

Research assessment report

Faculty of Architecture and the Built
Environment

Delft University of Technology

February 2023

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1 Introduction

1.1 Background

As part of their institutional quality assurance cycle, all academic research in the Netherlands is evaluated every six years following the Strategy Evaluation Protocol (SEP) 2021-2027. The main goal of these research assessments is to evaluate departments in light of their own aims and strategy. The SEP assessments help to monitor and improve the quality, societal relevance and viability of the research and contribute to fulfil the duty of accountability towards government and society.

In October 2022, the Executive Board of Delft University of Technology appointed an international committee to assess the research of the Faculty of Architecture and the Built Environment. The research assessment committee assessed the faculty research over the period 2016-2021. This report presents the committee's findings and recommendations.

1.2 Members of the assessment committee

The international assessment committee was carefully selected to represent all relevant academic expertise, as well as experience in university management. The committee includes a PhD-student (Tom Coenen), a midcareer researcher and associate professor (Gabriele Lobaccaro), a work field representative (Ruth Schagemann) and is well-balanced in terms of gender. The committee is composed as follows:

- Prof. dr. ir-arch. T. (Tom) Coppens, University of Antwerp (committee chair), Belgium.
- Univ.-Prof. Dipl.-Ing. Dr.techn. I. (Iva) Kovacic, Vienna University of Technology, Austria.
- Ass. Prof. dr. G. (Gabriele) Lobaccaro, NTNU Norwegian University of Science and Technology, Norway.
- Prof. D.M. (Despina) Stratigakos, State University of New York at Buffalo, USA.
- T.B.J. (Tom) Coenen, MSc., EngD, University of Twente, Netherlands.
- R. (Ruth) Schagemann, President Architect's Council of Europe, Germany.
- Ir. Arch. W. (Ward) Verbakel, PLUSOFFICE architects, Katholieke Universiteit Leuven, Belgium.

The committee was supported by an independent secretary

- Dr.ir. F. (Femke) Merkx, Kenniscreatie, Onderzoek & Advies.

Due to illness Femke Merkx was unable to support the committee during the site visit. Dr. Carola Kruijswijk has taken over her role as secretary during the site visit.

All committee members and secretaries have signed the statement of impartiality and confidentiality. In this statement, they have declared to have no conflicting direct relationships or connections with the faculty and its departments, currently as well as during the assessment period.

1.3 Research units under assessment

The assessment takes part at the level of the departments. The departments taking part in this assessment are:

- Management in the Built Environment (MBE)
- Urbanism
- Architecture
- Architectural Engineering + Technology (AE+T)

In the period of the assessment, important reorganizations have taken place, notably with the integration of the department of Research for the Built Environment department (OTB) in the faculty. The OTB initially joined as a department in its own right. However, in 2019, the faculty decided to reorganise the OTB department, partly in response to a dire financial situation. OTB's remaining staff members were divided across the departments MBE, Urbanism and, to some extent, AE+T. The assessment (and self-evaluation report) presents the accomplishments of the departments as they existed in early 2022 and split the OTB legacy over the receiving departments. In the case of finances, splitting the OTB funding over the receiving departments proved to be too difficult. The amounts to be found in the annexes reflect the departments as they stood at the time.

1.4 Strategic Evaluation Protocol (SEP)

The committee followed the guidelines for research assessments in the Netherlands as is formulated in the Strategic Evaluation Protocol (SEP) 2021-2027 and assessed the four departments on three main criteria:

- Research quality
- Societal relevance
- Viability

These three criteria include several aspects, depending on the aims and strategy of each department. Among all relevant aspects, at least the following four aspects have been addressed, in concert with the main assessment criteria:

- Open Science: availability of research output, reuse & storage of data, involvement of societal stakeholders;
- PhD Policy and Training: selection, supervision, training and mentoring of PhD candidates, the PhD programme content and structure;
- Academic Culture: openness, (social) safety and inclusivity; and research integrity;
- Human Resources Policy: diversity and talent management.

The SEP 2021-2027 explicitly follows the guidelines of the [San Francisco Declaration on Research Assessment \(DORA\)](#) as well as the approach towards the rewards and recognition of academics as expressed in the national Dutch Position paper [Room for everyone's talent](#).

1.5 Procedure

The committee has based their assessment on a self-evaluation report, written by the departments, and on a two-day site visit to Delft on 28-29 November 2022.

In the self-evaluation report the four departments reflect on their ambitions and strategy during the previous six years as well as for the future, in a narrative argument, supported wherever possible with factual evidence.

The committee made a division of tasks. For each department two assessors were appointed. Based on the self-evaluation report these two assessors wrote a preliminary assessment which was subsequently discussed online in a two-hour committee meeting. On a number of topics, the self-evaluation report was not entirely clear. Questions for clarifications and additional information were asked. Extensive answers and additional information were provided a couple of days prior to the site visit.

At the start of the site visit, the committee gathered to discuss questions for the interviews. During this meeting the committee also discussed the committee members Statements of Impartiality and Confidentiality. It was concluded that none of the disclosed relations with the departments under assessment would hamper an independent assessment.

During the site visit, and for each department, the entire committee had group interviews with four groups: 1) PhDs and postdocs; 2) assistant professors and associate professors; 3) group leaders and management; 4) societal stakeholders. In addition, the committee spoke with Faculty Management and the Rector Magnificus. Details on the site visit programme are presented in Appendix 1.

The final assessment report was written after the site visit. For each department two assessors took the lead in writing the assessment text. A general assessment focusing on the level of the faculty was written by the committee chair. The secretary took responsibility for editing. The entire committee takes responsibility for all four assessment reports, which have been endorsed by all members of the committee.

The Executive Board of Delft University of Technology as well as the four departments have had the opportunity to check this report for factual inaccuracies, which have subsequently been corrected.

2 Faculty of Architecture and the Built Environment

2.1 Research Quality

The faculty is a world leading institute in the field of architecture and the built environment, as reflected in both quality of education and quality of research. The research covers a wide area of topics, relating to architecture, urbanism, design and the built environment. Being part of a technological university, the faculty displays a diversity of research methods and strands from the domains of engineering, social sciences and the humanities.

The faculty has grouped research into six faculty themes to foster collaboration between the different research sections in the departments. These faculty themes have been formulated by the current Dean in consultation with the departments. Moreover, the faculty has financed 12 PhD positions to foster collaborations on these themes among the departments. Although such a “joint research agenda” based on societal challenges can be a powerful instrument to streamline research in an inherently diverse faculty, during the site visit we observed that the research themes are only partly supported and that not all researchers have the same awareness or appreciation of these themes. Junior staff members and PhD researchers in particular seemed to have little awareness of these overarching faculty themes. Moreover, the overarching themes of the faculty are not always or not always clearly referred to by the departments in the self-evaluation report, indicating that the structuring capacity of these themes might not yet be at its full potential. (R1)

Relatedly, in formulating research themes and priorities at the department level, we noticed substantial overlap of the themes among the different departments. This is not necessarily problematic, as long as the disciplinary perspectives through which the societal challenges are addressed are sufficiently complementary and foster collaboration within the faculty. A potential danger, however, is that overlap of themes in different departments can lead to internal competition. Furthermore, thematic overlap blurs the visibility and recognition by outside academic institutions, societal actors and industries that do not necessarily understand the differences between the disciplinary perspectives of the different departments.

Besides its efforts in formulating research themes and organizing the Graduate School for Architecture and the Built Environment (GS), we found little reference to strategic planning to steer research at the faculty level. (R2) However, we noted that the departments are facing the following similar challenges which could be addressed at the faculty level:

- **Safeguarding research time:** the basic rule is a 40% allocation of research time for full professors, associate and assistant professors, but during the visit the committee noted that tasks for education and other services regularly dissipates research time. Suggestions were made to organize semesters more efficiently, allowing education-free periods, or to stimulate research sabbaticals. While formal systems for time allocation and monitoring are in place these seem not to be used throughout the whole organization. Furthermore the departments seem to have different methods for allocating time for education, research and managerial tasks. (R3)

- **Incentives to attract external funding:** although the budgets for the departments have been increasing over the past years, budgets reserved for dedicated research activities and policies (such as sabbaticals, international mobility, stimulation grants) are limited. While there were additional financial impulses, these have been distributed evenly, in order to stimulate collaboration. The committee noted however that a clear strategy at the faculty level on how internal funding could be used as a leverage to increase external funding or to achieve other research goals is lacking. (R4)
- **Policy information and monitoring:** the self-assessment report contained limited evidence on performance indicators for research. During the visit, performance indicators were hardly known or have been given little attention by interviewees. This raised the question if such data and monitoring systems are used reflectively throughout the organization. The committee recognizes that the different output profiles of the departments require different forms of policy information and monitoring (for instance the importance of exhibitions as academic output for some departments). The shift to narrative reporting in the self-assessment to address the diversity in research output among the different department is appreciated by the committee but cannot fully replace quantitative indicators. The assessment of artistic and design-led research output requires specific policy and indicators that allow to monitor developments. Thus strategies can be continuously improved to safeguard research output that is in line with the departmental aims.
- **Human Resource and PhD policies:** Challenges occurred with on-boarding new researchers across all departments. (R5)

2.2 Societal relevance

The faculty is housed in infrastructure of the highest quality, with research and most of the education taking place in the same building. This creates a fruitful environment for collaboration and stimulates crossovers between research and education. Although interfaculty collaboration on different themes has increased over the past years, one of our interviewees feared that the housing of the faculty into one building might impede further integration and collaboration with other faculties within the university and the wider ecosystem of knowledge institutions, government agencies, societal actors and business. Whether this position is shared by others is not clear. If not yet existing, the committee recommends to organize interfaculty research and education activities in the faculty buildings with the aim of stimulating integration and collaboration. (R6)

All departments have an impressive track record in working with external stakeholders and research is well embedded, impactful and relevant. In the discussions with external stakeholders, the future thinking of the university is appreciated when working with the faculty. However, external stakeholders also expressed the wish for a better functioning system of knowledge transfer to practice, bridging conceptual ideas to feasible applications. As the TUDelft as a whole is particularly strong in this field, the Faculty of Architecture and the Build Environment might benefit from developing a knowledge transfer strategy of its own. We did not find any reference to such a strategy in the self-evaluation, nor in the additional documents provided. (R7)

2.3 Viability

Different departments are struggling with a structural loss and the faculty depends on external funding to cover the costs of permanent staff. During the site visit the committee understood that the faculty has formulated the ambition to cover staff costs of permanent staff by first-stream money. It is not clear yet how this ambition can be achieved. Contrary to most other European public universities, universities in the Netherlands expect an increase in funding through the sector plans and rolling grants ('starters- en stimuleringsbeurzen'). However, these funds are often earmarked for specific activities or costs and cannot be used to cover general debt or structural losses. Given the increasing number of students, and the university wide ambitions to develop a multi-campus model, funding needs for education are also expected to increase. The financial situation might pose restrictions on the ability to set up new research initiatives (such as seed money, infrastructure or sabbaticals) in the future.

2.4 Recommendations on faculty level

The committee issues the following recommendations:

1. Develop a dissemination and alignment strategy for the faculty research themes among researchers and other staff.
2. Expand and formalize the research policy of the faculty by developing a strategic plan with clear goals, KPI's and an implementation strategy.
3. Develop clear guidelines for time allocation and monitoring among research staff (without increasing administrative burdens).
4. Consider research policies in which first-money stream is used as a leverage for external money or attaining research goals.
5. Develop a faculty-wide protocol for onboarding new researchers, including PhDs.
6. If not yet existing, organize interfaculty research and education activities in the faculty buildings with the aim of stimulating integration and collaboration.
7. Develop a clear knowledge transfer strategy ('valorisatiestrategie'), also for non-technological outputs such as design proposals, methods, knowledge or know-how.

3 Management in the Built Environment

3.1 Aims and strategy

MBE's research mission is to theoretically understand governing, organizing and managing in the built environment in order to design interventions for societal challenges and transitions. This mission is translated into the following objectives:

1. Develop novel perspectives and translate these into designing innovative strategies, solutions, methods and tools;
2. Improve governing, organizing and managing that can impact future designs in the built environment;
3. Engage with societal stakeholders and users within and across different functions and scales (buildings, portfolios and urban areas) and different project phases and lifecycle stages (from initiation, design and construction to use, management, maintenance, and redevelopment);
4. Develop knowledge for next-generation leaders in management in the built environment.

For the period of evaluation (2016-2021) MBE has formulated four strategic research aims:

1. Better integrate research aims of separated research programmes into one larger, department-wide research programme and search for coherence, collaboration and integration, both in content and organization;
2. Improve scholarly rigor in further developing sound, theoretically and methodologically substantiated research;
3. Attract more PhD candidates and develop better procedures for supervision and monitoring progress;
4. Become more aware of and intentionally develop an academic culture that fosters safety, diversity, inclusiveness and research integrity.

3.2 Research Quality

The research quality of MBE qualifies as very good. Some scholars of MBE are globally recognized in their field and respective top publications are well cited. Some are members of editorial boards of important journals in the field. In the last six years MBE has focused successfully on improving its research rigor by increasing the number of peer reviewed publications (from 46 per year in 2016 to 80 per year in 2021) and by the acquisition of more long-term research funding (such as NWO and EU funded research). This strategy has been fruitful. Research funding has almost doubled (from 2,8 million to 5,2 million) and MBE is lead partner in two EU funded programmes (Interreg and Horizon2020), as well as in other projects.

Although individual scholars of the department are internationally prominent and renowned in diverse subjects related to the management of the built environment, a clear international research profile of the department as a research unit with significant distinguishing feature is still under development.

In line with the recommendation of the 2016 evaluation, the department has restructured its research programmes. Along with the integration of part of the OTB department in 2019, research in the department has been merged in three sections: Design and Construction Management (DCM), Real Estate Management (REM) and Urban Development Management (UDM). This has streamlined research and decision making in the department (with the research coordination team). Furthermore, three main joint research themes have been identified in the former period - circularity, energy transition and housing equity. Additionally, a new topic - digitalization in management of built environment – has emerged. These topics, evolving along major societal challenges enabled integration of different sections, thus fostering collaboration within the department.

The committee noted that in the new research scheme reference to traditional management topics is missing. Moreover, some of the central challenges identified are also strategic themes for other departments in the faculty. From an outsider perspective, it is difficult to identify the unique selling proposition of the department. Although the midterm assessment 2016-2018 recommended to remove the term “management” from the groups, we see added value in advancing the management perspective in the research domains of the groups as the unique selling proposition of the department as well as for the creation of a clear research profile. The PhD students have pointed out in the interviews that they were attracted to the department due to its reputation and expertise in the field of management and governance of the built environment, therefore this strength should be strongly communicated and be made visible. (R1)

The department has very valuable research and output but could improve its internal and external visibility and align communication. The committee noted that information on the departmental website was outdated. Also, internally young researchers (PhD students) do not seem to be aware of the departmental research structure and strategy. (R2)

MBE has an open research culture and has organized at least five international conferences over the last six years, which is substantial given covid restrictions in this period. Moreover, a considerable effort is being done to publish open access, which is now almost 100%. In terms of diversity and gender balance, PhD and young researchers value female leadership in the department as a role model. However, over the last years the gender balance of full professors has not improved, which needs increased attention. In terms of inclusiveness, the research committee noted that in particular self-funded PhD students sometimes feel alienated from the department. Some expressed the desire to be more involved in other activities, such as education. The research of MBE is well embedded in the university, as the department participates in multiple intra- and interfaculty initiatives.

In line with the strategic aims, the number of PhD-students has increased from 36 in 2016 to 55 in 2021. Although the department is doing relatively well, and the average duration of a PhD is below the faculty average, the self-evaluation report mentions that completing the PhD in time remains a challenge as only 53% of the candidates graduated within 5 years. Supervisors mention the lack of time to properly follow up PhD students in daily supervision. PhD-students are generally satisfied with their supervision but mention a lack of methodological courses and onboarding in the faculty. (R3)

The department has been successful in the implementation of the overall research strategy to establish long-term research projects which allow for increased visibility, an increase in the number of employed PhD Students and attracting junior staff. Striving for an enhanced integration of former departments and the use of synergies of respective disciplinary expertise should remain an

important objective. However, the primary objective is defining a clear unique selling proposition and a commitment to management and governance of the built environment.

3.3 Societal Relevance

The committee was well-impressed by the societal impact of the MBE research, which is considered to be very good to excellent. The research addresses housing equity, circularity and energy transition which are current major challenges in the built environment. MBE has an excellent track record in working with other research and societal actors and industries. Over the last years external funding from industries and governments through contract research has increased considerably both in absolute (from 317 k€ to 1822 k€) as in relative terms (from 11% to 35% of total research funding).

MBE participates in several important projects for policy and practice that have a substantial impact on policy making and practices in the field (such as 'dialogtafel Groningen', or Circular Area Development Binckhorst). The case studies presented in the self-evaluation report provide additional examples of how research in the field of value creation, circularity and energy have been picked up by societal actors and industries. Some professors within the department are bridging figures between the university and societal actors and one professorship is funded by industry organization "Bouwend Nederland". Finally, MBE professors regularly share their expertise with the broader public through appearances in the media. The societal impact of the research is still mainly national, and a next logical step could be to play a role in international societal organizations.

The department's research strategy to improve scholarly rigor has led to an increase of peer-reviewed publications. At the same time the number of "professional publications" has dropped, potentially missing out on opportunities for dissemination to relevant professions and practitioners. Moreover, a further internationalization of recruitment policies might also create challenges in terms of embedding research in the Dutch context, as professors who do not speak Dutch might miss important policy debates or might be less influential in the Netherlands due to language barriers. At present 40% of the associate and assistant professors have a non-Dutch background. In the future, the number of full professors with a non-Dutch background is expected to increase. The committee recommends developing binding language policies for permanent research staff. In general, MBE needs to reflect on how to preserve its strong engagement with industry and practice and yet at the same time maintain scholarly rigor. Moreover, given the internalization of its staff, MBE should also consider its societal relevance on an international level. (R4)

The committee spoke with several societal actors that are in general very satisfied with collaboration and research of MBE. They see added value in the ability to think ahead of practice. However, they sometimes lack aftercare in the valorization of research results. A clear knowledge transfer strategy, also for non-technological research could help to bridge the gap between research and practice. (R5)

3.4 Viability

Viability of the MBE department is considered very good. The department has developed successful strategies to secure external funding, shifting from short-term contracted research towards long-term institutional funding programmes, which is crucial for future viability. This strategy also allows for more employed PhD students.

Interdisciplinarity and trans-disciplinarity are a strength of the group, but at the same time a potential weakness. To be an attractive partner for inter- and cross-disciplinary research, strong disciplinary backgrounds (in terms of methods and epistemologies) are needed. A research group defining itself as interdisciplinary might lose focus or might miss current developments in particular disciplinary fields of management. MBE should therefore carefully reflect and communicate more explicitly on its unique selling proposition and how and why an integration of disciplines in research groups could be attractive in the longer term. Concludingly, clear communication of the research focus and objectives of MBE within the Faculty and beyond would both increase the visibility of the department.

The SWOT analysis in the self-evaluation report shows a good level of self-reflection. The department has been able to identify four relevant points of attention for the future: MBE Identity; low awareness of personal research grants opportunities; insufficient budget to replace retiring staff; and work pressure. The department is planning to propose a strategic personnel plan to anticipate the wave of retirements in the coming ten years. The committee recommends using this plan as leverage to strengthen and consolidate the research profile in a management and governance research agenda. (R6) Measures for a more inclusive academic culture and better PhD supervision have been formulated and will be implemented in the coming period.

During the site visit interviews the committee noted that crucial information on the department's KPIs, such as actual research/education time or success rates for grants were not known, monitored or communicated. Research management should be based on structured management information and performance monitoring and be part of a culture of permanent quality control. The committee recommends translating the four strategic goals for the coming period (2022-2027) into measurable KPIs. (R7)

While mentioned as a weakness in the SWOT, the research strategy for the coming years does not propose specific solutions to deal with the high work pressure of researchers. The committee recommends monitoring work pressure and developing strategies for dealing with workload pressure in order to balance teaching, research and writing of research grants and proposals. (R8)

3.5 Summary of conclusions and recommendations

The research quality of MBE qualifies as very good. Several MBE scholars are globally recognized in their field and respective top publications are well cited; some are members of editorial boards of important journals in the field. MBE has focused successfully on improving its research rigor and on the acquisition of more long-term research funding. The committee was well-impressed by the societal impact of the MBE research, which is considered to be very good to excellent. The research addresses current major challenges in the built environment and MBE has an excellent track record in working with other research and societal actors and industries. Over the last years external funding from industries and governments through contract research has increased considerably. Viability of the MBE department is considered very good, though continued attention and further improvement needs to be made regarding the definition of a clear unique selling proposition, articulating the added value of management research and clarifying the attractiveness of an interdisciplinary profile on the longer term.

The committee issues the following recommendations:

1. The department needs to better articulate the added value of management research in its research mission statement, reflect and communicate more explicitly on its unique selling proposition.
2. Develop an internal and external communication and dissemination strategy and increase visibility.
3. Improve the capacity for and structure to support the supervision of PhD candidates. If not yet available, provide domain-specific methodological courses for PhD-students, and improve the onboarding process of PhD-students.
4. With the increase in internationalization of staff and in order to embed research in the Dutch societal context the department needs to develop binding language policies for international staff while simultaneously considering societal relevance on an international level.
5. Develop a clear knowledge transfer strategy (for both technological and non-technological research), thus improving aftercare in working with external stakeholders
6. Use selective replacement of (retiring) tenured staff as a leverage to strengthen and consolidate the research profile.
7. Translate the department's strategic goals for the coming period (2022-2027) into measurable KPIs for developing and monitoring research policies.
8. Monitor work pressure and develop strategies to deal with excessive workload of staff.

4 Urbanism

4.1 Aims and strategy

The department of Urbanism's mission is to advance, share and apply knowledge on how to adapt the built environment to societal and environmental changes, and to apply contextual design, planning and engineering strategies and interventions for a better society. The Delft Approach to Urbanism is knowledge-based, design-oriented, and multiscale, in which landscape architecture, urban design and planning closely collaborate with engineers, data scientists, sociologists, geographers, and ecologists in an interdisciplinary, context-driven and solution-focussed manner.

The department's research is organized in six sections (urban design, landscape architecture, urban studies, urban data science, spatial planning and strategy and environmental technology and design) around four cross-cutting themes: Delta Urbanism, Inclusive Urbanism, Green Urbanism and Data-supported Urbanism.

For the period of the evaluation (2016-2021) the department has set the following strategic aims:

1. Consolidate the Urbanism research programme in clear cross-cutting themes, and focus on high-quality, societally relevant and impactful research;
2. Move from multidisciplinary working to an interdisciplinary approach and further develop the foundations of the Delft approach to Urbanism;
3. Foster disciplinary breadth, depth and innovation of the constituent disciplines of Urbanism;
4. Build more robust interconnections between the research programme and education, making effective use of the high-quality student population;
5. Increase societal impact - making a difference in the real world.
6. Introduce the principles of open science more clearly in the department's research routines;
7. Further develop an efficient and impactful Urbanism PhD programme;
8. Provide a cohesive, diverse and inclusive academic culture and a community for all members of Urbanism to thrive.
9. Build strong national and international strategic collaborations with academic and non-academic partners.

4.2 Research Quality

The research quality of the department is excellent. The department presents itself in a strong and confident manner and available indicators support this confidence, although trends in some of the indicators were also difficult to assess. Although a number of strategic research aims of the previous period have been met well, some need continued effort to further develop.

The department has restructured its research around cross-cutting themes (Delta urbanism, green urbanism, inclusive urbanism and data-supported urbanism) and was able to take leading positions in large international research collaborations and received prestigious grants. The new structure helped to foster interdisciplinary research. The cross-cutting themes are well known and shared within the department by members at different levels and are understood to be effective in structuring the research output cohesively and stimulate internal exchange. Especially the junior

researchers (PhDs and Postdocs) were able to convey their enthusiasm and critical reflection on these research themes and how they might continue to evolve.

The department claims to conduct its research within the Delft approach to urbanism. This label demonstrates confidence in its own strengths and capacity. The Delft approach to urbanism is applied to both the educational tasks as well as to research and the four subthemes. The term works well in communication and as an open invitation to discuss and reflect on the methodologies. The committee was able to confirm that the dialogue and internal reflection on the Delft approach is part of an ongoing discourse within the junior and senior research staff.

The publication output is diverse (including open data and data models) and is increasingly oriented towards peer reviewed journal articles, demonstrating disciplinary prominence. The number of peer reviewed articles in relation to the fte research staff is remarkably high compared to the faculty average [3,1 Peer reviewed articles/fte research staff]. This is in contrast with the low number of PhD students per FTE [1,75 PhD/fte research staff].

The department has an open research culture with almost 90% of its output now open access and a commitment to the FAIR principles. Moreover, it has organised important international conferences and organises MOOCs for an international audience. During the site visit it became clear that there is an open academic culture in place that allows junior research staff and PhD students to be part of an ongoing reflection on the discipline and the position of the department within. The committee was not able to examine in detail how this culture also includes (social) safety and the care for academic integrity, but the positive environment seems a good place for these aspects to thrive. In relation to research integrity the committee recommends developing a clear ethical protocol for collaborations, data management and sharing instructions in order to maintain independent and uncompromised research positions, if not yet available. (R1)

Maintaining a world-leading position requires continued effort and could produce blind spots. Some academic output indicators point towards significant reductions. There is a decrease in conference papers and professional publications (already before the pandemic), the peer-reviewed article/fte ratio, while being significantly high, is declining and the overall publication output has not increased over the last years, despite an increase in general funding. From the available data, it was not possible to derive clear trends, as the figures have been heavily influenced by the OTB integration. We therefore recommend a more sophisticated interpretation of some of the figures in order to monitor evolutions that could be important early indicators of research quality changes and of the need to mitigate these trends with specific targeted effort and support. (R2)

Furthermore, although the Delft approach to urbanism is widely shared among members of the department and, to some extent, in the broader field of external stakeholders, this approach is recognized though not clearly defined. The unique selling points of this approach could be defined more precisely (e.g. data-driven or data-supported; interdisciplinary amongst which disciplines) and we invite the department to substantiate the claims made (e.g. How unique is it to have the range from planning to urban design within one department?) with precise and international benchmarking. (R3)

The need to be innovative has been identified in the strategic aims, and the department has freed up resources for “curiosity research”. The committee could not find procedures, results or evaluations of this curiosity research in the self-assessment report, but it remains key to monitor and evaluate its innovative capacity in the future. Given the high work pressure on researchers and the many needs for additional funding, the opportunity costs need to be justified. (R4)

The department aims to better connect urbanism research and education. Although this is a laudable goal, the committee missed a vision on how part-time professors that also have a position outside of academia and practice-led research (and for that matter studio-based research) could find a more structural place in the research programme. (R5)

The culture within the department comes across as inviting and open and fuelled with bottom-up initiatives from the PhD and junior researchers. As a point of improvement, on-boarding of new researchers at the PhD level could be more formally and broadly integrated in the department organisation to ensure a better start and welcoming working environment. (R6)

Improving the PhD training and framework was a specific aim in the strategic plan, and it seems that several reflection moments discussing ongoing research have become part of the department's internal culture. The committee could not precisely identify all the actions associated with this strategic aim. They could become more formalised in the department's operation. In the same line, reducing time needed to complete PhDs is recognized as a challenge, but specific measures to work towards this aim need to be formulated. (R7)

4.3 Societal Relevance

The societal relevance of the department is excellent. The department of urbanism has a strong international reputation with relevant stakeholders, and its work is being picked up by national and international media. Researchers from the department are involved in international quadruple helix networks with NGOs, businesses, governments, and wider society. Members of the department have won internationally prestigious prizes (such as the IFLA award) and have contributed to international exhibitions such as the Architecture biennale in Venice. Stakeholders from the field echo the engagement and investment of the department to be part of larger societal discussions and agendas. The involvement in transition questions is acknowledged by the external stakeholders.

The aim to build strong national and international collaboration with societal stakeholders seems well developed for specific types of (well-established) institutes and is well demonstrated in the self-assessment report. In many of the department's research projects the research is conducted with well-established and relevant partners and institutions (as mentioned in the report on pages 159-161). Other types of organizations and actors that operate in more fragile, sometimes marginalized or grassroots parts of society do play a role in some of the research projects (as mentioned in the case studies) but do not receive the same attention in the self-assessment report. This might indicate an unconscious bias within the value sets and evaluation framework used within the department (explicitly or implicitly). Specifically for the topic of inclusive urbanism the focus on larger organizations such as the WHO could be more explicitly balanced by giving more central roles to other types of organizations and representation from civil society. Similar arguments could be developed for delta, data-supported and green urbanism. In the light of inclusive urbanism, a critical approach towards the institutional structures needs extra care. (R8)

The aim in the strategic plan for 2022-2027 to be more socially and ecologically inclusive is admirable. The societal challenges, both in the Netherlands and worldwide, have direct links to and can find solutions in the discipline of urbanism. Design and practice have an important role to play in this endeavor as is recognized in the department's self-evaluation and by the assessment committee. How the practice of urbanism in the Netherlands is evolving for example, and how it is producing its own design research that may or may not live up to academic standards are questions

raised by external stakeholders from governance, socio-cultural organizations, policy makers and practitioners. The department could further strengthen its societal relevance by taking up a role in monitoring the developments within practice, providing frameworks for and knowledge on the practice's design research and providing the data and theoretical frameworks for assessing impact of transition claims. Mutual learning between urban design practice and academia (e.g. by studying design research from the practice, continued education, learning through practice) seems to be absent in the department, potentially missing out on the benefits that specific types of practice might have for research. (R9)

The indicators for relevance to society are sometimes conflating output with outcomes and impacts. For instance, books, book chapters and professional publications are given as indicators for relevance to society. As such, these indicators do not demonstrate impact, because the influence and reach of these publications on practice might be limited.

4.4 Viability

The overall viability of the department is good. The grouping of research in four shared research themes provides a viable guidance for future research. All four themes are highly relevant and the combination of academic research expertise (design, data, technical) within the department is promising. However, the strategic aims for the next period of evaluation still need to be defined and there is unclarity and some concern regarding the financial situation for the department as permanent research staff is not yet fully covered from the first-money stream.

The research themes relate to but not necessarily align with the six faculty-wide themes, even though most of these faculty themes rely strongly on the discipline of Urbanism and Landscape Architecture. More could be done to formalize the relation to the faculty-wide themes and profit from the associated funding streams. (R10)

The elaboration of the research strategies in nine aims for the past six-year period has offered a clear perspective for the department. The SWOT analysis in the self-assessment report is helpful but the committee noted that it is mainly analysing the internal institutional environment. It would be helpful to add an analysis of the external research landscape and the threads and opportunities within this landscape. For example, expected success rates of external funding acquisition, or emerging themes in the European research agenda such as the New European Bauhaus. The strategy for the next period has yet to identify the strategic aims for the coming period. These aims could be translated in KPIs in order to monitor progress and performance of the research agenda. (R11)

Human resource policy will have its own challenges in the future. Although the decline in the number of full professors has not yet affected the quality and impact of the ongoing research, for the near future a more precise action plan to address this seems necessary in order to have the needed staff and experience to manage both the increased research staff and projects. In terms of research staff, there has been a welcome shift from temporary contract researchers to tenured assistant professors giving more stability to the research staff. Researchers in the department experience a high work pressure, a need for efficiency in guiding PhDs and managing research and yet also a lack of time to experiment and to be proactive towards other research opportunities.

The department has been struggling to attract full professors especially with a diverse background. In terms of gender balance and dominance of Dutch professors at the senior level the department

(full professors and associate professors) is underperforming within the faculty, while this is much less the case at other levels (PhD, researchers and assistant professors). This has been identified in the past and continues to be a point of attention in the future. Full professors are seen as important contact points with society (e.g. media and industry) yet need to balance links and familiarity with the Dutch context with an international orientation.

In general diversity and inclusion in the domain of human resources and working culture is currently focussed on gender and nationality. Although these parameters cannot be ignored and important progress is still to be achieved, the definition of diversity as given in the interviews during the site visit comes across as limited and is not in line with current societal discourse. If the department is serious about this concern, catching up to the rest of the faculty is a minimum effort. The committee recommends developing and implementing a broader strategy to improve diversity of staff (especially for full professors) while finding the right balance between seeking for (international) diversity and keeping grounded within the Dutch context. (R12)

A major point of attention concerning future viability is the financial situation of the department. The cost structure of the department is structurally imbalanced which to a certain extent can be traced back to the integration of part of the former OTB department. Permanent research staff is not yet fully covered from the first-money stream. Available budgets from the second- or third-money streams are needed to level the imbalance, and the possibility to use these budgets as strategic impulse to further the research and realise strategic goals is limited. This financial situation puts pressure on a high-performing department which needs to continue to invest in excellence to maintain its relevance. Some new sources of funding ('sectorgelden') are earmarked for specific goals (e.g. hiring new staff members) and cannot mitigate the imbalance. Lastly, the feedback on the financial situation of the department that the committee received from different people was somewhat inconsistent, leaving the committee with the question if the financial challenge is well identified. (R13)

4.5 Summary of conclusions and recommendations

The research quality of the department is excellent. The department presents itself in a strong and confident manner (e.g., the Delft approach to urbanism) and available indicators support this confidence. In the period of evaluation, the department has restructured its research around cross-cutting themes and was able to take leading positions in large international research collaborations and received prestigious grants. The new structure helped to foster interdisciplinary research and has been effective in structuring the research output cohesively and stimulate internal exchange. The societal relevance of the department is excellent. The department has a strong international reputation with relevant stakeholders, and its work is being picked up by national and international media. Researchers are involved in international quadruple helix networks. Stakeholders from the field echo the engagement and investment of the department to be part of large societal discussions and agendas. The involvement in transition questions is acknowledged by external stakeholders. The overall viability of the department is good. The grouping of research in four shared research themes provides a viable guidance for future research. All four themes are highly relevant and the combination of academic research expertise (design, data, technical) within the department is promising. However, the strategic aims for the next period of evaluation still need to be defined and there is unclarity and some concern regarding the financial situation as permanent research staff is not yet fully covered from the first-money stream.

The committee issues the following recommendations:

1. Develop a clear ethical protocol for collaborations, data management and sharing instructions in order to maintain independent and uncompromised research positions, if not currently existing.
2. Develop research quality policy and indicators on the long-term to ensure output volume, diversity and quality; monitor early indicators of potential evolutions; and integrate the critical interpretation of those indicators in executive decisions for the research strategies.
3. Continue developing the Delft approach as a distinct school of thought, substantiating it with international benchmark evidence.
4. Evaluate the procedures and outcome of curiosity research.
5. Reflect on the role and place of part-time professors that also have a position outside of academia and practice-based research in the research portfolio.
6. Formalize on-boarding of PhDs in the department organisation to ensure a better start and welcoming work environment.
7. If not yet existing, formulate and formalize actions to improve PhD supervision and training and to reduce PhD completion times.
8. Develop a specific approach towards the representation and inclusion of non-institutional partners within the various urban research projects and potentially integrate this in the 'Delft approach to urbanism'.
9. Continue to engage with the design practice in general and of the Netherlands in a mutual learning approach to increase the societal relevance.
10. Expand and formalize the research policy of the department in relation to the faculty-wide themes, in line with the disciplines' claims to the research themes and profit from the associated funding streams.
11. Identify the strategic aims for the next evaluation period and translate these in KPI's to establish and share insights on the performance of the ongoing research, the department's strengths and its impact in the domain.
12. Develop and implement a broader strategy to improve diversity of staff (especially for full professors) while finding the right balance between seeking for (international) diversity and keeping grounded within the Dutch context.
13. Identify and address the financial challenge in order to maintain a viable research context and high-performance levels.

5 Architecture

5.1 Aims and strategy

The department approaches architecture as the science and art of designing and realizing buildings. The mission of its research programme is to better understand the foundations of the architectural domain and particularly how buildings can create both practical and functional value and cultural and societal meaning.

In response to the recommendations made by the 2016 research assessment committee, the department's research structure has been recalibrated with the following aims: to ensure that research groups have enough critical mass, to explore collaborations through a more flexible structure, to enhance peer-to-peer research exchanges and PhD tutoring within the groups, to better align the projects of incoming PhD candidates with the research topics and approaches within the department and to formulate a funding strategy in connection with the research groups.

Following the department's 2019 mid-term review eight recommendations were formulated:

1. Strengthen research interaction and exchange between the clusters to foster cultures of cooperation, trust and inclusivity;
2. Continue to develop the clusters as active and creative sites of intergenerational and varied architectural research practice;
3. Utilize new faculty themes as the basis for research cohesion, exchange and pathways to transformation;
4. Review and explore how the department's research culture can be made more explicitly of value to the architectural profession, including the value of PhDs;
5. Use the strong connections with professional practice and the established international networks for practice-based research and research-by-design in architecture more systematically to develop the specific profile of the department in this area;
6. Given the difficulty of gaining grants in this discipline, establish a departmental sabbatical fund to which staff at all levels can apply;
7. Refer to good practice interdisciplinary grant successes in the faculty to further develop grant applications;
8. Support and nurture history and theory expertise, recruitment and practices in the department.

The departmental strategy that was developed following the previous research assessment cycle – especially in response to the recommendations made during the 2019 mid-term assessment – focused on strengthening its:

- research structure and management;
- academic culture;
- PhD policy and training;
- cross-faculty and cross-departmental collaborations;
- relationship with practice and open science;
- HR policy;
- research funding.

5.2 Research Quality

The research quality of the department is very good. The department generates research of a high caliber that attracts international attention, national and European grants, visibility within the profession, and large numbers of doctoral students. The committee's site visit confirmed that the department fosters a research environment of positive energy and productive collaborations as indicated in the self-assessment report.

Research staff produce a broad range of research outputs, from refereed articles to exhibitions, and in venues that demonstrate academic, professional and broader societal impact. The prestige of the publishing and exhibition venues, the stature of the collaborative partners, the leading roles taken in major conference organization, and many other forms of research engagement speak to the caliber and visibility of the research produced and the outlets through which it is disseminated. The department has also made significant strides in its goal to publish more open access peer-reviewed articles, which grew from about 45% in 2016 to over 90% in 2021. The department's success in receiving grants from the Dutch Research Council and the European Horizon 2020 Programme as well as the personal grants obtained by research staff attest to the academic excellence of the faculty's research in fields such as housing, urbanism, education, cultural heritage, and regional planning, among others.

According to the data provided in the self-evaluation report, the research output of the department has had notable fluctuations in the past few years, particularly in the number of refereed articles, even though research capacity has increased in the same period. However, we note that—despite the department's emphasis on practice-based research, such as its leadership in the Communities of Tacit Knowledge initiative— the quantitative data provided do not fully address the richness of different forms of design research. More forms, including exhibitions, are mentioned in the narrative part of the report. One step in the recognition of these diverse forms of research output would be to monitor them more systematically. (R1)

In the last six years, the department has thoughtfully created a robust infrastructure to encourage cross-disciplinary discussions and collaborations around research, such as with the quarterly research days and the "Under Construction" research clinic. This speaks to the priorities set by the department in this period and the intentionality with which it has approached the development of a culture of intellectual exchange across differences. At this point, the department should assess what has worked particularly well and seek opportunities to further fund and embed these successful initiatives into the infrastructure of the department to create stability and permanence. This includes the successful Theory Fellowship pilot program, which recently ended. (R2)

The department has grown into ten research agendas around which research staff form research groups, organize intellectual exchanges and collaborate on projects. In 2016, the department consisted of six research groups. Despite the recommendation of the assessment of 2016 to consolidate research groups to achieve enough critical mass, additional research themes/groups have been added to the structure. The self-assessment report noted that the growth of the ten research agendas/groups had created "fragmentation" and imbalances in terms of the size and resources of the different groups and suggests that a consolidation effort is needed to create greater critical mass. The perception of fragmentation was disputed by some during the visit, and reference was made to educational structures (design studios) to justify these research agendas.

We did not hear a strong desire for consolidation of the ten research groups. Indeed, some junior faculty expressed strong support for the current structure. Whether the step to consolidate should be taken would best be determined in consultation with all the research staff. From an external perspective, the complexity of the department's overall research structure is confusing and does not help to communicate the department's research energy or achievements as efficiently or emphatically as possible. During the visit, we noted there was sometimes a struggle to articulate the research structure and how it functions and is resourced. The ten agendas seem to be unaligned with formal structures of chairs, sometimes leading to a lack of senior leadership in some of the units. This opacity may impede opportunities for research collaborations beyond the department. The committee recommends developing a communications strategy to clarify the department's research organization, which will support broader awareness of its research foci and benefit outsiders and newcomers unfamiliar with the department's research infrastructure. Concurrently, it recommends monitoring the output and the funding of the research units to evaluate whether the threshold of a critical mass has been met. (R3)

The self-assessment report states that increasing external funding is a departmental goal. During the site visit, research staff expressed skepticism about their ability to succeed in grant applications. This skepticism, which seems prevalent, does not bode well in terms of meeting the department's higher external grant goal. We suggest that incentives be offered to encourage grant applications and to offer support. The recommendation to establish a sabbatical fund has not been adopted due to financial constraints. Although funding is not available to provide sabbaticals to all research staff, the department may find it a good investment to offer a reduction in teaching load for a grant-writing semester. Additionally, the department should consider creating a small pool of seed funding designed to give researchers the opportunity to position themselves better for larger grants. (R4)

The department fosters an intellectual culture of open discussion and engagement with disciplinary and broader societal concerns. It creates opportunities for internal and external exchanges about research through special event days, conferences, and so forth. During the site visit, the dynamism produced by this intellectual openness and engagement was much in evidence. There is an attention to the diversity of voices in the creation of architectural knowledge and practice that is especially commendable. At the same time, during the visit, a certain defensiveness was expressed in terms of consolidating the ten research units. It is not clear whether this is based on a strong commitment to the particular research themes and methods of certain groups, fatigue with recent restructuring, or dissatisfaction with the previous decision-making process in how changes have been implemented. The site visit raised questions about whether all members of the department were equally engaged in discussions about the department's current and future research directions.

The department has had a sizable increase in the number of doctoral students from 28 in 2016 to 54 in 2021 (appendix 4). This increase has brought new research energy to the department and new possibilities for collaboration. The increase also speaks to the reputation of the doctoral program and its ability to attract outstanding students. PhD students seem engaged and motivated. They value the openness in choosing thesis topics and the possibility of transdisciplinary cooperation with other fields. The increase in PhD students has added to the responsibilities of doctoral supervision. The structure of having a promoter, co-promoter and daily supervisor helps to distribute these responsibilities. Nonetheless, the self-assessment report notes a desire to further reduce the load on promoters by involving junior professors in the supervision. This presents a threat, however, of further reducing the research time available for junior staff. During the site visit PhD students expressed general satisfaction with their supervision but mentioned a desire for more supervision from and engagement with senior staff.

Although the report states that this structure of PhD supervision has worked well, it also notes that students lag in their completion times beyond the four-year period. The completion times are also poorer compared with those in other departments in the faculty. Additionally, there is a notable difference in gender among the funded PhD students, with male students being funded at considerably higher rates than women. The committee welcomes the department's plans to use additional funds that have become available to create more funded PhD positions. During the site visit, research staff also expressed a desire for more doctoral students from the global south, which would add to the department's research strengths by creating new geographical partnerships with universities in the global south, thus expanding the range of research themes and adding important new perspectives. There are some funding opportunities to enable this diversification of the doctoral students.

The committee recommends investigating the causes why doctoral students lag in completion times, increasing gender parity among the funded students, and expanding the geographical areas of recruitment, particularly in the global south. (R5)

5.3 Societal Relevance

The department is strongly committed to using its research to address pressing issues in the discipline and in society at large. It is partnering in international initiatives to strengthen architectural pedagogies, research, and practice. Its research on sustainability, housing and heritage is well known and influential. Other areas seem well poised to develop a similarly strong impact. The department's support for vehicles of research dissemination (publishing and exhibitions) is also important. In some cases, the commitment to translational research needs strengthening.

The midterm review of 2019 recommended reviewing and exploring how the department research culture can be made more explicitly of value to the architectural profession, including the value of PhDs. The recommendation led to the development of three new research lines (architectural pedagogies, digital culture, and design research) with distinct impact pathways. Some of these research lines are under development and their impact still needs to be developed (such as the new open project), others are already more developed and include important new research projects with the inclusion of societal and professional partners. What is less clear, however, is how societal needs have been identified and how professional and societal actors are consulted on the developments of these research lines and their pathways. (R6)

The midterm review also recommended using strong connections with professional practice and established international networks for practice-based research and research-by-design in architecture more systematically to develop the specific profile of the department in this area. The assessment report states the intention to more actively integrate professors of practice into the department's research program. Additionally, it envisions a "director of enterprise" who will be outward facing and will build "closer relationships with practice, industry, and other societal stakeholders." The creation of a public outreach coordinator role would help to promote and raise awareness of the department's research work beyond academic circles. This position could serve an important function in helping to translate research for a broader audience, thereby speeding the translation of scholarly and design discoveries into practice. This position could also help research staff who wish to establish broader connections to media, industry or social organizations, but who may not have the networks to do so on their own.

The committee recommends considering the creation of an outward-facing position to foster closer relationships with professional and society stakeholders; facilitate new networks for research staff; and help to disseminate, promote, and apply new discoveries to speed their adoption by the profession, industry and broader society. (R7)

5.4 Viability

The viability of the research qualifies as good. The department demonstrates strong potential for future research growth and societal impact over the next six years. Questions remain, however, on specific goals, targets, and strategies for that growth. Also, high teaching loads and policies of inclusion and diversity need attention.

It is unclear from both the self-assessment report and the visit how the current organization of ten agendas/groups benefits the creation of long-term research strategies. While individual researchers in the department have personally developed substantial research trajectories that have carved out important areas of contribution to the profession and to society, neither the report nor the visit demonstrated a path forward on an institutional level for determining and realizing clear and bold long-term research goals.

The goals articulated in the self-assessment report signaled the intention to increase external funding through greater success in grant proposals; build parity among the ten research groups; diversify research staff across all ranks, and particularly at the senior levels; and increase the funding for doctoral students, among others. Missing from this aspirational statement were targets, a timeframe, specific strategic plans for achieving the targets, and metrics to measure progress.

With one notable exception, the self-assessment report did not articulate bold goals in terms of positioning the department for future success. The exception was the suggestion that because of the research strengths of recent hires, the department could position itself as a national leader for research in diversity, equity, and inclusion in architecture. This admirable goal, if it is to be pursued, also needs a clearly articulated vision, timeframe, strategic planning, and metrics to measure progress.

The data produced for the self-assessment as well as that produced annually by the department for its own internal assessments could be more broadly used for a department-wide discussion of long-term research goals. During the visit, we learned that various leaders had contributed to the creation of the self-assessment, and that these leaders had the opportunity to discuss the information gathered with other research staff. Nonetheless, during our discussions, it became clear that a broader awareness of the self-assessment report's recommendations and data was lacking, and, in some cases, the report's findings were disputed. It seems that a dedicated, department-wide process for all research staff to discuss the overall research state of the department would help to inform research staff of a broader picture and to determine priorities and goals at a department level. The committee recommends involving all research staff in developing department-wide research goals, with carefully articulated strategic and implementation plans, to position the department for future success. (R8)

The self-assessment report and the site visit meetings emphasized the demands of teaching in an architecture department, making it difficult to find time and space for research: classes must be taught and so research by necessity takes a secondary place and is conducted around teaching,

whenever possible. Note was made of the flexibility in arranging teaching schedules to accommodate different teaching styles and to maximize time for research, yet it seems that this does not sufficiently resolve the problem. An earlier recommendation to create sabbaticals was not implemented because of the lack of funds. We recommend that the department undertake a study to investigate what percentage of time is actually allocated to research for all ranks of professors in order to determine whether there is a systemic issue and if corrective measures are needed. (R9)

In the past six years, the department has prioritized and made significant strides in reaching greater gender parity among the research staff, although the self-assessment report notes that this has not been uniformly achieved across seniority ranks. In the next six years, the department aims for more equitable gender distribution across ranks. To achieve this, it will need to assess its recruitment tools and strategies to see where improvements can be made in attracting senior professors or promoting from within.

The department is also struggling to achieve greater diversity among its full professors with regard to their national backgrounds. According to the data provided, in the past five years, no full professors have been hired from outside Europe. There are also no associate professors with backgrounds from outside Europe. There is greater national diversity among assistant professors. By contrast, the majority of doctoral students come from outside Europe. During the onsite visit, doctoral students remarked negatively on these imbalances. One student commented on the clear visibility of the glass ceilings for female and non-European research staff.

Although the department has instituted concrete measures to improve its search processes, such as through implicit bias training for search committees, the next step in diversifying research staff—retaining the new talent recruited—remains underexplored. Strategies to foster retention include creating onboarding and mentoring programs, assessing the inclusivity of the work culture (for example, through climate surveys), building trust through accountability, and so forth. Transparency in department and university policies is important for fostering a sense of equal opportunity. During the onsite meetings, we discovered that some research staff were ill-informed about the possibilities for internal pathways to promotion, believing it was impossible within the department.

The mandate from the university that all faculty create a diversity officer role may assist the development of a culture of inclusion and belonging within departments. However, the success of such positions depends on whether enough time is allocated to the role, resources are provided (a budget, administrative help) to carry out the work, and the position has authority and visibility. Too often, these positions are merely symbolic, and quickly result in overwork, frustration, and burnout.

The committee recommends continuing to develop recruitment and retention strategies to increase the diversity of research staff across ranks, particularly with regard to gender and national diversity, and to create a robust infrastructure for the work of diversity in the department so that it is adequately resourced, visible, and empowered. (R10)

5.5 Summary of conclusions and recommendations

The research quality of the department is very good. The department generates research of a high caliber that attracts international attention, national and European grants, visibility within the profession, and large numbers of doctoral students. The department fosters a research environment of positive energy and productive collaborations. There is a strong commitment to addressing major

challenges in society and in the discipline through research in order to improve the experience of the built environment, strengthen the diversity and relevance of the profession, address pressing national and global concerns, and generally enhance the well-being of individuals and society as a whole. In some cases, the commitment to translational research needs strengthening. The department demonstrates strong potential for future research growth and societal impact over the next six years. Questions remain, however, on specific goals, targets, and strategies for that growth. Also, high teaching loads and policies of inclusion and diversity need attention.

The committee issues the following recommendations:

1. Include a broader range of formats in monitoring research output data to recognize both the scholarly and design-oriented research of the department.
2. Review the infrastructure and programs that have been created in the past six years to create a culture of intellectual exchange across difference and bolster (through additional funding or other means) those that have performed well to ensure the stability and permanence of this foundation. This includes the successful Theory Fellowship pilot program, which recently ended.
3. Develop a communications strategy to clarify the department's research organization, which will support broader awareness of its research foci and benefit outsiders and newcomers unfamiliar with the department's research infrastructure. Concurrently, monitor the output and funding of the research units to evaluate whether the threshold of a critical mass has been met.
4. Explore incentives, such as a reduction in teaching, to encourage research staff to apply for external grants and seed-money funding to make staff more competitive for large grants.
5. Investigate factors that would help doctoral students to improve completion times, increase gender parity among the funded students, and expand the geographical areas of recruitment, particularly in the global south.
6. Develop stronger strategies to identify evolutions in societal needs and develop the relationship between practice and academia in order to increase societal relevance.
7. Consider the creation of an outward-facing position to foster closer relationships with professional and society stakeholders; facilitate new networks for research staff; and help to disseminate, promote, and apply new discoveries to speed their adoption by the profession, industry and broader society.
8. Involve all research staff in developing department-wide research goals, with carefully articulated strategic and implementation plans, to position the department for future success.
9. Study whether systemic barriers prevent honoring the contractual obligations for assistant, associate, and full professors regarding the allocation of research time and, if needed, take corrective measures.

10. Continue to develop recruitment and retention strategies to increase the diversity of research staff across ranks, particularly with regard to gender and national diversity, and create a robust infrastructure for the work of diversity in the department so that it is adequately resourced, visible, and empowered.

6 Architectural Engineering and Technology

6.1 Aims and strategy

The department of Architectural Engineering and Technology (AE+T) is bridging the disciplines of Architecture and Building science and engineering by deploying an engineering and technology-driven approach to the design of buildings and the built environment. The focus is on both existing and new buildings to address the vast and complex building tasks at hand. The overall mission stated by the AE+T department is: “Meeting the demand for better buildings considering our planet’s finite resources”, and more specifically regarding research: “Advancing technology to enable the design of a better built environment considering our planet’s finite resources and with added value for people and nature”. Key points to achieve this mission are the pursuit of a collaborative academic culture, an active outreach to wider societal actors, intensive participation in international research networks, and a strategic focus on the topics of energy transition, climate adaptation, health and comfort, circularity, digitization and heritage.

Next to the topical aims, the department has set four strategic aims for the organization:

- 1) Developing excellent research contents, which are beneficial to the staff's individual and collective scientific development; facilitates interdisciplinary collaborations between specialists where this is needed to address the complex nature of the built environment; allows a holistic and unique approach to span architecture and civil engineering.
- 2) Fostering fruitful collaboration and behavior: nurturing the sense of belonging within a daily work team, whilst receiving the benefits of being associated with a larger organization; reducing internal competition while encouraging mutual understanding and respect; capitalizing on the combination of the department's expertise in organizing and delivering research and education; facilitating a supportive relationship with other departments and faculties.
- 3) Providing a meaningful organization to allow for independence and academic freedom whilst respecting the organizational framework; enable challenge-responsiveness and the sharing of organizational burdens; allow having the ‘right size’ and having enough carrying capacity; facilitates internal and external communication.
- 4) Maximizing impact through valorization and external visibility: strengthening individual visibility affiliated to strong community; supporting innovation in the synergy between the disciplines; forming a stronger, clearly identifiable entity with more leverage over external societal actors; attracting top talents and excellent students.

6.2 Research Quality

The committee assesses the overall quality of the research at the AE+T department as very good, with several elements of excellence such as scientific outcomes, research facilities, involvement of practitioners and collaboration with the industry, as well as an open and inclusive research culture. Generally, the department's mission and topical research aims are well reflected by the recent research outcomes, grants, and networks. In that regard, significant examples are the cross-

departmental Circularity in the Built Environment (CBE) hub and the diverse set of AE+T labs (BK-Labs).

In relation to the four strategic aims listed in the previous section, the department has strongly invested in labs and experimental facilities to develop innovative research and test new technologies. There are several successful examples of these labs leading to world-class research outcomes and societal impact as well as forming showcases to increase visibility (e.g., The Green Village). The various labs and experimental facilities have clearly drawn attention from both academia and practice.

Lately, the individual labs have increasingly been building collaboration structures to stimulate interdisciplinarity and knowledge diffusion. This has contributed to all four strategic aims. Moreover, by introducing physical spots where research meets practice and society, the labs have strongly contributed to the goals of “open science”. Further improvements on “open science” have been made in terms of open-access publications, collaborative networks and events, and open-source databases and software, contributing to the global scientific and public debates.

The aim to develop excellent research content has been supported by the research outputs in terms of an increased scientific/professional output ratio. Nevertheless, the committee noted a lack of reporting patents issued by the department. Especially for a technology-oriented department, such patents can contribute to increase practical application of research and diffusion of ideas while remaining in control of the ideas. Therefore, the committee suggests looking, next to scientific publications, to patents as a mode of technology transfer. (R1)

The integration of formerly separated research programmes into one department, has created opportunities for knowledge exchange and collaborations as indicated by the various grants won by collaborative proposals. The department has strongly aimed for an increase in both internal and external collaborations. There are many inspiring examples of such networks and collaborative initiatives. Although the self-evaluation report shows that the department keeps seeking for more industry-academia networks and to increase internal collaborations, the assessment committee suggests to also put structural processes or policies into place to guide or stimulate such developments. (R2)

The committee was positively impressed by the comfortable and outspoken attitude of researchers across all ranks, including PhD candidates and post-docs. This indicates an excellent and positive work environment in which both permanent staff and temporary researchers experience openness and inclusiveness as well as possibilities to grow within the organization. Despite the large number of educational activities, the balance between research and education was carefully managed to the satisfaction of staff members across all ranks.

The diversification of staff has been problematic in the past but has gained increasing attention within the department. Apart from the ranks of Assistant Professors, the male/female ratio has considerably grown towards equal numbers. Moreover, the international and intercultural diversity has increased throughout the department in the past six years. Noteworthy, however, is the lack of non-European senior staff. A better representation of this group is important to maintain a pluralistic and multicultural perspective towards research and a feeling of representation and career opportunities by junior staff, researchers and PhD candidates that have largely a non-EU background. The department's current strategy is to improve this aspect by means of a retirement/hiring policy, but, considering the existing huge gap, this might need more intentional effort. Beyond diversity in terms of male/female and Dutch/foreign ratios, the conversations during

the site visit on the breadth of the diversity concept and the strong links to the hiring processes in the department are promising yet require continuous attention.

Regarding the PhD candidates, a major change was the creation of working place into a single large room to foster community feeling and collaboration. Although it was generally experienced positively, it turned out to be strongly dependent on individual preferences. A recommendation would be to reserve smaller rooms for individuals that prefer silent and more private working spaces (R3). This can also help in some key periods of a PhD trajectory which require more focus and concentration such a publication and/or thesis writing. PhD candidates seemed generally satisfied with the supervision activities and guidance by senior staff and the Graduate School. A point of attention is a smoother on-boarding of new candidates with particular attention on the first days and weeks. Currently, the process is unstructured and very much dependent on appointed supervisors and fellow-PhD candidates. (R4)

The self-evaluation report shows how the AE+T department adheres to TU Delft's central policies on research integrity, which are of a high standard. However, additional steps are not fully demonstrated. The close links with practice (both regarding funding and data) and in particular the appointment of visiting and industry-affiliated professors comes with implications that might harm research integrity in the future. The committee recommends the implementation of a specific set of policies to ensure 'good' research that reaps the fruits of collaboration with practice, yet mitigates the risks caused by potential conflicts of interest and research integrity issues. (R5)

6.3 Societal Relevance

Despite opportunities for improving processes, methodology and alignment, the assessment committee considers the societal relevance of the work performed by the AE+T department to be excellent. Beyond relevance for practice in general, which can be expected from an applied research department, the department is increasingly shifting focus to wider societal relevance in terms of a future-proof, sustainable and safe built environment. The research has immediate implications for practice at all levels and is developed in close collaboration with practitioners, enabling their input.

This practical relevance explains the relatively high degree of industry funding, and, in turn, the industry funding ensures a high practical application of research results. The appointment of industry-affiliated and visiting professors has contributed to knowledge exchange by bringing practice closer to the knowledge creation, increasing the ties between research and practice. This was confirmed by the dialogue that the assessment committee had with the stakeholders during the site visit. There are several inspiring examples of industry-academia networks and initiatives with positive results for both research and practice. Besides research into critical societal needs, such as health and energy, the department has also conducted research in special explorative projects promoting innovation (e.g., BK-Labs, The Green Village at the TU Delft Campus with all the research facilities open to the public). Those activities have added to the visibility of the research in the built environment and the department's reputation and moreover have strengthened the department with additional knowledge and creativity.

The self-evaluation report states that "methods of working 'with' society rather than 'for' society have grown in strength and update within our thinking". Despite the obvious evidence in living lab settings and industry-academia networks, the committee did not find much evidence that this way of thinking is internalized in the research methods and approaches. For example, the approaches

from section 5.3 in the self-evaluation report, such as the MOOCs and SenseLab as well as the Solar Decathlon seem to represent a rather one-way knowledge flow (i.e., lack of evident research participation from the public or practice). Here, design science and engineering methods seem to be predominant. Considering the aim for societal impact, approaches such as participative design science, ethnographic studies, and action research could stimulate a change towards science with society rather than for society by offering a participative approach at the nexus between people and technology. (R6)

A significant initiative of high societal relevance and impact was the effort in modelling and building real-life prototyping, which has become a visible focal point to the university and the wider public. This is represented by the Green Village that offers a space open to the public to exhibit research outputs. Among the research facilities, the most relevant and functioning are the prototypes of the Solar Decathlon exhibition, the Product Development (PD) Test Lab, and experimental living labs. The PD Test Lab represents a best practice for university literally opening their doors and facilities to wider society. Another significant example of societal relevance and impact came about by the chairs on health and comfort. Physical interaction with schoolchildren and citizens in the SenseLab informed societal actors about the importance of indoor air quality during the pandemic. This has played a significant role towards the promotion of a healthy environment.

Over the last years, an ever-expanding portfolio of MOOCs and professional education courses has been developed. The assessment committee believes that this represents a significant and valuable open-science platform that contributes to knowledge dissemination for a broader audience ranging from society to industry and policymakers. Furthermore, the assessment committee believes that the MOOCs allow the department to expand its visibility worldwide and to position itself as leader and expert on both educational and research topics. (R7)

6.4 Viability

Both research quality and societal relevance as well as the anticipation with regard to emerging societal challenges indicate that potentially viability could be excellent. However, the committee finds the financial situation precarious, in particular with regard of the financing of permanent staff. This results in an assessment of viability as good, which is explained below in greater detail.

The department's research aims address the current societal challenges effectively and provide suitable directions to contribute to the future challenges from both an academic and societal perspective. Nevertheless, the aims are rather all-encompassing and moreover used in a fragmented way, risking a lack of distinctness and profiling as a department, both inside and outside the TU Delft. The committee recommends reducing the number of strategic topical research goals in line with the university and faculty goals and describing those in terms of just several societal challenges in line with the department's strengths. The mission statement in section 6.2 of the self-evaluation report provides a viable starting point. Each chair with its own discipline and expertise can define their own more specific strategic aims, albeit actively aligned with the other chairs. This enables the tracking of progress, both internally (longitudinally) and externally (compared to other organizations, countries, or policies). (R8)

The committee agrees that the department's proposed strategy to minimize the management role of the various chairs would have benefits in the long-term future. Nevertheless, the assessment

committee highlights that a strategic alignment between the departmental management and the research projects of chairs require continuous attention.

In the self-evaluation report, it is mentioned as a weakness that there is a high work pressure and heavy teaching loads. Moreover, in the future strategy fragmentation and resulting bureaucracy is mentioned, as well as a high level of tenure trackers and self-financed PhD candidates, which are all known to be sources of high pressure and unhealthy working conditions. In addition, several future strategies are proposed that will most likely even increase the pressure on younger researchers, such as encouraging younger researchers to apply for grants or to become involved in networks. This all takes place in a time that student numbers – and hence educational load – are growing. The recommendation from the assessment committee is to structurally take into account the effect of all strategic decisions on work pressure and to make sharp choices. (R9)

In the past years, early-career researchers have been attracted mainly in the form of tenure-track assistant professors with the goal to provide scientific freedom and initiative to junior staff. Next to this strategy, recruitment of staff, predominantly junior staff, has focused on internal promotion rather than external vacancies, with advantages for, for example, topical coherence. During the site visit, the level of independence of junior staff was emphasized and supported by across the ranks. Nevertheless the committee recommends a strategy to institutionalize the autonomy of junior staff beyond the promise that full professors as project leaders take goals and aims of assistant professors and other junior staff into account.

The assessment committee is confident that in the near future the department can provide availability of funding opportunities, due to close alignment with relevant societal challenges and additional resources due to the Sector plan. Nevertheless, there appears to be a structural financial deficit, which leads to a large reliance on third-stream money flows for staff salaries and overhead. Although this financial situation could be partly solved by the current strategy of hiring new professors financed with first-stream funds to replace retired professors in the next years, it also poses challenges to both continuity of expertise as well as leadership roles. In addition, this strategy might not be enough to finance all staff members through first-stream funds. Therefore, the committee recommends employing other strategies, not only within the department level, but also at the faculty and university level.

Over the last years, a strategic development was to appoint industry-affiliated professors which combine both significant research, educational and academic background with valuable and relevant experiences in real-world application and/or great firms that are leaders in the sector of building technology and construction. The assessment committee recommends continuing with this strategy yet maintaining a balance with research-oriented full professors to remain in the forefront of building research. Furthermore, the department has a strategy to continue to focus on junior academic hires in tenure track positions, building on internal recruitment and promotion. Current and future tenure track candidates represent an investment to secure the future of the department in terms of the expertise needed.

However, the focus on tenure track positions, does not resolve the short-term challenge that the numbers of scientific staff taking leadership positions are tight. The assessment committee recognizes this as one of the main challenges for the future recruitment campaign of the academic staff. In addition, assistant professors take up more senior leadership roles, which may be fine for some, but which might not always be desirable given their need or wish to have time for development in other areas. The committee recommends developing a policy on future leadership and in doing so, making a good use of the Recognition and Rewards policy, which enables a diversity

of academic career paths, allowing some to specialize in management and others to concentrate on research, teaching or valorisation. (R10)

6.5 Summary of conclusions and recommendations

Overall, the committee assesses the academic quality as very good, with several elements of excellence such as scientific outcomes, research facilities (BK-labs), as well as an open and inclusive research culture. Generally, the department's mission and topical research aims are well reflected by the recent research outputs, grants, and networks. Despite opportunities for improving processes, methodology and alignment, the assessment committee considers the societal relevance to be excellent. The department is increasingly shifting focus to wider societal relevance in terms of a future-proof, sustainable and safe built environment. The research has immediate implications for practice at all levels and is developed in close collaboration with practitioners, enabling their input. Both research quality and societal relevance as well as the focus on societal challenges indicate that potentially viability could be excellent. However, the committee finds the financial situation challenging as part of the permanent staff is funded by the third money stream. Also, due to upcoming retirements, (future) leadership positions pose a concern.

The committee issues the following recommendations:

1. Next to scientific publications, consider patents as academic output and mode of technology transfer.
2. Set structural processes or policies in place to guide or stimulate industry-academia networks and to increase internal collaborations.
3. Besides offering PhD students a single large workspace, thus improving community feeling and collaboration, reserve smaller rooms for individuals that prefer silent and more private working spaces.
4. Set a procedure in place to ensure a smooth on-boarding of new PhD-students, with particular attention on the first days and weeks.
5. Implement a specific set of policies to ensure 'good' research that reaps the fruits of collaboration with practice, yet mitigates the risks caused by potential conflicts of interest and research integrity issues.
6. Continue to develop and stimulate methodological approaches that foster the change from science with rather than science for society, such as participative design science, ethnographic studies, and action research.
7. Continue to develop the MOOCs in order to develop the department's visibility worldwide and to position itself as leader and expert on both educational and research topics.
8. Reduce the number of strategic topical research goals in line with the university and faculty goals and describe them in terms of just several societal challenges in line with the

department's strengths. The mission statement in section 6.2 of the self-evaluation report provides a viable starting point.

9. Make sharp choices when taking strategic decisions on new activities, goals and requirements and structurally take into account the effect on work pressure.
10. Develop a policy on future leadership and in doing so, make a good use of the Recognition and Rewards policy, enabling a diversity of academic career paths, allowing some to specialize in management and others to concentrate on research, teaching or valorisation.

Appendices

Appendix 1 Site visit programme

DAY 1: Sunday November 27 (Hotel)

18.30 Committee meeting

19.30 Committee dinner

DAY 2: Monday November 28 (Berlage I and II)

8.30 Interview with Faculty management (Dick van Gameren (Dean), Amber van Leeuwenburgh (Faculty Manager), Frank van der Hoeven, (Director Research), Paul Chan (Director Faculty Graduate School), Corrinne de Vries-Posthoorn (Manager Finance), Eline Geuzinge (Manager Human Resource))

9.00 Recording findings

9.15 Interview with MBE PhDs and postdocs (Özlem Altinkaya Genel (PostDoc), Felipe Bucci Ancapi (PhD), Mathilda Du Preez (PostDoc), Maarten Koreman (PhD), Bo Li (PhD), Pedram Soltami (PhD), Cynthia Souaid (PhD), Fatemeh Vafaie (PhD))

10.00 Recording findings

10.15 Break

10.30 Interview with Rector Magnificus Tim van der Hagen

11.00 Break

11.15 Interview with MBE - assistant and associate professors (Monique Arkesteijn (associate, PhD Policy), Darinka Czischke (associate), Tom Daamen (associate, director SKG, Open Science), Queena Qian (associate), Marjolein Spaans (assistant, research programme coordinator, Integrity & Ethics), Gerard van Bortel (assistant), Karel van den Berghe (assistant, HRM, TT), Tong Wang (assistant, HRM,TT))

12.00 Recording findings

12.15 Lunch with stakeholders department MBE: (Desirée Uitzetter (Director Area Development BPD Ontwikkeling BV and chair NEPROM (Association of Dutch Project Development Companies)) (network SKG), Alexander Bletsis (Innovation Manager Province Noord-Holland) (network Opdrachtgeversforum in de bouw (Client Forum in Construction)), Wim van Diersen (director Bribus, jointly developed Circular Kitchen of which 1st prototype is at MBE). Lunch with stakeholders department Urbanism: (Ben Kuipers, NVTL (Dutch professional association for garden and landscape architects and designers), Ed Dammers,

- PBL (Netherlands Environmental Assessment Agency), Mattijs van Ruijven (municipality of Rotterdam))
- 13.15 Interview with MBE - group leaders and management (Anouk Bloembergen (dept. manager, HRM), Paul Chan (section leader/director Graduate School, prof., PhD Policy), Erwin Heurkens (section coordinator, assistant prof), Willem Korthals Altes (section leader, prof., integrity & ethics), Arjen Meijer (PhD mentor, assistant prof, MBE until 2020, currently AE+T, PhD Mentor), Hilde Remoy (research programme leader/section leader, associate prof, Open Science), Ellen van Bueren (dept. chair, prof., HRM))
- 14.00 Preliminary conclusions MBE
- 14.30 Interview with Urbanism - PhDs and postdocs (Monica Veras Morais (PhD LA, standard), Geert van der Meulen (PhD UD, standard), Cinco Yu (PhD – SPS former PhD council member, scholarship), Stefano Calzati (postdoc UDS), Elizabeth Migoni Alejandro (postdoc ETD), Daniela Maiullari (postdoc LA))
- 15.15 Recording findings
- 15.30 Break
- 16.00 Interview with Urbanism - assistant and associate professors (Roberto Rocco (academic culture, HR Policy, diversity & inclusion, Ass.Prof. Spatial Planning & Strategy), Ana Petrovic (TT, research quality, Ass. Prof. Urban Studies), Marcin Dabrowski (TT, PhD-policy, Ass. Prof. Spatial Planning & Strategy), Claudiu Forgaci (open science, Ass. Prof. Urban Design), Reinout Kleinhans (academic culture: integrity & ethics, Assoc.Prof. Urban Studies), Fransje Hooimeijer (societal relevance, Assoc.Prof. Environmental Technology & Design), Taneha Bacchin (TT, research quality, Ass.Prof. Urban Design), Marjolein van Esch (TT, viability, Ass.Prof. Environmental Technology & Design))
- 16.45 Recording findings
- 17.00 Interview with Urbanism - group leaders and management (Maarten van Ham (viability, departmental Chair, Full Prof. Urban Studies), Steffen Nijhuis (PhD policy, Research Leader, Assoc. Prof. Landscape Architecture), Leo van den Burg (academic culture, Section Leader Urban Design), Alexander Wandl (research quality, Assoc. Prof. Environmental Technology & Design), Jantien Stoter (open science, Full Prof. Urban Data Science), Eric Luiten (societal relevance, Full Prof. Landscape Architecture), Joost Niermeijer (HR policy, departmental Manager))
- 17.45 Preliminary conclusions Urbanism
- 19.30 Dinner and further discussion

DAY 3: Tuesday November 29 (Berlage I and II)

9.00 Committee meeting

9.30 Break

9.45 Interview with Architecture - assistant and associate professors (Manuela Triggianese (Architecture and the City group, PhD policy), Rachel Lee (History group, integrity and ethics), Nelson Mota (Global Housing group, open science), Dirk van den Heuvel (Architecture, Culture Modernity group, HRM), Amy Thomas (Architecture, Culture, Modernity group, integrity and ethics), Angeliki Sioli (Situating Architecture group, PhD policy), Aleksandar Stanicic (Situating Architecture group, open science), Stavros Kousoulas (Ecologies of Architecture group, integrity and ethics)

10.30 Recording findings

10.45 Break

11.15 Interview with Architecture - group leaders and management (Kees Kaan (departmental chair), Danielle Groetelaers (departmental manager), Janina Gosseye (departmental research leader), Heidi Sohn (PhD mentor), Klaske Havik (representative of the newly established 'Architectural Pedagogies'), Roberto Cavallo (representative of the newly established 'Architectural Pedagogies'), Salomon Frausto (representative of the newly established 'Design Research' research line), Georg Vrachliotis (representative of the newly established 'Digital Culture' research line), Carola Hein (representative of the 'History' research line)

12.00 Recording findings

12.15 Lunch with stakeholders department Architecture (Dirk van der Hoeven (Het Nieuwe Instituut (HNI), Paul Gerretsen (Principal designer, Vereniging Deltametropool), Ton Venhoeven (Principal Architect and Urban Planner Venhoeven CS)
Lunch with stakeholders department AE+T (Monique Fledderman (Manager of education, environment and innovation at VMRG, façade contractors' association), Paul Thissen (Province of Gelderland), Erwin ten Brincke (Associate Partner at ABT bv.))

13.15 Preliminary conclusions department Architecture

- 13.30 Interview with Architecture - PhDs and postdocs (Alejandro Campus Uribe (postdoc, Architecture Culture Modernity group), Marija Mateljan (PhD candidate, Digital Culture group), Grazia Tona (PhD candidate, Borders and Territories group, PhD council), Jurjen Zeinstra (recently completed PhD, Situated Architecture group), Penglin Zhu (PhD candidate, History group), Brook Haileselassie (PhD candidate, Global Housing group), Soscha Monteiro de Jesus (PhD candidate, Ecologies of Architecture group)). Interview with AE+T - PhDs and postdocs (Nick ten Caat (PhD candidate Climate Design & Sustainability), Prateek Wahi (PhD in Building Physics & Services, PhD council representative of the department), Pedro de la Barra Luegmayer (PhD candidate Design of construction, Architectural Technology, scholarship), Eftychia Kalogianni (PhD candidate GIS Technology, Digital Technologies), Tatiana Armijos Moya (Post-doc in Design of construction, Architectural Technology, former member PhD council), Simona Bianchi (Post-doc in Structural Design & Mechanics, Architectural Technology))
- 14.15 Recording findings
- 14.30 Interview with AE+T - assistant and associate professors (Stijn Brancart, Assistant Professor at Structural design, Architectural Technology, TT), Charalampos Andriotis (Assistant Professor of Artificial Intelligence in Structural Design & Mechanics, TT), Eleonora Brembilla (Assistant Professor in Building Physics and Services, TT), Azarakhsh Rafiee, Assistant Professor in GIS Technology, Digital Technologies, TT), Michela Turrin (Associate professor, Digital Technologies), Barbara Lubelli, Associate Professor Heritage & Architecture, Internal promotion career path), Olga Ioannou (Assistant Professor Building Product Innovation, Architectural Technology, TT)
- 15.15 Recording findings
- 15.30 Break
- 15.45 Interview with AE+T - group leaders and management (Onno de Wit (Department manager), Prof. Michiel Kreutzer (Full Professor, Head of the department), Thaleia Konstantinou (Assistant Professor at Building Product Innovation, Research coordinator of the Department, former PhD selection committee), Julia Kreuwel (HR advisor), Michela Turrin (Associate Professor at Design Informatics, Section leader Digital Technologies), Prof. Mauro Overend (Full professor at Structural Design & Mechanics, Section leader Architectural Technology), Wido Quist (Assistant Professor at Heritage & Technology, Section leader Heritage & Architecture, PhD selection committee), Martin Tenpierik (Associate Professor at Building Physics & Services, Section leader Environmental & Climate Design, PhD selection committee))
- 16.30 Preliminary conclusions department AE+T
- 17.00 Break
- 17.15 Presentation preliminary findings and drinks

Appendix 2 Composition and funding data MBE

Input of Research Staff	2016		2017		2018		2019		2020		2021	
	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE
Scientific Staff												
Full professor	13	3,5	11	2,9	10	3,0	13	4,0	14	4,4	13	4,1
Associate professor	11	3,6	10	3,8	10	3,3	9	3,3	10	3,6	10	3,8
Assistant professor	21	6,8	22	7,0	21	7,7	21	7,3	23	8,0	21	7,4
Researchers (incl.postdocs)	23	11,2	23	10,6	28	9,6	30	11,0	31	11,8	25	11,2
PhD candidates	36		38		42		39		53		55	
Total research staff	104	25,1	104	24,3	111	23,6	112	25,6	131	27,8	124	26,5
Visiting Fellows	27	7,3	31	6,4	17	3,1	18	3,7	20	2,3	14	1,4
Total staff	131	32,4	135	30,7	128	26,7	130	29,3	151	30,1	138	27,9

	2016		2017		2018		2019		2020		2021	
	K€	%	K€	%	K€	%	K€	%	K€	%	K€	%
Direct funding (1)	1.391	50%	1.421	50%	1.365	45%	1.897	45%	2.263	45%	2.241	43%
Research grants (2)	251	9%	355	13%	281	9%	15	0%	172	3%	504	10%
Contract research (3)	317	11%	349	12%	552	18%	1.275	30%	1.920	38%	1.822	35%
Own contribution	-47	-2%	-129	-5%	-146	-5%	-276	-7%	-547	-11%	-536	-10%
Other (4)	855	31%	820	29%	988	32%	1.299	31%	1.197	24%	1.139	22%
Total funding	2.767	100%	2.817	100%	3.041	100%	4.210	100%	5.005	100%	5.171	100%
<i>Expenditure</i>												
Personnel costs	-2.053	92%	-2.094	88%	-2.205	89%	-3.076	90%	-4.161	89%	-4.256	87%
Other costs	-189	8%	-283	12%	-279	11%	-352	10%	-489	11%	-657	13%
Total expenditure	-2.242	100%	-2.377	100%	-2.485	100%	-3.428	100%	-4.650	100%	-4.913	100%
Result	525		440		557		782		354		258	

Appendix 3 Composition and funding data Urbanism

Input of Research Staff	2016		2017		2018		2019		2020		2021	
	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE
Scientific Staff												
Full professor	9	2,6	9	2,4	9	2,3	9	2,1	8	1,8	7	2,0
Associate professor	16	5,2	17	5,7	15	5,0	19	6,0	18	6,2	19	5,8
Assistant professor	14	4,0	15	4,5	17	5,1	21	6,9	25	7,5	26	8,7
Researchers	40	15,8	39	18,6	42	20,3	38	15,4	37	15,2	28	12,0
PhD candidates	57		54		54		43		49		55	
Total research staff	136	27,6	134	31,2	137	32,7	130	30,4	137	30,7	135	28,5
Visiting Fellows	40	0,8	34	1,7	35	1,6	52	4,0	41	6,6	33	3,0
Total staff	176	28,4	168	32,9	172	34,3	182	34,4	178	37,3	168	31,5

	2016		2017		2018		2019		2020		2021	
Research unit	K€	%	K€	%	K€	%	K€	%	K€	%	K€	%
Direct funding (1)	1.597	46%	1.719	41%	1.559	35%	2.033	49%	2.331	47%	2.601	53%
Research grants (2)	908	26%	1.223	29%	1.014	23%	991	24%	1.029	21%	536	11%
Contract research (3)	975	28%	1.563	37%	2.111	47%	1.328	32%	2.319	47%	2.012	41%
Own contribution	-508	-15%	-657	-16%	-686	-15%	-776	-19%	-1.058	-21%	-549	-11%
Other (4)	466	14%	359	9%	494	11%	565	14%	312	6%	285	6%
Total funding	3.439	100%	4.207	100%	4.491	100%	4.141	100%	4.932	100%	4.885	100%
<i>Expenditure</i>												
Personnel costs	-3.026	83%	-3.447	79%	-3.702	79%	-3.449	79%	-4.672	84%	-4.438	88%
Other costs	-635	17%	-905	21%	-1.002	21%	-898	21%	-893	16%	-597	12%
Total expenditure	-3.661	100%	-4.352	100%	-4.705	100%	-4.347	100%	-5.565	100%	-5.034	100%
Result	--223		-145		-214		-206		-632		-150	

Appendix 4 Composition and funding data Architecture

Input of Research Staff	2016		2017		2018		2019		2020		2021	
	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE
Scientific Staff												
Full professor	7	2,0	7	2,0	9	1,9	8	1,7	10	1,9	10	2,3
Associate professor	10	2,6	9	3,1	9	3,0	9	3,1	10	2,6	8	2,8
Assistant professor	20	5,5	16	4,7	16	4,9	19	5,1	23	6,7	25	8,2
Researchers	14	5,9	22	8,1	25	11,5	23	10,6	16	7,5	21	7,0
PhD candidates	28		33		41		49		48		54	
Total research staff	79	16,0	87	17,9	100	21,3	108	20,5	107	18,7	118	20,3
Visiting Fellows	32	6,3	29	9,14	34	8,8	28	8,7	22	6,9	21	6,1
Total staff	111	22,3	116	27,04	134	30,1	136	29,2	129	25,6	139	26,4

	2016		2017		2018		2019		2020		2021	
	K€	%	K€	%	K€	%	K€	%	K€	%	K€	%
Direct funding (1)	2.585	79%	2.450	73%	2.222	66%	2.733	66%	2.878	71%	3.242	72%
Research grants (2)	109	3%	75	2%	50	1%	66	2%	202	5%	151	3%
Contract research (3)	294	9%	372	11%	631	19%	784	19%	641	16%	790	18%
Own contribution	-60	-2%	-133	-4%	-168	-5%	-303	-7%	-304	-7%	-181	-4%
Other (4)	338	10%	584	17%	638	19%	863	21%	648	16%	513	11%
Total funding	3.266	100%	3.348	100%	3.372	100%	4.142	100%	4.065	100%	4.515	100%
<i>Expenditure</i>												
Personnel costs	-2.812	88%	-2.478	85%	-2.368	84%	-3.559	88%	-3.708	92%	-4.139	93%
Other costs	-399	12%	-421	15%	-451	16%	-475	12%	-338	8%	-332	7%
Total expenditure	-3.211	100%	-2.899	100%	-2.819	100%	-4.034	100%	-4.046	100%	-4.471	100%
Result	55		449		553		109		19		45	

Appendix 5 Composition and funding data AE+T

Input of Research Staff												
	2016		2017		2018		2019		2020		2021	
	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE
Scientific Staff												
Full professor	14	3,2	12	2,8	13	3,30	14	3,5	13	3,7	16	4,3
Associate professor	10	3,0	12	3,6	14	3,8	13	3,7	11	3,8	10	3,4
Assistant professor	23	6,8	22	6,4	19	6,0	15	5,0	15	4,1	20	6,0
Researchers (incl Postdocs)	32	14,4	33	15,7	27	10,5	28	9,9	27	9,0	31	16,0
PhD candidates	61		65		55		61		69		68	
Total research staff	140	27,4	144	28,5	128	23,6	131	22,1	135	20,6	145	29,7
Visiting Fellows	22	4,5	26	7,3	33	6,5	32	6,7	28	7,4	21	4,0
Total staff	162	31,9	170	35,8	161	30,1	163	28,8	163	28,0	166	33,7

	2016		2017		2018		2019		2020		2021	
	K€	%	K€	%	K€	%	K€	%	K€	%	K€	%
Direct funding (1)	2.361	48%	2.334	57%	2.070	54%	2.563	58%	2.686	55%	2.915	49%
Research grants (2)	545	11%	726	18%	395	10%	319	7%	447	9%	975	16%
Contract research (3)	2.147	44%	1.295	31%	1.527	40%	1.716	39%	1.790	37%	2.149	36%
Own contribution	-275	-6%	-538	-13%	-333	-9%	-382	-9%	-397	-8%	-569	-10%
Other (4)	112	2%	302	7%	176	5%	235	5%	360	7%	497	8%
Total funding	4.890	100%	4.119	100%	3.835	100%	4.451	100%	4.886	100%	5.967	100%
<i>Expenditure</i>												
Personnel costs	-3.998	80%	-3.660	84%	-3.393	87%	-4.156	86%	-4.369	87%	-5.182	88%
Other costs	-974	20%	-681	16%	-516	13%	-653	14%	-672	13%	-721	12%
Total expenditure	-4.972	100%	-4.341	100%	-3.909	100%	-4.810	100%	-5.042	100%	-5.903	100%
Result	-82		-223		-74		-358		-156		64	