate within DIT on the development of research and education and share experiences on innovations in their schools. While doing their work, the DIT academics can draw upon the services and expertise available both at the central level and within the schools. In this way, people from these professional services were able to connect with other service departments at central or school levels and academics from other schools. On the one hand, this facilitated sharing best practices and together finding solutions for tensions between and within the policies, structures, and services at the central and school level. Concrete outcomes of these collaborations are the new interdisciplinary master's *Societal Transitions*, an interdisciplinary minor course on transitions, and several cross-disciplinary research papers.

On the other hand, only having connections with the schools through one or two individuals does not create the long-lasting relationships needed for true ownership by the schools. Additionally, the differences between the policies, structures, and services at the school level hampered the DIT team in their collaborations. For example, in the development of the master's *Societal Transitions*, the DIT team wanted to make sure that the schools had co-ownership of the content, development, and quality of the curriculum. However, as required by regulations, the master's programme should be placed under the responsibility of a dean, should have a staff/student council, a programme board, and an examination board, and should comply with the examination regulations. In EUR, these governance structures are all arranged at the school level. Due to a lack of cross-school options for these structures, the master's governance was placed under ESPhil. This means that there is no formal role of the other schools in the master's governance. Furthermore, it necessitates the academics of ESPhil to evaluate course content and assessments from other disciplines – such as economics and social sciences – and teachers from these disciplines to conform to the rules and norms of ESPhil. Similar governance issues are experienced in cross-school research collaborations, where researchers need to choose which school's rules and norms to follow for scientific integrity and quality, which ethical committee to ask for permission, where to declare shared costs, and where to request shared research resources.

A central institute with cross-school governance structures is a solution to these issues. By having the deans of all schools as members of the institute's board

and rotating the chair position between them, the institute's activities, procedures, and structures are co-owned by all schools. The institute could house the governance structures for cross-school education programmes and research projects. A cross-school examination board and the ethical committee can be comprised of representatives of all schools, who co-develop the rules for examination and ethical compliance for cross-disciplinary collaboration. A task force can be set up with representatives of professional services from the central and school level to guide cross-disciplinary teams through the forest of procedures and provide the professional support these teams need.

Purpose 3. Training and innovation platforms for the competencies for social robustness

Besides facilitating a formal place for education and research collaborations, this institute could also be the place to consolidate strategic initiatives. As indicated by the Midterm Review “The strategy is given its concrete form and content by means of the ‘projects’. [...] The project portfolio is extensive. Dozens of projects have been set up and are at different stages of development, implementation, and assessment. [...] The panel understands the dilemma of providing sufficient scope for initiatives on the one hand and maintaining focus and control on the other but would like to highlight the importance of also prioritising this point.”

Each of the strategic initiatives relates to one of the ten competencies for academic teams (see figure 1 for overview of competencies). Six of these competencies are represented by professional services at the central level. For example, academic transparency is covered by the Open & Responsible Science services of Erasmus Research Services and instructional delivery is covered by CLI and Risbo. However, the four competencies that are crucial for social robustness (cross-disciplinarity, anticipation, reflexivity, and engagement) do not yet have a clear place in EUR and multiple strategic initiatives are working on these competencies. We suggest that these competencies would form the foundation of the Cross-school Institute.

To stimulate cross-disciplinarity, two portfolios would be developed for cross-school collaborations: one for research and one for education. Each portfolio would have a portfolio director, who would be the liaison between the project leads and the Board of the Institute. Existing cross-school collaborations – such

as the Convergence Alliance projects and the Erasmus Initiatives for research and the interdisciplinary master *Societal Transitions* and the multiple cross-disciplinary minor courses for education – could become part of these portfolios. To continue to grow these portfolios, the portfolio directors together with the funding officers of the Erasmus and education innovators of CLI would guide the development of new cross-disciplinary initiatives. The projects in these portfolios could allow EUR employees to explore the different levels of cross-disciplinarity.

The three other competencies would all have their strategic pillar. Each pillar has a training programme for staff to improve their skills for this competency. To develop training on the specific competencies, academics from the EUR schools and outside EUR would be asked to contribute. Their primary target audience is the academic staff of the EUR, but they could also be open to non-academic staff or staff from partner universities. Across the pillars, there is an innovation platform to experiment with new tools, instruments, and configurations that stimulate these competencies in research and education. The innovation projects in the innovation platforms can take any shape or form and can concern research as well as educational activities. Some innovations will feed into the cross-disciplinary projects, other innovations might be experiments within one school or small ad-hoc activities that require the expertise and facilities available in the pillars. The teams of the pillars are responsible for good collaboration with RISBO, CLI, the graduate schools, and professional services at the central and school level. The teams could be a combination of educational professionals and innovation accelerators, preferably with experience in the competencies (e.g., scenario thinking, anticipatory design, normative/emotional reflection, citizen science, open innovation/co-creation).

Purpose 4. Transformational, cross-disciplinary program on sustainability for students

In contributing to sustainable development, we should also support our students in becoming the changemakers needed for a sustainable and just future. Our university, therefore, needs a cross-school programme that trains our students in the knowledge and skills required for handling societal grand challenges. The first element of this programme as recommended by the Sustainability Working Group in 2020 is a cross-disciplinary, sustainability course for all EUR's bachelor students. Although adopted by the

board, the development of this course has stagnated due to a lack of resources and structural support. The second element of this programme would be a cross-school transformational skills training, using the five dimensions of the Inner Development Goals framework as a foundation: 1) Being – Relationship to Self, 2) Thinking – Cognitive skills, 3) Relating – Caring for Others and the World; 4) Collaborating – Social skills; 5) Acting – Driving Change (82). Like with the cross-disciplinary spaces, academics of all schools can contribute to training in all five dimensions. For governance purposes, each school adopts one of the five dimensions, resulting in the training for each skill dimension being co-owned by two schools. Building on its experience with the Reflection and Leadership tracks of the Master on societal transitions, the DIT team can lead the development of such training programs in collaboration with experts from other initiatives, such as Erasmus Verbindt, ErasmusX, Impact at the Core, and the community-based education projects run by the individual schools.

References

1. Sterken E, Noordegraaf M, Wilton S, Van der Chijs V, Aris A. Report midterm review strategy 2024. Rotterdam; 2022.
2. Williams A, Whiteman G, Kennedy S. Cross-Scale Systemic Resilience: Implications for Organization Studies. *Bus Soc*. 2021;60(1):95–124.
3. Schot J, Kanger L. Deep transitions: Emergence, acceleration, stabilization and directionality. *Res Policy* [Internet]. 2018;47(6):1045–59. Available from: <https://doi.org/10.1016/j.respol.2018.03.009>
4. Loorbach D, Frantzeskaki N, Avelino F. Sustainability Transitions Research: Transforming Science and Practice for Societal Change. *Annu Rev Environ Resour*. 2017;42:599–626.
5. Wittmayer JM, Schöpke N. Action, research and participation: roles of researchers in sustainability transitions. *Sustain Sci*. 2014;9(4):483–96.
6. Wittmayer JM, Loorbach D, Bogner KB, Hendlin YH, Hölscher K, Lavanga M, et al. Transformative Research: knowledge and action for just sustainability transitions. 2022.
7. Tett G. The great disruption has only just begun. *Financial Times* [Internet]. 2022 Dec 14; Available from: <https://www-ft-com.eur.idm.oclc.org/content/b8f75aed-123c-4c5b-8bd2-82442d96418b>
8. Brewer J. Why Are universities failing humanity? *Medium* [Internet]. 2017; Available from: https://medium.com/@joe_brewer/why-are-universities-failing-humanity-b94c78d42d56
9. Hessels LK, van Lente H, Smits R. In search of relevance: The changing contract between science and society. *Sci Public Policy* [Internet]. 2009 Jun 1 [cited 2015 Nov 11];36(5):387–401. Available from: <http://openurl.ingenta.com/content/xref?genre=article&iissn=0302-3427&volume=36&issue=5&spage=387>
10. KNAW, NFU, NWO, TO2-federatie, Vereniging Hogescholen, VSNU. Netherlands Code of Conduct for Research Integrity. 2018.
11. Rip A. De gans met de gouden eieren en andere maatschappelijke legitimaties van de moderne wetenschap. *Gids* [Internet]. 1982;Jaargang 1:285–95. Available from: https://www.dbnl.org/tekst/_gid001198201_01/_gid001198201_01_0032.php
12. Hessels LK, van Lente H. Re-thinking new knowledge production: A literature review and a research agenda. *Res Policy*. 2008;37(4):740–60.
13. Ferraro F, Etzion D, Gehman J. Tackling Grand Challenges Pragmatically: Robust Action Revisited. *Organ Stud* [Internet]. 2015 Mar 24;36(3):363–90. Available from: <http://journals.sagepub.com/doi/10.1177/0170840614563742>
14. Greco A, Sharma G, Grewatsch S, Bansal P. Cocreating Forward: How Researchers and Managers Can Address Wicked Problems Together. *Acad Manag Learn Educ* [Internet]. 2022 Jul 5; Available from: <http://journals.aom.org/doi/full/10.5465/amle.2021.0233>
15. Owen R, Macnaghten P, Stilgoe J. Responsible research and innovation: From science in society to science for society, with society. *Sci Public Policy* [Internet]. 2012 Dec 1 [cited 2015 Sep 2];39(6):751–60. Available from: <http://spp.oxfordjournals.org/cgi/doi/10.1093/scipol/scs093>
16. Padilla MA, Thompson JN. Burning Out Faculty at Doctoral Research Universities. *Stress Heal*. 2016;32(5):551–8.
17. AOb. Weer meer burn-outklachten in het onderwijs [Internet]. 2019 [cited 2023 Feb 1]. Available from:

- <https://www.aob.nl/nieuws/weer-meer-burn-outklachten-in-het-onderwijs/>
18. Gewin V. Pandemic burnout is rampant in academia. *Nature* [Internet]. 2021 Mar 18;591(7850):489–91. Available from: <https://www.nature.com/articles/d41586-021-00663-2>
 19. Retraction Watch. The Retraction Watch Leaderboard [Internet]. 2022. Available from: <https://retractionwatch.com/the-retraction-watch-leaderboard/>
 20. Garbers Y, Konradt U. The effect of financial incentives on performance: A quantitative review of individual and team-based financial incentives. *J Occup Organ Psychol*. 2014;87(1):102–37.
 21. Chu JSG, Evans JA. Slowed canonical progress in large fields of science. *Proc Natl Acad Sci U S A*. 2021;118(41):1–5.
 22. Bloom N, Jones CI, van Reenen J, Webb M. Are ideas getting harder to find?†. *Am Econ Rev*. 2020;110(4):1104–44.
 23. Schroter S, Black N, Evans S, Godlee F, Osorio L, Smith R. What errors do peer reviewers detect, and does training improve their ability to detect them? *J R Soc Med*. 2008;101(10):507–14.
 24. Godlee F, Gale CR, Martyn CN. Effect on the quality of peer review of blinding reviewers and asking them to sign their reports. A randomized controlled trial. *Jama*. 1998;280(3):237–40.
 25. Ioannidis JPA. Why Most Published Research Findings Are False. *PLoS Med* [Internet]. 2005 Aug 30;2(8):e124. Available from: <https://dx.plos.org/10.1371/journal.pmed.0020124>
 26. Ojala M. Emotional Awareness: On the Importance of Including Emotional Aspects in Education for Sustainable Development (ESD). *J Educ Sustain Dev*. 2013;7(2):167–82.
 27. Mezirow J. Transformative Learning as Discourse. *J Transform Educ*. 2003;1(1):58–63.
 28. Taylor EW. The Theory and Practice of Transformative Learning: A Critical Review [Internet]. Vol. 374, Information Series. Columbus, OH; 1998. Available from: <https://eric.ed.gov/?id=ED423422>
 29. Vasques A. Transformative Education at Erasmus University Rotterdam - Inner development for positive impact education. Rotterdam; 2023.
 30. Boring A, Ottoboni K, Stark P. Student Evaluations of Teaching (Mostly) Do Not Measure Teaching Effectiveness. *Sci Res*. 2016;1–11.
 31. Boring A, Philippe A. Reducing discrimination in the field: Evidence from an awareness raising intervention targeting gender biases in student evaluations of teaching. *J Public Econ* [Internet]. 2021;193:104323. Available from: <https://doi.org/10.1016/j.jpubeco.2020.104323> \
 32. Fan Y, Shepherd LJ, Slavich E, Waters D, Stone M, Abel R, et al. Gender and cultural bias in student evaluations: Why representation matters. EWEN HH, editor. *PLoS One* [Internet]. 2019 Feb 13;14(2):e0209749. Available from: <https://dx.plos.org/10.1371/journal.pone.0209749>
 33. Boring A. Gender biases in student evaluations of teaching. *J Public Econ* [Internet]. 2017 Jan;145:27–41. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0047272716301591>
 34. Head BW. Wicked Problems in Public Policy. Vol. 3, Public Policy. 2008. 101–118 p.
 35. Grewatsch S, Kennedy S, Bansal P. Tackling wicked problems in strategic management with systems thinking. *Strateg Organ*. 2021;147612702110386.
 36. Wiek A, Withycombe L, Redman CL. Key competencies in sustainability: A reference framework for academic program development. *Sustain Sci*. 2011;6(2):203–18.
 37. Guston DH. Innovation policy: Not just a jumbo shrimp. *Nature* [Internet]. 2008 Aug [cited 2016 May 10];454(7207):940–1. Available from: <http://www.nature.com/doi/10.1038/454940a>
 38. Stilgoe J, Owen R, Macnaghten P. Developing a framework for responsible innovation. *Res Policy* [Internet]. 2013 Nov 2 [cited 2015 Sep 30];42(9):1568–80. Available from: <http://linkinghub.elsevier.com/retrieve/pii/S0048733313000930>
 39. Garst J, Blok V, Branzei O, Jansen L, Omta OSWF. Toward a Value-Sensitive Absorptive Capacity Framework: Navigating Intervalue and Intravalue Conflicts to Answer the Societal Call for Health. *Bus Soc* [Internet]. 2021 Jul 20;60(6):1349–86. Available from:

- <http://journals.sagepub.com/doi/10.1177/0007650319876108>
40. Vogt M, Weber C. The role of universities in a sustainable society. Why value-free research is neither possible nor desirable. *Sustain.* 2020;12(7).
 41. von Schomberg R. A Vision of Responsible Research and Innovation. In: *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society* [Internet]. Chichester, UK: John Wiley & Sons, Ltd; 2013. p. 51–74. Available from: <http://doi.wiley.com/10.1002/9781118551424.ch3>
 42. Stirling A. Precaution, Foresight and Sustainability. In: *Reflexive Governance for Sustainable Development*. 2006.
 43. Owen R, Stilgoe J, Macnaghten P, Gorman M, Fisher E, Guston D. A Framework for Responsible Innovation. In: *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*. Chichester, UK: John Wiley & Sons, Ltd; 2013. p. 27–50.
 44. Sykes K, Macnaghten P. Responsible Innovation - Opening Up Dialogue and Debate. In: *Responsible Innovation* [Internet]. Chichester, UK: John Wiley & Sons, Ltd; 2013. p. 85–107. Available from: <http://doi.wiley.com/10.1002/9781118551424.ch5>
 45. Stirling A. “Opening up” and “closing down”: Power, participation, and pluralism in the social appraisal of technology. *Sci Technol Hum Values* [Internet]. 2008 Mar 12 [cited 2015 Sep 2];33(2):262–94. Available from: <http://sth.sagepub.com/cgi/doi/10.1177/0162243907311265>
 46. Zietsma C, Winn M, Branzei O, Vertinsky I. The War of the Woods: Facilitators and Impediments of Organizational Learning Processes. *Br J Manag* [Internet]. 2002 Sep [cited 2018 Jul 13];13(S2):S61–74. Available from: <http://doi.wiley.com/10.1111/1467-8551.13.s2.6>
 47. de Coninck HC. System change, not climate change. *Technische Universiteit Eindhoven*; 2022.
 48. Callon M, Lascoumes P, Barthe Y. Hybrid forums. In: *Acting in an Uncertain World: An Essay on Technical Democracy*. Cambridge, Massachusetts: The MIT Press.; 2009. p. 13–36.
 49. Lykke N. A Postdisciplinary Discipline. In: *Feminist Studies - A Guide to Intersectional Theory, Methodology and Writing* [Internet]. New York, NY, USA: Routledge; 2010. p. 14–30. Available from: <https://www.taylorfrancis.com/books/9781136978999>
 50. SOIF. Framework for Intergenerational Fairness - Pilot Report December 2020 [Internet]. 2020. Available from: www.soif.org.uk/igf
 51. Loo R. The Delphi method: A powerful tool for strategic management. *Policing.* 2002;25(4):762–9.
 52. Johansen I. Scenario modelling with morphological analysis. *Technol Forecast Soc Change* [Internet]. 2018;126(May 2017):116–25. Available from: <https://doi.org/10.1016/j.techfore.2017.05.016>
 53. Ramos J. FUTURES ACTION MODEL FOR POLICY WIND TUNNELING [Internet]. Action Foresight. 2017. Available from: <https://actionforesight.net/futures-action-model-for-policy-wind-tunneling/>
 54. Raworth K. A Doughnut for the Anthropocene: humanity’s compass in the 21st century. *Lancet Planet Heal* [Internet]. 2017 May;1(2):e48–9. Available from: [http://dx.doi.org/10.1016/S2542-5196\(17\)30028-1](http://dx.doi.org/10.1016/S2542-5196(17)30028-1)
 55. Hart DD, Bell KP, Lindenfeld LA, Jain S, Johnson TR, Ranco D, et al. Strengthening the role of universities in addressing sustainability challenges: The Mitchell Center For Sustainability Solutions as an institutional experiment. *Ecol Soc.* 2015;20(2).
 56. Guston DH. *Between Politics and Science: Assuring the Integrity and Productivity of Research*. Cambridge: Cambridge University Press; 2000.
 57. Monbiot G. Scientific publishing is a rip-off. We fund the research – it should be free. *The Guardian* [Internet]. 2018 Sep 13; Available from: <https://www.theguardian.com/commentisfree/2018/sep/13/scientific-publishing-rip-off-taxpayers-fund-research>
 58. Ross-Hellauer T. Open science, done wrong, will compound inequities. *Nature.* 2022;603(7901):363.
 59. Larivière V, Haustein S, Mongeon P. The oligopoly of academic publishers in the digital era. *PLoS One.* 2015;10(6):1–15.

60. Fairweather JS. The Mythologies of Faculty Productivity: Implications for Institutional Policy and Decision Making. *J Higher Educ.* 2002;73(1):26–48.
61. Bornmann L, Mutz R, Daniel H-D. A Reliability-Generalization Study of Journal Peer Reviews: A Multilevel Meta-Analysis of Inter-Rater Reliability and Its Determinants. Rogers S, editor. *PLoS One* [Internet]. 2010 Dec 14;5(12):e14331. Available from: <https://dx.plos.org/10.1371/journal.pone.0014331>
62. Rittel HWJ, Webber MM. Dilemmas in a general theory of planning. *Policy Sci* [Internet]. 1973 Jun [cited 2015 Sep 14];4(2):155–69. Available from: <http://link.springer.com/10.1007/BF01405730>
63. Geels FW. Micro-foundations of the multi-level perspective on socio-technical transitions: Developing a multi-dimensional model of agency through crossovers between social constructivism, evolutionary economics and neo-institutional theory. *Technol Forecast Soc Change* [Internet]. 2020;152(October 2018):119894. Available from: <https://doi.org/10.1016/j.techfore.2019.119894>
64. Latour B. *We have never been modern*. New York, NY: Harvester Wheatsheaf; 1993.
65. Bülow A, Keijsers L, Boele S, van Roekel E, Denissen JJA. Parenting adolescents in times of a pandemic: Changes in relationship quality, autonomy support, and parental control? *Dev Psychol* [Internet]. 2021 Oct;57(10):1582–96. Available from: <http://doi.apa.org/getdoi.cfm?doi=10.1037/dev0001208>
66. Haverland M, van der Veer R, Onderco M. Is this crisis different? Attitudes towards EU fiscal transfers in the wake of the COVID-19 pandemic. *Eur Union Polit.* 2022;23(4):680–99.
67. Hendlin YH. The Law of the Excluded Middle: Discourse as Casualty of the Post-Truth Extremist Response to the Coronavirus Pandemic. *Law, Cult Humanit.* 2021;
68. Long D, Bonsel GJ, Lubetkin EI, Janssen MF, Haagsma JA. Anxiety, depression, and social connectedness among the general population of eight countries during the COVID-19 pandemic. *Arch Public Heal* [Internet]. 2022;80(1):1–16. Available from: <https://doi.org/10.1186/s13690-022-00990-4>
69. Dekker L, Hooijman L, Louwerse A, Visser K, Bastiaansen D, Ten Hoopen L, et al. Impact of the COVID-19 pandemic on children and adolescents with autism spectrum disorder and their families: A mixed-methods study protocol. *BMJ Open.* 2022;12(1):1–9.
70. De Backer M, Felten P, Kirndörfer E, Kox M, Finlay R. ‘Their lives are even more on hold now’: migrants’ experiences of waiting and immobility during the COVID-19 pandemic. *Soc Cult Geogr* [Internet]. 2022;00(00):1–17. Available from: <https://doi.org/10.1080/14649365.2022.2111699>
71. Aarestrup FM, Bonten M, Koopmans M. Pandemics— One Health preparedness for the next. *Lancet Reg Heal - Eur* [Internet]. 2021 Oct;9:100210. Available from: <https://doi.org/10.1016/j.lanepe.2021.100210>
72. Cubides Kovacsics MI, Santos W, Siegmann KA. Sex Workers’ Everyday Security in the Netherlands and the Impact of COVID-19. *Sex Res Soc Policy* [Internet]. 2022 May 25;(689). Available from: <https://link.springer.com/10.1007/s13178-022-00729-4>
73. Williams A, Kennedy S, Philipp F, Whiteman G. Systems thinking: A review of sustainability management research. *J Clean Prod* [Internet]. 2017;148:866–81. Available from: <http://dx.doi.org/10.1016/j.jclepro.2017.02.002>
74. Brundijs K, Barth M, Cebrián G, Cohen M, Diaz L, Doucette-Remington S, et al. Key competencies in sustainability in higher education—toward an agreed-upon reference framework. *Sustain Sci* [Internet]. 2021;16(1):13–29. Available from: <https://doi.org/10.1007/s11625-020-00838-2>
75. Hahn T, Pinkse J, Preuss L, Figge F. Tensions in Corporate Sustainability: Towards an Integrative Framework. *J Bus Ethics* [Internet]. 2015 Mar 9;127(2):297–316. Available from: <http://link.springer.com/10.1007/s10551-014-2047-5>
76. Kump B, Wittmayer JM, Bogner KB, Beekman M. Engaged researchers’ agency in an academic system in transition [Internet]. Available from: <https://www.eur.nl/en/media/2022-10-engaged-scholarship-erasmus-universityobstacles-and-lessons-change>
77. Garst J, L’Heveder R, Siminerio LM, Motala AA, Gabbay RA, Chaney D, et al. Sustaining diabetes prevention and care interventions: A

multiple case study of translational research projects. *Diabetes Res Clin Pract* [Internet]. 2017 Aug 1;130:67–76. Available from: <http://dx.doi.org/10.1016/j.diabres.2017.04.025>

78. Berlant L. *Cruel optimism*. Durham, NC: Duke University Press; 2011.
79. KNAW. *The Pandemic Academic - how COVID-19 has impacted the research community*. Amsterdam; 2022.
80. Stevens TM, Aarts N, Dewulf A. Using emotions to frame issues and identities in conflict: Farmer movements on social media. *Negot Confl Manag Res*. 2021;14(2):75–93.
81. Boström M, Andersson E, Berg M, Gustafsson K, Gustavsson E, Hysing E, et al. Conditions for transformative learning for sustainable development: A theoretical review and approach. *Sustain*. 2018;10(12).
82. Jordan T, Reams J, Stålné K, Greca S, Henriksson JA, Björkman T, et al. *Inner Development Goals: Background, method and the IDG framework* [Internet]. Stockholm, Sweden; 2021. Available from: <https://www.innerdevelopmentgoals.org/framework>

DESIGN IMPACT TRANSITION PLATFORM

Design Impact Transition (DIT) platform

Erasmus University Rotterdam

Burgemeester Oudlaan 50

3062PA Rotterdam

dit@eur.nl

[Website](#)