REPORT

Cross-panel report
Sustainable Development

Panel chair:
Prof. Janet Hering

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Cross-panel report, sustainable development

KTH's Research Assessment Exercise (RAE) 2021

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Table of Contents

Introduction

This cross-panel report is part of the Research Assessment Exercise (RAE) 2021 at KTH Royal Institute of Technology. The report is based on parts of self-evaluations from nine research panels, other documents and interviews. The report aims to provide recommendations and feedback to the involved departments and KTH.

Experts in the cross-panel on sustainability:

- [Prof. Janet Hering,](#) Swiss Federal Institute of Aquatic Science and Technology, chair

- [Dr. Wolfgang Hribernik](#), AIT Austrian Institute of Technology GmbH

- [Prof. Magnus Breitholtz,](#) Stockholm University

The three experts have also had discussions with one representative from each of the nine research panels looking especially on issues related to sustainability within their respective panel. They are:

- Panel 1: Dr. Christopher Kennedy, University of Victoria, Canada
- Panel 2: Prof. Roland Wohlgemuth, Lodz University of Technology, Poland
- Panel 3: Prof. Em. Anne-Marie Hermansson, Chalmers University of Technology, Sweden
- Panel 4: Prof. Jodi Forlizzi, Carnegie Mellon University, USA
- Panel 5: Prof. Richard Goossens, Delft University of Technology, the Netherlands
- Panel 6: Prof. Em. Kevin Bennett, University of Cape Town, South Africa
- Panel 7: Prof. Dinesh Verma, Stevens Institute of Technology, USA
- Panel 8: Prof. Shelley L. Anna, Carnegie Mellon University, USA
- Panel 9: Dr. David Sonnek, Industrifonden, Sweden

Coordinator for the cross-panel on sustainability:

- Dr. Karin Larsdotter, KTH Royal Institute of Technology

Part A: Summary of the panel

0. Introductory comment

Sustainability and sustainable development demand a breadth and depth of integration that are profoundly challenging for universities. Sustainability must be incorporated not only as the subject of research and teaching but also in principles guiding how research, teaching, and all supporting university operations are conducted.

The embedding of sustainability in research and teaching demands a level of integration across disciplines that challenges the disciplinary structure and incentive systems of academics, both within universities and in professional scientific communities. In university operations, implementing sustainable practices can lead to co-benefits (e.g., reduced costs from increased energy efficiency) but also to conflicts between the pursuit of sustainability and other interests, including building for campus expansion and international air travel for professional advancement and visibility.

The KTH leadership is to be commended for elaborating an ambitious policy on sustainable development and developing measures for the implementation of this policy. There does appear, however, to be some gaps in reconciling 'high level' policy with actual 'lived experience' in research and associated professional activities. There would be an exciting opportunity to address these gaps by working with and strategically supporting existing faculty engagement, aligning (as much as possible) with the intrinsic incentives in the academic system, focusing on content to deepen the information obtained through data collection (e.g., bibliometric analysis), and leveraging synergies across policy goals (e.g., sustainable development and impact, sustainable development and gender equality).

1. Feedback on the formulated visions and strategies
That can lead to increased quality of research at KTH and increased impact related to sustainable development

The ambitious commitment by the KTH leadership on sustainable development is well articulated in the KTH policy document. Once again, this ambition is to be commended. It is also commendable that the commitment by the KTH leadership has motivated substantial relevant activity in research and education as well as the embedding of sustainability as a strategic objective for various Schools, Departments, and Research Platforms.

In support of its policy for sustainable development, KTH has established a Sustainability Office headed by a Vice President and a Sustainability Manager. KTH also participates in the Times Higher Education (THE) Impact Assessment and has commissioned an analysis of the alignment of its research with the Sustainable Development Goals (SDGs) from Elsevier. These are valuable and important measures, but they need to be used carefully so as to bridge – and not to expand – the apparent gaps between 'high level' policy and actual 'lived experience' in research, education, and associated professional activities.

The KTH leadership has established and funded Research Platforms as a means of promoting cross-disciplinary research, including research for sustainable development. The incorporation of sustainability in the strategy of the Research Platforms does not appear to be widely recognized by the faculty, thus limiting the effectiveness of the Research Platforms in this regard (see also section A.4).

2. Feedback on ideas and recommendations for essential steps
To be taken to renew research areas related to sustainable development

Efforts to renew and expand research areas related to sustainable development will have the greatest chance of success if they work with, rather than against, the strong tradition of 'bottom-up' faculty initiative and engagement. Running projects, initiatives, and programs that provide excellent examples of research for sustainable development could be promoted by the KTH leadership (e.g., through the Sustainability Office). In this context, it would be particularly important to understand what the engaged faculty perceive as the greatest barriers to expanding such activities (see section B.2). This would help to identify measures that would be effective in renewing and expanding research areas related to sustainable development (see also section A.4).

Successful activities related to sustainable development (see section B.5) could serve as the basis for 'flagship' programs and/or to pursue funding opportunities through EU programs. Sustainability and sustainable development are prominent in agenda setting in research policy at the EU level. Aligning with this activity could provide a strategic advantage for KTH. Some targeted support in the proposal writing and submission process might be needed to enable faculty engagement (see section B.2).

Similarly, the Departments or Schools in which successful research activities related to sustainable development are based could be targeted for faculty recruitment and advancement. Criteria that reflect the importance of sustainable development could be included in documents regulating faculty hiring and promotion. The hiring of new faculty (with interests in research for sustainable development) could be a powerful lever to align KTH research more closely with its policy on sustainable development, as well as to address deficits in diversity (see sections A.3, B.2, and B.4).

3. Feedback on potential links and synergies
Within KTH in relation to sustainable development

Substantial opportunities exist to leverage synergies across KTH policy goals, specifically with regard to impact and gender equality. Impact is essential to achieving the SDGs. Thus, impact cases that align with the SDGs (see section B.5) offer an important complement to the bibliometric assessment of SDG alignment (see section A.4). Similarly, KTH could emphasize SDG 5 (gender equality) in strengthening efforts to improve gender diversity, especially among the faculty (see sections B.2 and B.4).

The EU Horizon Europe programs, particularly those addressing the European Green Deal, offer synergistic opportunities to strengthen KTH research related to sustainable development (see also section A.2).

An exciting opportunity for synergies arises from the 17 SDGs themselves. Despite the recognition that the 17 SDGs are integrated (with action in one area affecting outcomes in others), there is a tendency to focus on alignment with individual goals. (Note that this tendency pervades the THE Impact assessment and the Elsevier bibliometric study). In identifying and developing solutions that address individual SDGs, KTH should recognize the imperative to integrate across the SDGs and thus avoid unintended and undesirable consequences. This would stimulate interdisciplinary fundamental research as an essential source for innovation and impact. Again, the opportunity could be taken to build on successful examples derived from 'bottom-up' faculty engagement (see section B.5).

4. Recommendations

On overall university level in relation to sustainable development

With its policy on sustainable development and Sustainability Office, KTH has the essential elements in place to be an academic leader in sustainable development. With its strength as a leading technical university, KTH is well positioned to engage with industry and the local and regional community in promoting the implementation of research on sustainable development. What is needed are measures that will broaden and deepen the strong, existing faculty engagement with the KTH sustainable development policy and align operations with research and education for sustainable development.

Recommendation 1: Strengthen the Sustainability Office and its links with campus operations. The Sustainability Office and its Vice President have excellent visibility and are well respected on campus. By strengthening the Sustainability Office and particularly by increasing its budget so that it could offer meaningful incentives to faculty, KTH could effectively leverage and expand current faculty interest and engagement. For example, the Sustainability Office could make awards to recognize outstanding accomplishments in research for sustainable development and for professional practices that promote sustainability (see also section B.1). The Vice President for Sustainability could be given a mandate to work more closely with campus operations so that the environmental management system would promote best practices for sustainability on campus. Integration of the environmental management system with, for example, procurement systems could support the implementation of sustainability goals (such as reducing emissions from international air travel and purchasing of services and goods). The Vice President for Sustainability could also be given a mandate to establish a board (or leadership council) that would include as members the Sustainability Manager and KTH faculty with demonstrated accomplishment in implementing the KTH policy on sustainable development. This would serve both to increase the intellectual engagement of the faculty with the Sustainability Office and to provide recognition for faculty who would be role models for their peers.

Recommendation 2: Establish KTH as an *intellectual* leader in sustainable development. The assessment of KTH's performance in sustainable development (i.e., through the THE Impact Assessment and Elsevier bibliometric assessment) provide useful input for the faculty and KTH leadership. But their bureaucratic nature likely discourages, rather than encouraging, the intellectual engagement of the faculty. Meaningful faculty engagement (e.g., through a Sustainability Office board or leadership council) could stimulate the use of the SDGs to motivate cross-disciplinary research and to identify critical research gaps. Integration across the SDGs – so that they are treated as a collective goal – could become an identifying feature of KTH leadership in sustainable development.

Recommendation 3: Examine the role of the Research Platforms in promoting sustainability. Sustainability is embedded in the strategies of the Research Platforms Digitalization, Energy, Industrial Transformation, and Transport. (Note that we did not meet with the other Research Platforms). This has the potential to be an excellent resource for the KTH research community, but it appears to be under-appreciated and under-utilized by the faculty. A survey of faculty attitudes and expectations could be valuable in identifying opportunities to strengthen the role of the Research Platforms in promoting the cross-disciplinary research that is essential for sustainable development. Such a survey could also help to determine whether the support currently offered by the Research Platforms is the best match for faculty needs (see also section B.2).

Part B: Report on specific questions

1. Future strategies

*KTH strives to be a leading technical university in research for sustainable development. What are your **recommendations** for future strategies for KTH in general, but also in relation to central initiatives, initiatives at school level, initiatives in other parts of the university, within the administration/support structures, incentive structures or other ideas?*

(Please see also sections A.2 and A.4.)

KTH has the essential strategic elements in place to position itself as a leading technical university in research for sustainable development. What is needed is to promote coherence between 'high level' policy and the actual 'lived experience' in research, education, and associated professional activities. This can only be accomplished by engaging the faculty intellectually, understanding the constraints that faculty experience or perceive, and – as much as possible – working with the incentives of the academic system and the scientific community.

1. Enhancing external funding opportunities. KTH could, through its central administration and leadership, increase its efforts to assist faculty in acquiring external funding for research in sustainable development. This would include providing support to submit proposals for EU Horizon Europe programs, particularly those addressing the European Green Deal. KTH could also make efforts to ensure that faculty are aware of new and/or lesser-known opportunities such as the multilateral, transdisciplinary Collaborative Research Actions (CRA) funded by the Belmont Forum. Lastly, KTH could engage with external funding agencies to identify and critique policies that hinder the type of cross-disciplinary research that is essential for research for sustainable development.

2. Promoting faculty engagement and intellectual identification with 'high level' policy on sustainable development. Despite sincere faculty interest and engagement in research for sustainable development, the current measures in place for tracking relevant activities can be perceived as rote and burdensome. Three approaches could be taken to stimulate intellectual engagement of the faculty:

    a. Recognizing and (financially) rewarding faculty accomplishments in relevant research and professional practices, with emphasis on activities that integrate across the SDGs.

    b. Engaging faculty intellectually in strategic planning (e.g., through a faculty leadership council or faculty advisory board for the Sustainability Office).

    c. Linking faculty recruitment, hiring, and promotion to the renewal and expansion of research areas related to sustainable development.

3. Strengthening links between sustainability management and operations at the School and/or Department level. Participation by Sustainability Strategists in business meetings at the School and/or Department level could be a valuable complement to (*post hoc*) auditing.

2. Gaps and Opportunities

*Given the global challenges and the strengths of KTH, are the strengths used in a way that they maximize the contribution to sustainable development? Are there **gaps**, e.g., research areas where the strengths of KTH could have a great positive impact on sustainable development, if implemented? Are there **missed opportunities**, e.g., by increasing synergies between different research areas?*

The most significant gap or missed opportunity is related to the general lack of integration across the SDGs. This may reflect the dependence on assessments that emphasize individual SDGs (e.g., THE Impact Assessment, Elsevier bibliometric assessment). Counter-examples (such as the project "AI and the SDGs") could be highlighted as a model for integrating across the SDGs.

The Research Platforms appear not to be sufficiently recognized by the faculty as potential enablers of cross-disciplinary collaboration for sustainable development (see also Section A.4). For example, the Research Platform on Industrial Transformation include sectoral foci on food- and bioproduction yet food sustainability was identified by one researcher as a gap in KTH's sustainability effort.

Strengthening cooperation between the Sustainability and Equality Offices could help to identify research opportunities relating to SDG 5 (gender equality) and to promote faculty diversity. Although KTH participates in the THE Impact ranking, this exercise does not include SDG 5. Transparent reporting on diversity statistics (i.e., on the Equality Office website) could promote best practices across Schools and Departments. Both diversity and sustainable development could be incorporated in criteria for faculty hiring and promotion (see also section A.2).

3. Cross-disciplinarity

*Do you see areas that would benefit from new **cross-disciplinary collaborations** within KTH but also with other universities, and that could lead to more external funding related to sustainable development?*

Cross-disciplinary collaborations would be naturally stimulated by a focus on integrating across the 17 SDGs (see also sections A.3 and A.4). Especially for a technical university, such integration is needed to avoid unintended consequences of a narrow focus on individual SDGs. Positive examples from 'bottom up' initiatives (see section B.5) could be used as models and the basis for strategic discussion among the faculty.

Faculty in the Schools and Departments could be mandated to work with the Sustainability Office to identify opportunities for cross-disciplinary collaborations that would support research related to sustainable development. This could very well become the basis for successful competition for funding through EU Horizon Europe programs, particularly those supporting the European Green Deal (see sections A.2 and A.3).

The Research Platforms could potentially play a larger role in stimulating cross-disciplinary collaboration relating to sustainable development. This would require input from the faculty. Such input could be solicited by the Research Platforms either based on faculty role models or on identifying and interviewing faculty whose research would be a good match for one of the Research Platforms but who has not yet pursued such engagement. (See also sections A.4 and B.2.)

4. Faculty renewal

*Do you see see areas where **new faculty positions** should be developed in order for KTH to compete successfully for external funding related to sustainable development?*

As context for this section, it is important to recognize that there seem to be some general trends toward faculty attrition and under-recruitment at the Assistant Professor level. Furthermore, expanding and sustaining research excellence at KTH appears to be compromised by hiring practices and policies as well as policies on faculty compensation. It appears that benefits could be gained by increased standardization and transparency.

(See also section A.2) In order to build faculty strength in research for sustainable development and to access external funding in this domain, departments hosting successful relevant research initiatives could be prioritized in hiring and promotion. In addition, guidelines for faculty hiring and promotion could be adapted to include criteria that reflect the importance of both sustainable development and diversity. Statistics on faculty diversity should be transparent and accessible (see also section B.2).

5. Examples of excellence

Mention areas within sustainable development where you have identified that KTH is exceptionally strong.

As a preface, it is important to note that the information provided to the cross panel on sustainable development did not always do justice to the scope of relevant activities. The provision of statistics from the Elsevier bibliometric study seems to have biased Department reporting toward percentages of research activity aligned with (usually individual) SDGs. Indeed, one Department (Biomedical Engineering and Health Systems) lamented that "the department has not been particularly good in using the keywords that are measured in the internal system". This focus on indicators and statistics distracts from the content (specifically the content reported in the Impact Cases), which provides greater insight into the intellectual engagement of the KTH faculty with the SDGs. Even though numerous Impact Cases cross-referenced sustainable development, this information was provided to the cross panel only upon request. It was notable that one Department (Urban Planning and Environment) explicitly stated that the SDGs *per se* are "not a starting point for identifying research problems".

Another Department (Intelligent Systems) commented that "W*e can improve by targeting UN SDGs areas more strategically and systematically, specifically in areas not well targeted today (e.g., biodiversity, climate change). We could define clear expectations and incentives wrt sustainability for both the organisation and individual researchers. We could target sustainability-focused research during recruitments and more systematically address sustainability issues in our education.*"

In the documents initially provided to the cross panel, a few Departments reported specific and convincing alignment of research activities with the SDGs, including the Departments of Civil and Architectural Engineering, Philosophy and History, Real Estate and Construction Management, Material Science & Engineering, Human Centered Technology (with a specific mention of supporting the KTH target to reduce its own air travel by 60% by 2030), Energy Technology (with a specific mention of the KTH Live-in Lab, which was also highlighted in Impact Case (IC) 5 in Panel 6), Learning in Engineering Sciences, Machine Design, and Engineering Mechanics.

Even more compelling are the Impact Cases that provide concrete and convincing links to the SDGs. The Impact Case "Feminist Futures – Architecture, Gender and Social inclusion" was particularly notable, as it originates from one of the very few KTH Departments with a strong representation of women on its faculty. Gender equality in the context of industrial work settings was also addressed in IC 6 (Panel 7), which demonstrated leadership from the VP Diversity.

Other Impact Cases addressed sustainability development in several contexts. These included: bio-based production in Panel 1 (IC 10), Panel 2 (ICs 7 and 10), Panel 3 (ICs 5 and 6); improving industrial processes in Panel 3 (ICs 8 and 11), Panel 6 (IC 3), Panel 7 (ICs 1 and 8), Panel 8 (ICs 5, 7, and 8); sustainable energy technologies in Panel 6 (ICs 4, 6, and 11) and Panel 9 (ICs 4 and 6); transport and mobility in Panel 3 (IC 4), Panel 5 (IC 1), Panel 7 (IC 11) and Panel 8 (IC 10); and improving human health and welfare including access to basic services in Panel 1 (IC 11), Panel 3 (IC 1), Panel 5 (ICs 3 and 4), Panel 6 (IC 1 and 2) and Panel 7 (IC 12). The Sustainability Office could use these relevant Impact Cases to highlight effective and impactful research for sustainable development (see also section A.4) and to stimulate discussion among Schools and Departments.

The set of relevant Impact Cases would also be a valuable basis on which to assess and promote integration across the SDGs. The Digitalization Research Platform project "AI and the Sustainable Development Goals" provides an excellent example of such integration with two important and visible outcomes in *Nature Sustainability* ([Connecting climate action with other Sustainable Development Goals](#)) and in *Nature Communications* ([The role of artificial intelligence in achieving the Sustainable Development Goals](#)).

6. Final remarks

Finally, please indicate any other topic in relation to KTH existing or potential work with sustainable development you find relevant.

The members of the cross panel on sustainable development would like to acknowledge the engagement and commitment of the KTH colleagues with whom we met. We are convinced that these colleagues are well positioned to help KTH strengthen and expand its research relevant to sustainable development. We would especially like to thank Karin Larsdotter for her excellent support of the cross panel.