

Learning and Innovation for Resilience and Sustainability

2021 – 2027

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Conceptual background

The research program *Learning and Innovation for Resilience and Sustainability (LIRS)* is a multidisciplinary and integrative research program with the *ambition* to build on the notions of resilience and sustainability and address important challenges faced by our modern society that involve a complex interplay between social, economic, technological and environmental systems.

The Sustainable Development Goals of the United Nations, as well as the Strategic Priorities of the European Union, focus on grand societal challenges such as sustainable economic development, inclusive education, social equality and wellbeing, digital transformation, and climate change. All these grand challenges involve a complex systemic interplay of social, economic, technological, and environmental systems at the regional, national, and global levels. In order to tackle these grand challenges we need to understand how these complex and multifaceted systems: (1) absorb disturbances and recover from events with a low probability yet high impact (how do they achieve systemic resilience) and (2) build systemic capabilities to effectively respond and adapt to repetitive events that involve different systemic interfaces among the social, economic, technological and environmental dimensions in order to maintain long term functionality and effectiveness (sustainability). The LIRS multidisciplinary research program aims to explore and engage with the complex dynamics that unfold at these systemic interfaces and generate knowledge and insights on how systemic sustainability and resilience can be achieved.

Sustainability in this context reflects a dynamic equilibrium in the interaction of the social, economic, technological, and environmental systems such that the carrying capacity of these multilayered systems is not exceeded. LIRS researchers engage with sustainability in a wide variety of systems, ranging from organizations (e.g., sustainable employment, sustainable careers, corporate sustainability, sustainability standards; sustainable healthcare), education (e.g., sustainability education), cities (e.g., sustainable urban development), economy (e.g., sustainability in finance; sustainable innovation), and environment (sustainability decisions and governance). We build on sustainability as a *proactive and adaptation - focused* systemic orientation on how to deal with and adapt to repetitive and cyclical events involving complex interplay among different systemic dimensions. The research program engages with sustainability as (predictable) systemic imbalances emerge at the interfaces between various interacting systems, especially where the social system intersects with the other dynamic systems.

Resilience has often been associated with the continued performance and stability of certain systems under stress (i.e., a conservative element). Within the LIRS program, it emphasizes the need for adaptation and transformation, especially as critical rare events with high impact (e.g., economic, ecological or technological crises) emerge and generate disturbances. Hence, the focus on resilience builds on a more *reactive and change-focused orientation*. We engage with resilience because it has assumed a pivotal role in explaining the performance of actors (i.e., individuals, groups, organizations, communities, and supply chains) as systems under continuous external pressures, difficult to predict or prevent with the potential to disrupt their functioning. The program is based on the notion that these challenges exist throughout our societies, and also pertain to the interfaces between social systems on the one hand and ecological, technological, and economic systems on the other hand. Here, particular emphasis is given to the social-ecological and social-technological interfaces as they absorb disturbances and recover from such challenging events.

All complex systems that are the objects of research within LIRS have societal, technological, and environmental footprints. Their dynamics are marked by learning and innovation and require both proactive as well as a reactive systemic competencies in order to achieve resilience and sustainability. Systemic resilience and sustainability are the core themes underlying the LIRS research program. We build on a synergistic view on resilience and sustainability as core systemic capabilities necessary for effectively tackling modern grand challenges at the regional, national and global level. In this vein, we argue that resilient and sustainable systems are those that successfully engage in learning at different levels and effectively combine *exploration* and *exploitation* capacities. Learning is viewed as a key systemic capability of translating knowledge into transformative actions. Exploration is needed to spot new developments, to analyze and assess them such that the system can be amended if the need arises. Exploitation is about fine-tuning the functionality of the system under the current conditions, so that effectiveness and efficiency gains are made. Learning and innovation are therefore key processes that drive the reactive (to absorb disturbances and recover from immediate impactful event) and proactive (to thrive, adapt efficiently to cyclical events and be effective on the long run) systemic competencies.

Both learning and innovation are deemed necessary for systems to become and remain resilient and sustainable. In the LIRS program, we take a relational perspective on learning as a core process that secures adaptation and change. Therefore, learning is what makes systems ready for innovation, but innovation also extends to organizational and political processes, the agency embedded therein and ultimately the systemic learning capabilities. Learning and innovation are also positioned in the institutional context that governs the synergies between resilience and sustainability in modern societies and LIRS research aims to also tackle the way in which learning and innovation can inform institutional frameworks with a regional, national and global impact.

Particularly, in exploring the relation between innovation and learning, the LIRS research program builds upon the existing frontrunner position of the Open Universiteit in the field of understanding and facilitating learning processes. In its turn, LIRS has made a prominent contribution to the overall OU research vision (i.e., *Digital, Accessible, Learning, and Innovation*) and it is one of the three

multidisciplinary research lines of the OU. In what follows, we present an overview of the four LIRS research branches. While described separately, the borders of these branches are fluid and permeate to interconnected research initiatives.

The **Learning** branch aims to improve our understanding of learning processes in individuals, groups, organizations, communities, and supply networks. Research topics that are addressed are: learning processes from employees, within organizational teams and between organizations; learning in communities and networks of organizations; learning by individuals via automated feedback and virtual labs; social and transformative learning by stakeholders.

The **Innovation** branch aims to enhance our knowledge of how innovations emerge, diffuse and impact the world, and the role of agency therein. Relevant research areas include: open innovation; innovations in environmental governance; strategic management and innovation; business intelligence and smart services; financial accounting innovations; the impact of new IT technologies on business process management and innovative business models.

The **Resilience** branch aims to increase our understanding of the capacity of systems to absorb disturbance and reorganize while undergoing change, and to retain essentially the same function or even improve. Some of the relevant research directions are: employee resilience, the resilience of organizational groups and teams, services and supply chains (i.e., addressing supply chains in which inter-firm collaboration and competition take place), and trustworthy systems (i.e., addressing resilience and trustworthiness of software systems and information systems). A key research direction concerns *digital transformation and resilient organizations*, including research on topics such as stress and AI, smart technology for service provision, as well as AI and robotics in healthcare.

The **Sustainability** branch aims to contribute knowledge on and insights into how our modern society strives to achieve a dynamic balance between its social, technological, economic, and environmental systems. This research branch includes research directions on sustainability: addressing the design, management, and organization of processes and systems contributing to a more sustainable world; sustainable employment and sustainable careers; sustainable smart cities; corporate sustainability reporting; sustainable healthcare; sustainable supply chains; sustainable innovation and education for sustainability. A central orientation of research *towards sustainable organization and governance*, including research topics such as: decisions and governance in complex socio-environmental issues, minimizing the environmental impact of modern organizations as well as sustainable societal development by improving digital and financial literacy.

LIRS vision, mission, and strategy (2021-2027)

LIRS intends to capitalize on and further develop the collaborative practices and research achievements of the *Learning and Innovation in Resilient Systems* program (2015-2020), including the successful research audit of this research program in September 2021. The main focus of the LIRS research program is the multidisciplinary analysis of resilient and sustainable complex systems and the question of how learning and innovation unfold in these systems. The vision that grounds

LIRS as a research program is rooted in the grand societal challenges that emerge nowadays at the interface of various interacting systems.

Vision Statement

Rigorous, impactful, state-of-the-art multidisciplinary research to address modern societal developments & challenges.

In the context of these grand challenges, LIRS intends to create a natural research environment that facilitates the comprehensive and multi-dimensional analysis of various complex systems. As such LIRS encompasses and stimulates research both in disciplinary domains as well as research that transcends and bridges disciplinary boundaries. State-of-the-art disciplinary insights are a necessary condition for engaging in fruitful cross-disciplinary dialogue. Therefore, in LIRS we build on such state-of-the-art disciplinary expertise. In order to engage effectively with the complex research problems emerging from the grand societal challenges, LIRS aspires to create a platform that stimulates multidisciplinary, interdisciplinary, and transdisciplinary research. It is therefore the mission of the research program to create the conditions under which such a research dialogue emerges and thrives.

LIRS Mission Statement

Provide support and facilitate researchers to embrace an open mind for engaging in a multidisciplinary research dialogue with societal stakeholders and generate transformative insights with significant academic and societal impact.

The strategic orientation of the LIRS research program is to increase our understanding of the innovative and learning capacity of resilient and sustainable systems with social, technological, and environmental dimensions.

Design Principles for LIRS

- 1. Capitalize on and increase the research expertise & capacity present in the OU departments*
- 2. Build a conducive environment for multidisciplinary research and facilitate dialogue across traditional research boundaries*
- 3. Embrace the fundamental principles of Open Science & Open Access*

The current academic context in the Netherlands is highly competitive. Financial resources are often directed towards well-established research institutes and centers, with little to gain for newly established (and smaller) research programs like LIRS. Therefore, the most important research funding channel for LIRS research is internal. Respective funds are distributed according to a clear strategy aimed at fostering research collaboration across departments and stimulating impactful multidisciplinary research projects.

Originally, the faculty attracted several senior researchers (mostly with a part-time employment) with work experience in other Dutch universities or organizations, in order to strengthen the

research climate in the faculty. This strategy aimed at facilitating the infusion of knowledge and expertise in the LIRS research program, as well as the acquisition of contract research. The dual focus on national research funds on the one hand and contract research on the other hand (aimed at supporting research valorization activities), mitigates the high risk associated with funding applications to national and European research grants. The table below summarizes a SWOT analysis that backs up the LIRS strategic choices for the coming six years.

SWOT analysis for the LIRS research program:

Strengths	Weaknesses
Participation in BSSC (through BSSC reach out to businesses, reach out to other universities, focus on innovation) Multidisciplinary research perspective Researchers with diverse backgrounds in the same organizational unit Top educational programs (including the PhD program) attractive for students with work experience Highly motivated and thrifty researchers, well embedded in the national and international academic arena (e.g. editorial boards, conference organization) Financial support provided by OU to multidisciplinary research Financial support provided by OU for open access publications	Size (small) Insecure financial situation Rather substantial bureaucracy Age (young) Reputation (lack of) ICT infrastructure – data storage Emerging research mindset (dominant focus on education) High teaching load Research employees with part-time appointments Lack of expertise in publishing systematically in top tier journals
Opportunities	Threats
Profile of the modal OU student (connected to organizations) Globalized & networked society NWO valorization-centered discourse Increasing lifelong learning needs in society Regional connectivity & partnerships with organizations and other academic institutions (universities or applied sciences) Focus on innovation and further development of knowledge economy at the national level BSSC was designated as one of the seven national hubs for AI coalition (creating important funding opportunities for CAROU)	Substantial competition (within & outside NL) with well-established research groups Funding and research outlets mainly focused on mono-disciplinary research New (IT driven) entrants (IBM, Google) Economic & epidemiological downturn/crises Interdependency (more ties more vulnerability) Diseconomies of organization & OU reorganization Complexity of multidisciplinary research (divergent disciplinary logics, conceptual confusion, etc)

In terms of *capitalizing on its strengths*, the LIRS strategy is to further support the multidisciplinary character of the program via the active involvement of the OU through: (1) internal funding initiatives to stimulate multidisciplinary research and collaboration across departments and schools (i.e., by capitalizing on the already existing collaborative relations among various departments), and (2) involvement in BSSC in order to strengthen research valorization, through CAROU and academic knowledge transfer to societal stakeholders (i.e., by capitalizing on existing collaborative relations with organizational and societal partners). Moreover, the LIRS research program intends to make

clear steps and further strengthen its Open Science initiatives by: (1) increasing the number of open access publications, (2) making research data better accessible to peers, and (3) increasing the engagement in big data research, especially in the context of CAROU.

An important element of the strategic plan also is to further develop the PhD program and capitalize on the success of this research program. Possible developments of PhD education include: (1) increasing the collaboration with businesses and attracting PhD students from organizations that operate in the BSSC environment and the region, (2) strengthening the collaboration with other PhD programs in the Netherlands, especially with respect to the courses and trainings available for the PhD students, and (3) increasing the involvement of PhD students in the research valorization efforts of LIRS, especially in the context of CAROU.

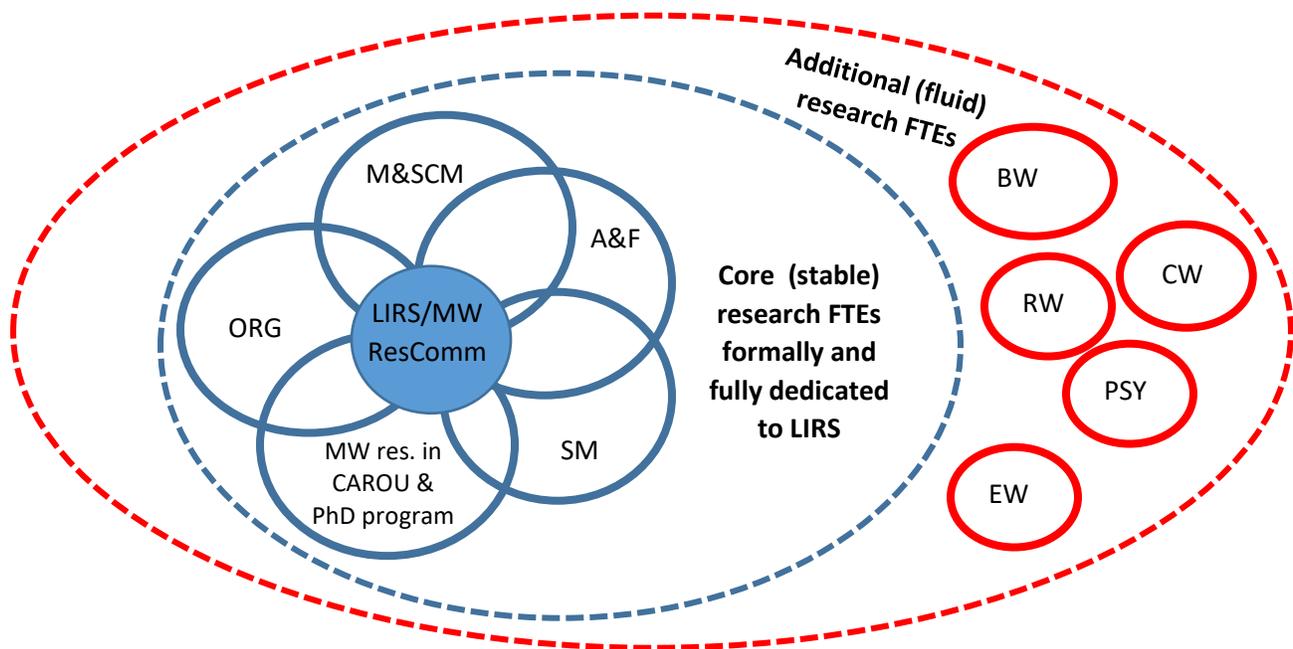
In *dealing with the identified weaknesses*, the LIRS strategic plan is to increase the research focus of the staff members and to protect research time as much as possible. Having a substantial number of staff members with part-time appointments can also generate potential drawbacks in terms of staff turnover. However, external embedding is much more essential for the (young) LIRS research program, and the benefits associated with the knowledge and expertise inflow are much more substantial than the potential drawbacks of this senior staff profile. The strategic plan is to strengthen the academic culture and to support young researchers by (1) developing mentoring systems for grant applications and career advancement, (2) further refining the LIRS seminars as a platform for stimulating multidisciplinary dialogue, increasing staff engagement in these meetings and also inviting reputable scholars to present their research, and (3) increasing the diversity of the research staff and its embedding in the general OU multidisciplinary research initiatives.

Moreover, in order to *mitigate the threats*, the LIRS program has a clear strategy of investing in research, steering research via input (e.g., finance multidisciplinary research projects) and process-focused interventions (e.g., further stimulating national and international embedding in collaborative networks, resuming the organization of the international LIRS symposium and using it as a platform for initiating a multidisciplinary research dialogue with scholars and practitioners).

Finally, the LIRS strategy is to *seize opportunities* (especially in terms of working with societal partners), further strengthening the connection between research and education, and capitalizing on the collaboration with students in research projects with practical relevance. Having a highly diversified staff profile, LIRS intends to deploy this substantial expertise to address modern societal and organizational challenges. Given the success of CAROU as a research valorization platform, the OU intends to increase its involvement in the BSSC by (1) becoming a shareholder in this innovation ecosystem, (2) involving more faculties in the research valorization efforts carried out in CAROU. All these OU strategic choices will further strengthen the position of LIRS as a multidisciplinary research program and increase funding opportunities for applied research in collaboration with the BSSC partners.

LIRS governance

LIRS is a multidisciplinary research program that brings together researchers with a variety of disciplinary backgrounds who engage in collaboration to address complex modern challenges. As a multidisciplinary research program, LIRS encounters a variety of organizational challenges. In order to cope with these challenges, the LIRS organization will change into a two-tier flexible structure. The departments that formally allocate their research FTE to the LIRS program (currently all MW departments), will form the stable core of LIRS. The departments that are partially committing their research FTE to disciplinary research programs, yet are willing to engage with multidisciplinary research collaborations in the context of LIRS, provide additional (fluid) research FTE. This governance structure is flexible and allows several departments that are willing to join LIRS to have representation in the LIRS/MW Research Committee (LIRS/MW ResComm).



The LIRS/MW ResComm is composed of:

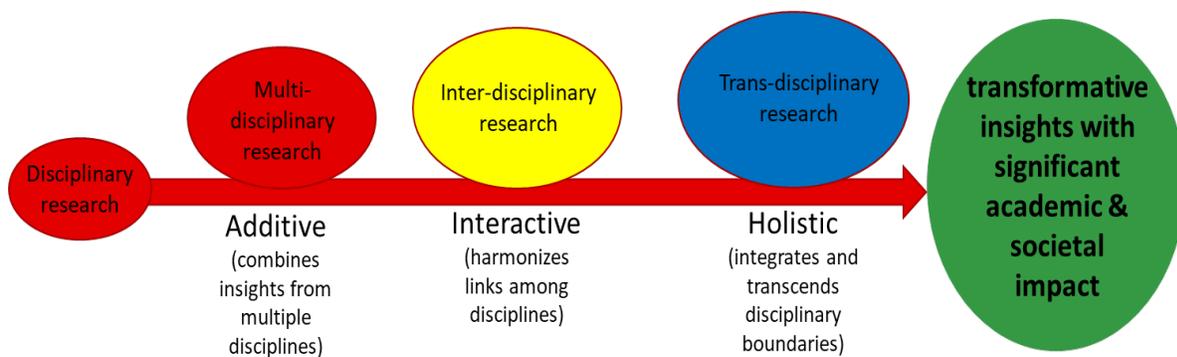
- One LIRS/MW research coordinator
- A representative of each MW department (or departments that fully commit their research FTEs to LIRS)
- One MW representative of the PhD students
- The director of the MW PhD program
- One MW researcher representative of CAROU
- A secretary – a role that can be rotated

The functions of the LIRS/MW ResComm are:

1. to embody, advocate and implement the vision and mission statements of LIRS
2. to coordinate the research activities within LIRS
3. to facilitate the cross-departmental dialogue across all departments involved in LIRS
4. to provide advice to the Dean, the faculty management team, and the departmental management in relation to research (this function is only fulfilled by the MW members of the RC)
5. to act as a communication hub between LIRS researchers and the OU research management bodies (including the Research Board)
6. to lead the preparation of site visits for LIRS research evaluations

(Preliminary remarks on) Research quality and research evaluation

LIRS welcomes research that spans the whole continuum from disciplinary to transdisciplinary science. Fruitful multidisciplinary research dialogues and collaborations stem from rigorous state-of-the-art disciplinary research. Disciplinary research is focused on fundamental and applied knowledge generation and such insights serve as a solid starting point for addressing some of the modern societal challenges. Multidisciplinary research combines concepts, theories and methods to address such societal challenges from multiple angles. Interdisciplinary research results in harmonization of theoretical and/or methodological approaches across disciplines, while transdisciplinary approaches take a holistic approach, bridging and transcending disciplinary boundaries in order to generate novel paradigmatic approaches in science. LIRS research intends to span all these types of research, aiming to make important contributions to the transdisciplinary approach of sustainability and resilience in systems with societal, technological, environmental and economical dimensions. To serve such a purpose, interdisciplinary insights on learning and innovation are deemed necessary, as the combination and transfer of theories, concepts and methods across different disciplines is required in order to fully understand the complexity of these processes. The figure below depicts the continuum of research approaches within LIRS.

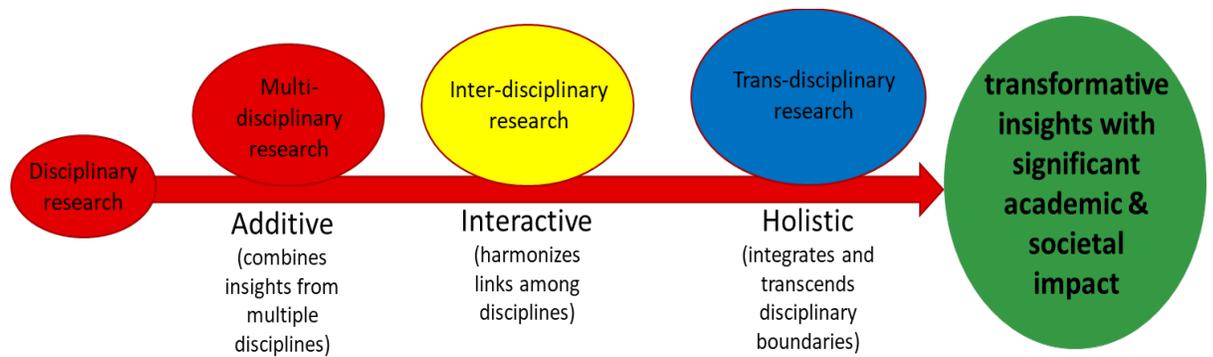


Certainly the co-existence of disciplinary with multi-, inter- and trans-disciplinary research within LIRS raises the issue of how research quality is evaluated. The evaluation of research quality in disciplinary research is chiefly focused on the validation of research outcomes (novel theoretical and/or methodological knowledge) by peers and as outcomes, number of publications in well-established scientific outlets is the dominant metric. Multi-, inter- and trans-disciplinary research in LIRS is focused on understanding the functioning of complex systems, in particular on how learning and innovation contribute to resilience and sustainability. Therefore, the evaluation of such research should be focused on usability, social impact as well as peer-review validation of multi-, inter- and trans-disciplinary research. Multi-, inter- and trans-disciplinary research quality and results are sensitive to varying disciplinary contexts and research goals, require different degrees of cross-disciplinary integration, effective collaborative practices in multi-disciplinary research teams as well as supportive leadership practices to create a structure and facilitate processes necessary for the cross-disciplinary dialogue to emerge. The intention is therefore to use a process perspective as a way of evaluating research quality in LIRS. Because disciplinary research generates relevant knowledge and methods to be used in multidisciplinary research, the evaluation of disciplinary research is only the starting point for research

evaluation in LIRS. The process of LIRS research evaluation however, departs from the restrictive way of judging research quality by looking solely at the number of publications in leading disciplinary academic outlets and intends to evaluate research excellence by also including publications in inter- multi-disciplinary journals, as well as metrics related to usability, societal impact and societal relevance of research. The process focus of LIRS research evaluation builds on the premise that a well designed and implemented processes will ultimately lead to the desired research outcomes in LIRS. It is the aim of the LIRS program to strive for research excellence and to build on (1) the process focus and (2) the peer-validation, usability and societal impact as metrics in research evaluation. In order to identify the most effective processes leading to successful cross-disciplinary dialogue, we intend to start from the mission of LIRS to: *“provide support and facilitate researchers to embrace an open mind for engaging in a multidisciplinary research dialogue with societal stakeholders and generate transformative insights with significant academic and societal impact”*. To this mission statement we add existing principles and practices for evaluating research programs including multiple disciplinary fields, like:

- the co-existence of different disciplinary research goals and practices,
- the development of collaborative practices in multi-disciplinary research teams leveraging effective knowledge integration and generation of novel insights that span disciplinary boundaries,
- feedback iterations from and transparency towards relevant societal stakeholders,
- the effectiveness in advancing the understanding of complex systems with social, technological, environmental and economic components, especially at the interface of the social system with the other components
- the establishment of cross-disciplinary research networks that are eligible for acquiring grants for multi-, inter- and transdisciplinary research

A preliminary view on how this process view on multidisciplinary research evaluation can be designed is presented in the table below.



Research type	Disciplinary research	Multi-disciplinary research	Inter-disciplinary research	Trans-disciplinary research
Research focus	Scientific knowledge generation (fundamental & applied research)	Combines insights & methods from multiple disciplines to understand complex (systemic) issues from multiple angles	Harmonizes links among disciplines and creates its own paradigmatic frameworks for understanding complex systems (learning and innovation in complex systems)	Integrates and transcends disciplinary boundaries, creates uniform discipline transcending terminology (resilience and sustainability)
Research evaluation	Validation by peers – research quality chiefly evaluated by publication in (top tier) journals	High quality applied research projects engaging different disciplines – usable knowledge is generated	Major contributions to inter-disciplinary frameworks of learning and innovation	Major contributions to unifying the conceptual and methodological frameworks for studying resilience & sustainability

Illustrative examples of recent disciplinary research:

- Bams, D., Pisa, M. & Wolff, C.C.P. (2021). Spillovers to small business credit risk. *Small Business Economics*, 57, 323–352
- Caniëls, M. C., Lambrechts, W., Platje, J. J., Motylska-Kuźma, A., & Fortuński, B. (2021). Impressing my friends: The role of social value in green purchasing attitude for youthful consumers. *Journal of Cleaner Production*, 303, 126993.
- Frijns, B., & Garel, A. (2021). The effect of cultural distance between an analyst and a CEO on analysts' earnings forecast performance. *Economics Letters*, 205, 109957.
- Neessen, P. C., Caniëls, M. C., Vos, B., & de Jong, J. P. (2021). How and when do purchasers successfully contribute to the implementation of circular purchasing: A comparative case-study. *Journal of Purchasing and Supply Management*, 27(3), 100669.
- Van Boerdonk, P. J. M., Krikke, H. R., & Lambrechts, W. D. B. H. M. (2021). New business models in circular economy: A multiple case study into touch points creating customer values in health care. *Journal of Cleaner Production*, 282, 125375.

Illustrative examples of recent multi- and inter-disciplinary research

- Blaurock, M., Čaić, M., Okan, M., & Henkel, A. P. (2022). A transdisciplinary review and framework of consumer interactions with embodied social robots: Design, delegate, and deploy. *International Journal of Consumer Studies*, 46(5) 1877-1899.
- Cobben, D., Ooms, W., Roijackers, N., & Radziwon, A. (2022). Ecosystem types: A systematic review on boundaries and goals. *Journal of Business Research*, 142, 138-164.
- Curşeu, P. L., Semeijn, J. H., & Nikolova, I. (2021). Career challenges in smart cities: A sociotechnical systems view on sustainable careers. *Human Relations*, 74(5), 656-677.
- Gelderman, C. J., Schijns, J., Lambrechts, W., & Vijgen, S. (2021). Green marketing as an environmental practice: The impact on green satisfaction and green loyalty in a business-to-business context. *Business Strategy and the Environment*, 30(4), 2061-2076.
- Ooms, W., & Piepenbrink, R. (2021). Open innovation for wicked problems: using proximity to overcome barriers. *California Management Review*, 63(2), 62-100.