BESLUT

Datum för beslut:
2025-06-03

Diarienummer:
KTH-RPROJ-0276016

Beslut om ett strategiskt forskningsinitiativ, KTH Smart cities - Stockholm SPHERE

Detta beslut har undertecknats elektroniskt.

Beslutet

KTH:s vicerektor för forskning beslutar att:

- Finansiera *KTH Smart cities - Stockholm SPHERE* med 1 mnkr centrala medel under 2025.
- Utse Martin Törngren, ITM-skolan, som ansvarig forskningsledare för satsningen.
- Återrapportering enligt utvärderingskriterier, för dialog om fortsatt bidrag ska vara Forskningsberedningen tillhanda 10 juni 2026.

Ärendet

KTH:s initiativ för forskningssatsningar inrättades enligt förslag från Översyn av KTH:s särskilda forskningssatsningar (Dnr: KTH-RPROJ-0276016). Förslaget innebär att centrala medel ska kunna användas till direkt finansiering av tre- till femåriga forskningsinitiativ med det huvudsakliga målet att dra in externa forskningsanslag.

Under föregående år har Forskningsberedningen arbetat vidare med att konkretisera förslaget, och kommit fram till ett antal kriterier för ett KTH Strategiskt initiativ samt kriterier för utvärdering (Protokoll 10/2024):

Kriterier för KTH Strategiskt forskningsinitiativ:

- Strategiska forskningsinitiativ är ett sätt för KTH att kraftsamla inom områden där det krävs nya samarbeten som är viktiga utifrån KTH:s vision och mål. Det kan dels vara att förstärka ett område som redan finns eller utveckla ett nytt.
- Strategiska forskningsinitiativ ska kunna initieras av både forskare, KTH:s ledning och forskningsberedningen.
- Strategiska forskningsinitiativ är satsningar med central finansiering på 0,5 - 3 mnkr per år i max fem år.
- Målsättningen för en beviljad satsning är att generera betydande externa bidrag till KTH om totalt minst 100 mnkr. Det kan vara externa bidrag från flera olika finansiärer som

tillsammans stärker området för forskningsinitiativet. Utväxlingen blir den viktigaste indikatorn som följs upp årligen.

Kriterier för utvärdering av beviljat KTH Strategiskt forskningsinitiativ ska ske efter ett år enligt nedan:

- Projektansökan – En eller flera projektansökningar.
- Kraftsamling - Vilka PI´s är med i projektansökan/ansökningar?
- Förberedelsearbete inför utlysningar.
- Exempel på nya forskningssamarbeten.

Dessutom kommer behov av central finansiering, budgetutrymme och strategisk relevans att vägas in vid Forskningsberedningens bedömning.

Till Forskningsberedningens möte den 22 maj inkom förslaget KTH Smart cities - Stockholm SPHERE, med professor Martin Törngren, ITM-skolan, som ansvarig forskningsledare, se bilaga 1.

Baserat på Forskningsberedningens diskussion rekommenderas Vicerektor för forskning att stödja att förslaget beviljas sökt budget, 1 mnkr för år 2025. En utvärdering ska ligga till grund för diskussion om fortsatt finansiering och i vilken omfattning. (KTH-RPROJ-0276016 Protokoll 10/2024).

Detta beslut har fattats av vicerektor för forskning Annika Borgenstam efter föredragning av forskningsrådgivare Johan Schuber.

Kungl. Tekniska högskolan

Annika Borgenstam, vicerektor för forskning KTH

Johan Schuber, forskningsrådgivare, avdelningen för forskningsstöd inom Verksamhetsstödet

Bilaga 1: projektförslag

Sändlista

För åtgärd:

Martin Törngren, ITM-skolan

Kopia till:

Skolchef ITM-skolan

Controllergruppen, controller@kth.se

Chefen för avdelningen för forskningsstöd Maria Gustafson

Tf Kommunikationschef Gunilla Iverfelt

Anna Aminoff

Sanna Pehrson, avdelningen för forskningsstöd

Expeditionsdatum:

2025-06-03

KTH Strategic Research Initiative proposal

Project Idea: To develop a research and innovation arena operating at the city-scale to support the sustainability transition of society, related to emissions, environmental footprint, efficient and resilient operation of critical infrastructure, reduced accidents and improved health, with specific initial emphasis on Stockholm city. The arena has the goal to enable cross-disciplinary experimental research in key research domains of cyber-physical systems that underpin transport, built environment, healthcare, energy, and water – transforming Stockholm into a **smart city**. Establishing the envisioned research and innovation arena provides a pathway for research and collaborations far beyond those of existing environments. SPHERE brings together currently fragmented research groups, centers, stakeholders and the needed experimental capabilities, providing the foundation for a longer-term center beyond the proposed strategic initiative.

***Project title*: Smart cities** - Pathways through Experimentation, Research and regulatory Exploration towards sustainability (**SPHERE**).

Martin Törngren, Professor, ITM (PI)
György Dán, Professor, EECS (co-PI)
Gyözö Gidofalvi, Associate Professor, ABE (co-PI)
Mattias Höjer, Professor, ABE (co-PI)
Yongkuk Jeong, Assistant Professor, ITM (co-PI)
Karl-Henrik Johansson, Professor, EECS (co-PI)
Olga Kordas, Professor, ABE (co-PI)
Zhenliang Ma, Associate Professor, ABE (co-PI)
Marco Molinari, Professor, ITM (co-PI)
Jonas Mårtensson, Professor, EECS (co-PI)
Henrik Sandberg, Professor, EECS (co-PI)
Mattias Wiggberg, Docent, ITM (co-PI)

Direct funding requested:

- 2025: 2 MSEK
- 2026-2029: 3 MSEK annually

Resulting total: 14 MSEK

Purpose

What will be achieved with the project? What´s the vision?

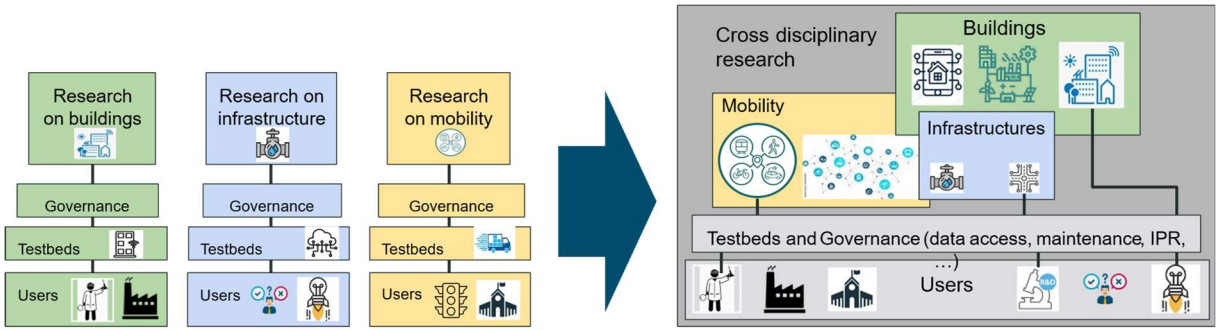
Society is experiencing a wave of technological breakthroughs in sensing, digital technology, materials and 3D printing - opening opportunities across domains such as:

- **Smart transportation**: Infrastructure that interacts with users to enhance safety, performance and enable proactive maintenance, control and management.
- **Urban manufacturing**: Data-integrated smart factories and supply chains embedded in city logistics.
- **Smart buildings and districts**: Integrating transport and energy systems, predictive maintenance, and occupancy optimization.

Given this momentum, the proposed initiative aims to transform Stockholm into a **smart city** – to become a leading arena for cross-disciplinary experimental research and innovation in key domains of cyber-physical systems (CPS) that accelerate the city's sustainability transition. This goal will be pursued through three pillars:

1. **Stakeholder integration**: Uniting actors across the city-scale CPS value chain—from city and regional governance to technology providers and researchers—spanning key urban sectors, including transport, built environment, healthcare, energy, and water.
2. **Cross-disciplinary research:** Establishing collaborations to develop sustainability-focused solutions targeting zero emissions and accidents.
3. **Experimental capabilities**: Enabling innovation testing from lab to city-scale by coordinating and linking existing isolated initiatives and testbeds.

As illustrated in the below figure, SPHERE aims to transform today's fragmented landscape of stakeholders, research disciplines, and testbeds into a coordinated research arena. This transformation will enhance the capabilities, scalability, governance, and efficiency of experimental infrastructures and will enable new cross-disciplinary research on aspects such as CPS trustworthiness (underpinning key smart city services), scalability and interoperability, data sharing and business models, and socio-technical transitions.



Current situation

SPHERE research and innovation arena

SPHERE also tackles the balance between innovation and regulation, promoting responsible innovation through:

- **Integrated science and policy**: Engaging city stakeholders and researchers to identify challenges and scalable solutions.
- **Efficient experimentation**: Leveraging and connecting existing testbeds to enable resource sharing, best practices, and cost-effective cyber-physical systems of systems studies.

How will the proposed initiative strengthen KTH and how will it contribute to fulfill KTH:s vision and goals?

The SPHERE initiative will

- bring together strong research groups, and industrial and societal stakeholders, providing novel opportunities for collaborative research across traditional disciplines and domains, further supported by the experimental capabilities.
- position KTH and Stockholm internationally as a hub for research and innovation with societal relevance, attracting funding, talent, and investment.

With its strategic partnerships and facilities, SPHERE will support impactful collaborations essential for socio-technical transformation. Shared testbeds foster interdisciplinary research, real-world validation, and are also very valuable for the engineering education.

How is it related to identified skills needed in society / industry and how is it connected to development of educational offerings?

There is a growing demand for skills that bridge technology and society. Policy makers and regulators need deeper insights into emerging technologies, while researchers must grasp the social context and real-world constraints.

One established, SPHERE will offer rich educational integration: internships, MSc theses, capstone projects, and PhD work—building on established best practices at KTH. It also creates opportunities for new programs and continuing education in socio-technical systems, ethics, and systems thinking.

Why at KTH

What strengths are already in place at KTH in the form of established environments, strong collaborations and research infrastructure - synergies?

KTH hosts key research environments such as CTR, Dig-It Lab, Digital Futures, ITRL, Live-In Lab, TECoSA and Viable Cities, aligned with SPHERE's aims. While these environments currently operate independently, recall the figure, collaboration discussions were initiated in the fall of 2024 to explore synergies and collaborations, also involving Stockholm city and Region and key industrial partners. KTH's strong ties to socio-technical stakeholders offer fertile ground for expanding experimental research collaboration.

Establishing the envisioned research and innovation arena provides a pathway for research and collaborations far beyond those of existing environments, with external stakeholders providing access to city-level data, infrastructures, and the societal context.

Describe and relate to the competition in the field (local/regional, national, international).

Many cities are investing in digital twin technologies - e.g., the EU's Cityverse for participatory planning. However, only a few initiatives support cross-disciplinary experimental research on a city scale. Notable international examples include COSMOS (New York) - a wireless testbed that evolved into a broader collaborative research platform, and Woven City (Toyota), a purpose-built small-scale sustainable city.

Research team

Describe the quality of the research team.

The proposal gathers experienced PIs from KTH's ABE, EECS, and ITM schools with strong leadership, multidisciplinary and experimental credentials. The PIs are active in key

application areas—transport, communication, manufacturing, the built environment, policy – and in relevant KTH centers (as mentioned above). Once launched, the initiative will open a reference group to other interested KTH researchers and external stakeholders.

Strategy for funding

Describe how the target will be achieved: > 100 mnkr in external grants to KTH.

The prospects are positive for larger external grants, essentially due to an increasing emphasis on sustainability, innovation and cutting-edge technology, fitting well with the focus of SPHERE. Several potential sources for large scale funding exist or are about to emerge. These specifically include the following:

- The proposed Swedish clusters for world-leading research and innovation in cutting-edge technology, as proposed in the government bill with corresponding assignments planned for Vinnova and VR.
- Horizon Europe, calls including for Climate-neutral and Smart Cities Mission projects (approx. at 100 million EURO), with the goal to deliver 100 climate-neutral and smart cities by 2030. In Horizon Europe there are further opportunities through several joint undertakings (JU), especially the SNS (Smart Networks and Services) and Chips JU's.

In Sweden, Vinnova provides multiple funding opportunities through e.g. its innovation programs (such as Impact Innovation) and programs co-funded with industry, especially the Advanced Digitalization program. The Swedish Agency for Economic and Regional Growth in addition has current calls on collaborative innovation and digital transformation that fit with the scope of SPHERE.

A further important potential lies in the long-term engagement with societal, industrial and financial stakeholders. Discussions with Stockholm city and Stockholm Region have revealed strong interests from their side. The long-term financial sustainability (6-10 years) of the action will leverage external national and EU funding as well as co-financing from the private sector (e.g., in-kind contribution and participatory cash contributions).

What is the goal for external funding achieved in the short term 1-2 years, 3-5 years and 6-10 years

For the coming year we will organize the work according to three main tracks, as follows:

- Stakeholder dialogues to develop pathways towards the research and innovation arena, including catalyzing initial collaborative projects through mainly national grants, and developing a strategic research agenda.
- Large scale fundraising and proposal developments addressing
    - a Swedish national SPHERE cluster for world-leading research and innovation in cutting-edge technology,
    - selected Horizon Europe calls
- Overall coordination and planning.

The first year is expected to result in an initial funding level through new projects that in combination provide in the order of 20 MSEK to KTH. For the following years we expect larger grants stemming from the above-mentioned opportunities. The exact timing of the grants and their success cannot be predicted with high accuracy, but the momentum in the direction of the SPHERE initiative provides for a window of opportunity to gather forces, and where more than 100 MSEK appears realistic.

KTH internt beslut med e-signatur: beslut- kth-proj-0276016_ KTH Smart cities - Stockholm SPHERE

Slutgiltig revideringsrapport 2025-06-03

Skapad:	2025-06-03 (Centraleuropeisk sommartid)
Av:	Johan Schuber (jschuber@kth.se)
Status:	Signerat
Transaktions-ID:	CBJCHBCAABAA8yJqoH-54RQjnPEv5kg3EInmmY5d4fU5

”KTH internt beslut med e-signatur: beslut- kth-proj-0276016_ KTH Smart cities - Stockholm SPHERE” – historik

Dokumentet skapades av Johan Schuber (jschuber@kth.se)
2025-06-03 - 09:17:53 GMT+2– IP-adress: 130.229.185.22

Dokumentet skickades med e-post till Johan Schuber (jschuber@kth.se) för signering
2025-06-03 - 09:18:01 GMT+2

Dokumentet har e-signerats av Johan Schuber (jschuber@kth.se)
Signaturdatum: 2025-06-03 - 09:18:14 GMT+2 – Tidskälla: server– IP-adress: 130.229.185.22

Dokumentet skickades med e-post till Annika Borgenstam (annbor@kth.se) för signering
2025-06-03 - 09:18:16 GMT+2

E-postmeddelandet har visats av Annika Borgenstam (annbor@kth.se)
2025-06-03 - 09:30:18 GMT+2– IP-adress: 151.177.38.246

Dokumentet har e-signerats av Annika Borgenstam (annbor@kth.se)
Signaturdatum: 2025-06-03 - 09:30:28 GMT+2 – Tidskälla: server– IP-adress: 151.177.38.246

Dokumentet skickades med e-post till Susanne Jarl (suja@kth.se) för ifyllnad
2025-06-03 - 09:30:30 GMT+2

E-postmeddelandet har visats av Susanne Jarl (suja@kth.se)
2025-06-03 - 09:55:45 GMT+2– IP-adress: 130.237.27.161

Formuläret har fyllts i av Susanne Jarl (suja@kth.se)
Datum för ifyllnad av formulär: 2025-06-03 - 09:55:56 GMT+2 - Tidskälla: server– IP-adress: 130.237.27.161

Avtal har slutförts.

2025-06-03 - 09:55:56 GMT+2