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Skapat av
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KTH Digitalisation Platform Strategic Plan

2021-2024

Summary

The KTH Digitalisation Platform (in short DIGI Platform) is an agile entity that provides relevant information and service to KTH environment and researchers that work in the digitalisation domain. The platform is aware that the subject plays an important role to address major societal challenges and wants to support KTH researchers to implement their ideas to support the development with relevant research collaborations and missions. The platform priorities are to catalyse multi-disciplinary research activities, build and maintain internal relations, and enhance external KTH visibility and recognition. It aims to achieve those objectives with the implementation of cross-disciplinary and thematic workshops, open calls for platform support and conference organiser support, dedicated strategic activities to develop the environment, internal and external communication activities, participation in management boards, external representation and guidance to relevant research groups, organization of expert groups for influence and alignment of research programs, active engagement with KTH strategic partners and dedicated support for Assistant Professors. The platform reference group supports the platform directors in the annual planning of the activities and provide feedback on the implementations. The annual operation is monitored by the KTH Research Platform steering group.

Content

Background and purpose

Based on existing research excellence and strength, KTH defined six multidisciplinary research focus areas to be covered by research platforms: **Digitalisation**, Energy, Industrial Transformation, Life Science Technology, Materials and Transport. The Platforms reflect the fact that the problems and challenges confronting future society and industry are complex and no single player is capable to solve them alone. It is necessary to deploy a multidisciplinary and multi-stakeholder approach and there must be more emphasis on multidisciplinary research and collaboration with both societal and industrial partners. The problems and challenges are not unique to Sweden, neither are the solutions. Therefore, it is necessary to adopt a cross-border approach and strengthen collaboration.

The Platforms are virtual entities complementing the school line organisation and they involve many research groups, centres, EIT-KICs and other strategic or multidisciplinary research initiatives within KTH.

Digitalisation is penetrating more and more all facets of our daily life. Digitalisation technologies enable great opportunities to enhance processes and services. Societal transformations are driven by technology developments such as artificial intelligence, data analytics, big data, machine learning, cooperated systems, 5G & beyond, industry 4.0, eScience, eHealth, digitised education, digital twins, CPS & IoT, smart cities, smart homes, smart grids, smart society etc. It is also foreseen to act as enabling technology to work towards UN's SDGs and tackle societal challenges such as climate warning, improved health and transportation services, smart grids but also new emerging areas such as in building industry. However, digitalisation technology also introduces new threats to the society due to ICT dependency, cyber-physical security, privacy, fairness and transparency in automated decision making/AI. Such ethical aspects need to be taken into account in the development to ensure trust in the technology, but holistic assessments are still rare.

Accordingly, there are major national and European efforts in the digitalisation domain, which can provide support to KTH researchers and where KTH researchers can engage. The European initiative "A Europe fit for the digital age" identifies artificial intelligence, cybersecurity, high performance computing as well as a European data strategy as major areas to which the platform strongly relates. Moreover, the platform aligns well with Vinnova's ambition to strive for excellent quality, sustainable development, efficient sharing of data and resources, being attractive internationally as well as influence and leadership. Moreover, there are funding agencies such as Forte which support platform related cross-disciplinary research.

Sweden and Stockholm area are leading areas in the ICT domain. Large share of the GDP relates to digitalisation. Accordingly, excellent research in the digitalisation domain is of high strategic relevance, but there are also many opportunities that can be exploited. In particular, there are ambitious roadmaps such as the smart and connected strategy for Stockholm which should make Stockholm the world smartest city by 2040 or regional and national eHealth initiatives. Development and research in digitalisation are major areas for all KTH strategic partners such as Ericsson, Scania, or ABB. Accordingly, the DIGI Platform faces many opportunities so that the challenge will be to cover the wide range as well as to deliver relevant support to KTH researchers and environment. The purpose of this Strategic Plan is to outline the priorities, goals, and envisioned actions of the platform.

Vision

KTH researchers consider the KTH Digitalisation Platform a useful entity which provides relevant information and easily accessible support to initiate and enable their research ideas and activities. Events and activities organised by the platform are considered of good quality and worthwhile. There is an active, lively and ongoing exchange of ideas that supports a continuous renewal.

The platform helps to develop strategic areas and brings together researchers from different disciplines. KTH researchers are aware of complementary research, data, and infrastructure across the schools and feel confident to work in cross-disciplinary consortia and actively participate in cross-disciplinary funding applications. Relevant research groups are easily identified through the platform's mapping. Researchers take the lead in organizing internal workshops and form new partnerships with a constant renewal of ideas and initiatives. Data is easily exchanged between researchers through suitable data platforms. Several KTH researchers actively participate in advocacy work and expert groups to offer specialised knowledge, to represent and enhance the visibility as well as to share the interests of KTH. Assistant Professors related to digitalisation are offered extra support for fast integration and to develop quickly.

The digitalisation research at KTH as well as the research environment are continuously considered as excellent on highest international level. KTH researchers internationally collaborate with the most excellent researchers. The research is both disciplinary and cross- disciplinary with a wide range of application areas. KTH strategic partners consider KTH researchers as their natural research collaborators in the digitalisation domain. KTH researchers in the digitalisation domain are successful in receiving research funding from national funding agencies as well as European programs.

Target Groups

This Strategic Plan should inform about priorities and planned actions of the KTH Digitalisation Platform. Accordingly, the KTH management including the other research platforms is the main target group of this strategic document so that strategies and activities can be aligned. Moreover, it provides relevant information to other KTH services entities such as KTH Research Support Office and Communications Support. It also serves as an internal document for the management of the platform so that the KTH Digitalisation Platform directors, reference group, and the KTH Research Platforms steering group are target groups. Lastly, the strategic plan can be interesting for KTH researchers, centres, SIPs, strategic partners, etc. for information on the goals of the platform.

Priorities

P1: Catalyse multidisciplinary research activities

Goal: Support KTH researchers to pursue cross-disciplinary research beside disciplinary research. Bring researchers together from different disciplines or with complementary competences to seed new collaborative research. Communicate external funding opportunities and provide financial support to KTH researchers to enable cross-disciplinary research activities that help to create networks and increase research activities in the digitalisation domain.

P2: Build and maintain internal relations

Goal: Strengthen the relationships and networks within KTH through activities and support for researchers by the platform. Encourage researchers to take the lead in organizing internal workshops and form networks and partnerships. Support the alignment and coordination of activities by active participation in internal boards and initiatives. Provide KTH researchers information about internal initiatives and opportunities. Create expert groups for advocacy and strategic advice. Organise dedicated early career researchers' events and activities that help young researchers to become known and establish an own internal network. Support the easy exchange of data among KTH researchers.

P3: Enhance external KTH visibility and recognition

Goal: Strengthening and maintain the international and national visibility and recognition of KTH's already strong brand in the digitalisation domain. Provide KTH researchers support that take the lead in organizing international workshops and conferences. Encourage and support KTH researcher to represent KTH in strategic partnerships and advocacy work for KTH. Maintain and communicate an overview of KTH main competence areas, research groups and centres in the digitalisation domain. Support and organise events where KTH researchers have the opportunity to present their research and interact with relevant external stakeholders. In particular, support the exchange with the strategic partners of KTH including academic alliances such as Nordic5Tech.

Follow-up

- The KTH Digitalisation Platform director and co-directors regularly meet, discuss, and plan the implementation of platform activities. The communication plan and activities are regularly discussed with the platform communicator. The platform regularly reports about the ongoing activities to the KTH Vice President for Research, the platform administrator, and other platforms in the regular platform coordination meetings. The annual operation plan is discussed with the DIGI Platform reference group which provides feedback and suggestions on the proposed plan in a dedicated meeting in autumn. In a dedicated meeting in spring, the platform provides the reference group a detailed update on the ongoing activities for alignment and support. The annual operation plan including the annual budget proposal should be presented and approved by the KTH Research Platforms steering group in December. Annually, the platform prepares a written report about the past annual activities and a financial report which should be presented and approved by the KTH Research Platforms steering group in the following spring.

Reference group of the KTH Digitalisation Platform (Nov 2020)

- Professor Karl Henrik Johansson, Director of Digital Futures
- Professor Dan Henningson, Director of SeRC
- Professor Yifang Ban, ABE
- Professor Ivo Martinac, ABE
- Professor Britt Östlund, CBH,
- Professor Martin Törngren, ITM, Director of ICES and TeCOSA

KTH Research Platforms steering group (Nov 2020)

- Professor Annika Stensson Trigell, KTH Vice President for Research (chair)
- Professor Jens Zander, Head of School EECS
- Professor Muriel Beser Hugosson, Head of School ABE
- Professor Martin Törngren, Director of Studies ITM
- Professor Anna Delin, Deputy Head of School SCI
- Professor Mikael Lindström, Head of School CBH

KTH Digitalisation Platform Action Plan 2021-2024

The following list is understood as a budget of envisioned activities. More concrete plans will be provided in the annual operation plans. In particular new activities will be established later.

Activities

Cross-disciplinary workshops. Targeted workshops bring together researchers from different areas, i.e., bridging methodological and application domains (one area from the digitalisation domain meets a non-digitalisation area). For example, areas from digitalisation domain such as AI/ML with applications in health; security/privacy aspects in industrial transformations; telecommunications with applications in transport; high performance computing in natural science; ICT/software solutions for sustainability and so on. These workshops are preferably conducted in collaboration with other KTH Research Platforms to increase reach and relevance.
Goal: One larger workshop event per year.

Thematic workshops. The DIGI Platform opportunistically supports or organises thematic workshops on timely topics. The goal of the workshops is to network, represent, and/or seed collaboration. They can be purely internal, with stakeholders or strategic partners or with invited international guests.
Goal: The platform wants to encourage and support KTH researchers to organise such thematic workshops.

Open platform support calls. The open call for platform support facilitates bottom-up activities that develop the research environment, seeds multidisciplinary research activity, enables cooperation across the schools and disciplines, provides funding for workshops and activities that increase external funding and uses existing infrastructure. In particular, this call can provide initial seed funding for multidisciplinary activities that can eventually become larger projects with external funding. Early career researchers will be prioritised and will be strongly encouraged to apply for these calls.
Goal: Three cut-off deadlines per year, projects will be independently assessed according to pre-defined criteria by the KTH Digitalisation Platform directors and ranked in a consensus meeting.

Open calls for conference organiser support. The DIGI Platform provides KTH researchers financial support to organise international research events that will enhance the recognition of the organizing researcher as well as the KTH brand in the domain.
Goal: Three cut-off deadlines per year, projects will be independently assessed according to pre-defined criteria by the KTH Digitalisation Platform directors and ranked in a consensus meeting.

Strategic activities. Dedicated activities that enhance the research environment in the digitalisation domain funded by platform savings. Initially, the data sharing activity will be continued with the aim to connect more pilot projects to this activity. The goal is to create the experience and technical environment that enables easy exchange of data, and create common, standard practices around data management. Support of environments or testbeds such as KTH Live-in-lab where cross-disciplinary research takes place.
Goal: Attract and enable more KTH researchers to start to work in those environments with the goal to attract external research funding in the long run.

Communications. The DIGI Platform webpage is updated regularly to provide a structured and up-to-date overview of KTH competence areas and groups in the digitalisation domain. Dedicated external communication activities to promote KTH research, the platform workshops and research environment. Newsletters and internal webpages inform about initiatives and opportunities relevant for KTH researchers in the digitalisation domain. Introduces one early career researcher, preferably assistant professor, in the digitalisation domain in the newsletter. Include regularly a survey in the newsletter to collect feedback and explore interest in engagement.
Goal: At least 3 newsletters and one dedicated external communication activity per year. At least one general revision and update of the external webpage per year.

Management. The DIGI Platform director serves in internal boards to align research activities in the digitalisation domain. In particular, the director is currently an appointed member of the Digital Futures Governing Board, a member of the SRA ICT TNG steering group, a member of the KTH Live-in Lab executive group, a member of the IT-support for KTH researcher group, and a steering group member of the ABB strategic partnership. The platform regularly exchanges with KTH Vice Presidents for Research and Digitalisation.
Goal: Improve environment by raising awareness and alignment of activities to create synergies.

Representation and guidance. The DIGI Platform serves as a first contact, internal and external representative of the area and provides guidance to relevant research groups and researchers at KTH, in particular for relevant EU events, groups and networks. The platform acts as a member in professional external associations and supports individual KTH researchers to represent the area. The platform supports researchers that represent KTH at strategically relevant events or networks. The platform supports researchers to establish nodes, events or groups within these networks.
Goal: Provide orientation to relevant researcher groups to increase interaction with society, serve as contact, represent and increase KTH engagement in external representation.

Influence and alignment. Support KTH researchers and KTH Research Support Office to influence and align research agendas, gather KTH experts to provide expertise and advocacy work, providing input to policies or draft work programs with coming calls.
Goal: Identify at least 10-15 researchers who (can) act as experts and/or are interested in advocacy work.

Strategic partners. The DIGI Platform actively supports KTH strategic partnerships and KTH strategic academic networks and alliances in the digitalisation domain.
Goal: Increase collaborations with at least one joint activity with a strategic partner per year.

Early career researcher support. Establish and support a network for newly appointed assistant professors in the digitalisation domain to help them to develop their career as well as to establish an own network. Regularly introduce one early career researcher, preferably assistant professor, on the internal pages and newsletter. Organise events dedicated events for early career researchers.
Goal: Provide career development support. Establish a network with regular activities.

Internationalisation. Support KTH researchers to welcome or visit other researchers or research environments to build a network, learn from academic role-models, support KTH management to represent KTH as well as maintain or establish new research collaborations or academic network related to the digitalisation domain.
Goal: Support at least one internationalization activity per year.

Follow-up

The KTH Digitalisation Platform directors annually plan activities for the following year, but the actual platform management and implementation will be more agile, i.e., the platform plans to act opportunistically on the current situation, opportunities, and workload. Monitoring of the platform will be as described above.

Responsibility

The DIGI Platform aims to engage KTH researchers in the implementation of workshops, activities, expert groups, networks etc. and delegate responsibility accordingly. However, the platform will ask for brief reports to monitor the activities. The platform communicator is responsible to manage communication activities, in particular follow up internal and external platform webpages. The platform administrator is responsible to manage administrative aspects of activities. The platform director and co-directors share the lead of different activities with delegated responsibility.

The platform director monitors the overall activity and has overall responsibility of the platform activities. Lastly, the platform reference group as well as the KTH Research Platform steering group monitor the overall platform activity.

Concrete Action Plan for 2021

- *Cross-disciplinary workshop with KTH Industrial Transformation Platform on (Cyber-)Security in Industry in autumn 2021*
- *Organise at least one thematic workshop in spring 2021*
- *Strategic support for pilot projects to share data and KTH Live-in-lab environment to help launch more cross-disciplinary projects*
- *Open calls for platform support and conference organisers (three deadlines)*
- *Regular newsletters and revised internal and external internet platform representation*
- *Active participation in management groups*
- *Outreach to KTH researchers to build experts group and advocacy activities*
- *Initial work to launch an assistant professor network, possibly organization of a first event*
- *Support internationalization to support strategic KTH-UK outreach, e.g. with Manchester University*

REPORT	Date
	2020-11-25
Responsible	Lina Bertling Tjernberg, Director KTH Energy Platform

KTH Energy Platform Strategic Plan

2021-2024

This strategic plan of the KTH Energy Platform outgoes from previous work of the platform. It follows the KTH Research Platforms guidelines for a strategic plan and is intended to provide a framework for the platform work. The strategic plan has been discussed within the KTH Energy Platform reference group. The strategic plan span over the next four years. Overall objectives of this Strategic Plan are: to provide the platform members and stakeholders with a clear vision of the purpose and prioritised objectives of the platform, and to contribute to the KTH's Development Plan 2018-2023**. The strategic plan is concluded with a concrete action plan for the coming year.*

* See Guidelines for the KTH Research Platforms; **see KTHs Development Plan 2018-2023.

Summary

This document presents KTH Energy Platform Strategic Plan for 2021-2024, including the platform's purpose, vision, as well as its prioritised objectives, related goals and the actions to reach them. The actions are divided into four streams by their nature, namely internal communication and event, external communication, strategic work and seed, and implementation. The follow up mechanisms and key performance indicators are stated for each platform's priority. Finally, a concrete action plan is presented for 2021.

Content

Background and purpose

Based on existing research excellence and strength, KTH defined six multidisciplinary research focus areas to be covered by research platforms: Digitalisation, **Energy**, Industrial Transformation, Life Science Technology, Materials and Transport. The Platforms reflect the fact that the problems and challenges confronting future society and industry are complex and no single player is capable to solve them alone.

Within these challenges, clean and safe energy supply is central to a truly sustainable society. It has a dedicated Sustainable Development Goal (SDG#7 Affordable and clean energy) and is an enabler to reach nearly all other 16 goals. Within the Swedish context, sustainable energy is in particular at the heart of the re-thinking of cities (sustainable communities, SDG #11), innovation, industry and infrastructure (SDG #9), responsible production (SDG #12) and climate action (SDG #13).

At the national level, Sweden has an ambitious goal to become one of the world's first fossil-free welfare countries and to acquire a secure, sustainable and resource efficient energy system with net-zero greenhouse-gas emissions by 2045. It follows national and political strategy under-construction and some specific actions. The Swedish National Energy Agency has issued a strategy document with 6 recognised research and innovation areas. In addition, the document lists enablers for reaching the goals in these areas, the so-called 7 turn-key solutions ranging from technical to social and economical. At EU level, similar directions are taken and a common goal of net-zero greenhouse-gas emissions by 2050. This is reflected in the coming Horizon Europa research program and priorities.

Given the large extend of energy research as contextualised above, it is necessary to deploy a multidisciplinary and multi-stakeholder approach and there must be more emphasis on multidisciplinary research and collaboration with both societal and industrial partners. The problems and challenges are not unique to Sweden, neither are the solutions. Therefore, it is necessary to adopt a cross-border approach and strengthen collaboration. This is done by mobilizing actors across disciplines – especially disciplines that are not traditionally connected to energy engineering but are clearly playing a role into today's energy research and quest for sustainability.

KTH is active, and often leader, in a large number of energy relevant areas by its research centres and larger innovation program, groups and individual researchers. In many cases, the energy research at KTH also covers a wide spectrum from fundamental research, to applied research (technical, economical and social) and innovation up to commercialization. The broader energy research includes creation of new materials, development of new processes, interaction with digitalisation and engineering of devices, integration of technical systems, the societal embedding of energy systems, the operation of test beds, and others. The KTH energy community affiliated with the Energy Platform consists of more than 500 researchers and 15 larger efforts and altogether they pave the way for a truly sustainable energy system.

The Platforms are virtual entities complementing the school line organisation and they involve many research groups, centres, EIT-KICs and other strategic or multidisciplinary research initiatives within KTH.

Vision

KTH Energy Platform is a gateway to KTH energy research for KTH researchers and external stakeholders. It is an entry point and a lighthouse for the KTH Energy research community. In particular, it is an inclusive forum for idea generation, collaboration and co-creation, and a catalyst for cross-faculty and cross-sectorial energy and society relevant research initiatives.

Mission

The KTH Energy Platform empowers KTH researchers to unite and address societal challenges. It strengthens KTH's position at the forefront of energy research and innovation for a sustainable tomorrow. It does so by facilitating and initiating collaboration between actors within KTH and also with external actors. The KTH Energy Platform provides collegiality arenas for inventing tomorrow's research by meeting, collaboration and interaction beyond the linear organization.

The KTH Energy Platform is also an arena for welcoming researchers and providing them with a sense of community. It is an inclusive arena where gender equality and diversity are central and a step toward the development of a sustainable KTH Campus. It will reflect in KTH's leadership in research for an inclusive energy transformation.

Target Groups

The KTH Energy Platform activities targets KTH researchers as well as external stakeholders (strategic partners, industry, civil society as well as local and regional authorities) and funding bodies.

This Strategy is an internal document aimed at KTH management and energy research community. Vision and mission of the Energy Platform will however be communicated broadly.

Priorities

The KTH Energy Platform works towards achieving its five objectives, namely
1. Stimulate, facilitate and/or initiate cross-faculty/sectorial research activities
2. Build and maintain external and internal relations
3. Maintain a strategic outlook & provide strategic input for planning of infrastructure andinvestments
4. Enhance KTH's external, influence, visibility and recognition
5. Increase external funding by promoting successful research applications (at alllevels)

For the period 2021-2024, the strategic priorities 1, 4, and 5 will have a special focus since they are most instrumental for achieving the Energy Platform vision and mission and also they are interlinked with the coming large research efforts (Horizon Europe, new national competence centres).

Follow-up

The activities are followed up by the KTH Energy Platform's directors, research and information officers; the KTH Research Platforms steering group: the reference and coordinator group following the Strategy Section. The settled key performance indicators are used to measure the platform's achievements.

KTH Energy Platform Action Plan 2021-2024

Activities

Stimulate, facilitate and/or initiate multidisciplinary energy relevant research activities

The KTH Energy Platform aims to stimulate, initiate and coordinate (in the initial phase) initiatives or projects of strategic relevance for KTH and Sweden. It covers the emerging research fields that require cross-institutional and interdisciplinary approaches. The platform will leverage synergies between different KTH research groups in order to seize the opportunity to establish leadership in the new research areas and to ensure timely response to the societal needs.

Goal by 2024: The KTH Energy Platform shall facilitate several strategic initiatives (suggested by researchers) in research areas in line with those identified by the Swedish Energy Agency and/or Horizon Europe (e.g. passive zero energy housing, negative emissions, hydrogen, smart energy systems and energy efficient circular material flows …).

Actions

Exploration: Screening the EU and Swedish strategic documents, participation in reference groups, international and national networks, and running seminars with KTH's researchers and external partners to identify synergies between different research groups and the potential for emerging inter-institutional research fields.

Initiation: Bringing together KTH research groups and external partners in the identified areas of interest. One to two focus areas per year is an estimated output from this activity.

Development Support/coordinate several strategic cross-school and multidisciplinary initiatives per year, with focus on positioning KTH as a strong actor in the area/s through networking and visibility efforts. Provide strategic input for faculty development and planning of research infrastructure in the energy domain.

Implementation: Provide information and support around external research funding and grant management through continued close collaboration with Research SupportOffice. This will be done by organizing common information meetings and thematic workshops to connect KTH researchers with each other and potentially to the strategic partners prior to large calls.

Enhance external visibility, recognition and influence of KTH energy research

KTH should be the "first choice" partner when it comes to energy research and innovation in Sweden. The Energy Platform aims at strengthening KTH energy research brand and influence in the public debate and official inquiries, through exhibiting KTH's excellence and expertise in the energy field at Swedish and international arenas.

Goal by 2024: KTH is widely recognised as a major player in the energy research field. The KTH Energy Dialogue is established as a flagship energy research event in Stockholm and the KTH Energy Platform is present at major events (e.g. in Almedalen). KTH competence areas in the energy field are clearly communicated, and contact researchers are easily found through the KTH Energy Platform's communication means. KTH researchers are visible in the media and in national inquiries.

Actions

Exploration Utilise Crowdhelix, digital networking and KTH partner networks to acquire best practices in coordinating energy research through physical or virtual centres, platforms and initiatives. Explore possibilities of social media and modern digital communication (virtual KTH environment …).

Initiation Map events and public debate, establish a network with Vetenskap & Allmänhet, media/journalists and develop a concept for visibility of energy research and on how to make research results visible.

Development Develop and disseminate external communication materials, such as white papers/ articles, rollups and others. Maintain the platform's digital presence and develop new vectors (virtual campus) for both internal and external audience.

Implementation Organise and advance Energy Dialogue with new specific "hot" topics each year as a flagship energy research event in Stockholm. Co-organise thematic conferences, workshops or brainstorming.

Increase external funding by promoting successful research applications (at all levels)

Acknowledging the importance of external funding and coming large efforts, the KTH Energy Platform will work toward better funding applications by KTH researchers – both for individual and consortium grants with seed funding and also joint event (workshop & info meeting) organised together with the RSO.

Goal by 2024: The KTH Energy Platform shall facilitate the initiative of KTH to host and be major player in several large energy related competence centres, and coordinating EU projects within the field of sustainable energy research. A special focus will be on facilitating initiatives by young researchers to obtaining their first individual grant (e.g. Energy Agency, FORMAS, Vinnova or VR)

Actions

Exploration Identify the topic of interest into Horizon Europe call and national vision documents for the future energy system. Establish discussion networks with university partners, with KTH Strategic partners and potential fundingbodies.

Initiation Select several topics (1-2 per years) for planning internal brainstorming meetings and initiate a core group for further development of the area.

Development Support consortium development (regular meetings, kick-offs) and organise workshops with potential partners and digital event (blogs) to establish KTH expertise in the media. Organizing writing session with the help of senior researchers and possibly professional coaches in collaboration with the RSO. The KTH Energy Platform will use its network and mobilise researchers while RSO will provides professional support throughout the application process.

Implementation Support the writing of the application together with the RSO for example by making information available on how to get answers and internal support.

Build and maintain external and internal relations

Maintain a strategic outlook and provide strategic input for planning of infrastructure and investments.

Follow-up

The activities will be followed up by the platform's directors, research and information officers reference Group. It is done by the means of the indicators listed above that quantify the platform's achievements and progress towards the goals.

The objectives are regularly followed up by:
- Energy Platform's director, research and information officers – biweekly
- Energy Platform's reference group – monthly
- KTH Research Platforms steering group – twice per year

Specific follow-up strategy are derived using the following Key Performance Indicators (KPI)
- Attendance at the KTH Energy Dialogue by external partners
- KTH representation at conferences, seminars and other events organised by funding agencies and other relevant actors
- Number of articles or digital material prepared as communication and disseminationmaterials
- Representation of KTH energy researchers at high-level conferences, meetings and official visits, public inquiry and bill writing; and their visibility in media (presence in blog, broadcast,...)
- External visitors of the KTH Energy Platform's website
- Number large research efforts driven and coordinated by KTH
- Gender and diversity balance (60%-40%) in organised events and awards, e.g. Kraftkvinnorna's Power Woman of the Year.

Responsibility

The KTH Energy Platform directors and research officer hold the main responsibility for follow up and reporting to the KTH Research Platforms steering group and KTH management. The responsibility outreach internally, is shared between the directors and the reference group.

KTH Energy Platform Concrete Action Plan 2021

The main annually events by the KTH Energy Platform are as follows:

- Providing a seminar at the annual political week in Almedalen in June (for 2020 an alternative digital event was arranged).
- PhD student summer school (within an established international collaboration SEEEP) arranged annually in the period of June-August.
- The key annual event is the KTH Energy Dialogue in November (it will take place on 18th November 2021),
- Call for proposals for, initiatives from energy researchers at KTH, at least two each semester.
- School visits by the KTH Energy Platform leadership and presentations at the school assembly meetings (mainly during the autumn semester to initiative involvements prior the KTH Energy Dialogue).
- Internal seminars and workshops with topics related to actual calls and new ideas for initiatives. Some of these events are co-arranged with Research Support Office and/or other platforms. Initiatives are also taken with joint seminars with other universities and authorities (for example there is a planned workshop in January 2021 targeting to give input to the national electrification strategy (I2020/02609).
- Documentation of main events and publications of articles on the web and in social media.
- Contributions in KTH's work with referral writing to government investigations in the energy area.
- Continued work with updated of the webpages with support from platform administration.
- Publication of around six newsletters.

Other activities included in the action plan is economic support to the joint initiative (with the KTH Materials and Life Science Technology Platforms) for supporting the logistics of electron microscopy analysis at KTH during 2021. It is important to underline that this support is not part of the regularly main events of the KTH Energy Platform.

REPORT

Date
2020-11-25

Created by
Monica Bellgran, Director
Magnus Burman, Co-Director
Kerstin Forsberg, Co-Director

KTH Industrial Transformation Platform
Strategic Plan

2021-2024

Summary

Today's society is characterised by extensive changes and transformation, not the least regarding the environment and climate. UN's climate panel suggest that the coming ten years will be decisive for the future climate of the planet. Hence, radical measures on policy and at structural levels are required in combination with actions on organisational and individual levels to increase resource efficiency and reduce the CO2 emissions to a level that limits the global warming to 1.5 degrees. The industry is both part of the problem and the solution. It needs to change products, production and businesses towards becoming fossil free, circular and otherwise sustainable. The competitiveness is even more crucial to maintain as extensive investments are needed for this transformation.

The objectives of the KTH Industrial Transformation Platform (in short Transformation Platform) are to catalyse multidisciplinary research activities, build and maintain internal relations, and enhance external KTH visibility and recognition. Those objectives are realised by the use of different mechanisms and initiatives further described in this document. The platform focuses 80% of its resources on research and 20% on professional lifelong learning activities. The scientific disciplines in focus are product development, industrialization and production, innovation and business models, and last but not least enabling technologies aiming for industrial transformative applications. Digitalisation is considered an important mean to improve efficiency and productivity, a way to increase revenues and competitiveness, and a potential transformation enabler for the industry. Fundamental for the scope of the platform is the systems view and the emphasis on creating industrial ability and capability to transform.

The vision of the KTH Industrial Transformation Platform is to use all available means within the KTH academic research portfolio to support the critical transformation of industry needed in order to stay at the 1.5 degree target, while still maintaining competitiveness. This means becoming fossil free and CO2 neutral, and transforming from a linear to a circular economy and thereby contributing to a sustainable society within the planetary boundaries.

Content

Background and purpose

Based on existing research excellence and strength, KTH defined six multidisciplinary research focus areas to be covered by research platforms: Digitalisation, Energy, **Industrial Transformation**, Life Science Technology, Materials and Transport. The Platforms reflect the fact that the problems and challenges confronting future society and industry are complex and no single player is capable to solve them alone. It is necessary to deploy a multidisciplinary and multi-stakeholder approach and there must be more emphasis on multidisciplinary research and collaboration with both societal and industrial partners. The problems and challenges are not unique to Sweden, neither are the solutions. Therefore, it is necessary to adopt a cross-border approach and strengthen collaboration. The Platforms are virtual entities complementing the school line organisation and they involve many research groups, centres, EIT-KICs and other strategic or multidisciplinary research initiatives within KTH.

Today's society is characterised by extensive changes and transformation, not the least regarding the environment and climate. UN's climate panel suggest that the coming ten years will be decisive for the future climate of the planet. Hence, radical measures on policy and at structural levels are required in combination with actions on organisational and individual levels to increase resource efficiency and reduce the CO_2 emissions to a level that limits the global warming to 1.5 degrees. The industry is both part of the problem and the solution. It needs to change products, production and businesses towards becoming fossil free, circular and otherwise sustainable. The competitiveness is even more crucial to maintain since extensive investments are needed for this transformation. Completely new green field factories, i.e. starting from scratch, are rare in Swedish industry which means that we need to re-engineer our brownfield assets. The transformation issue is challenging as it requires radical changes of existing structures, cultures and processes. It also involve implementation and use of new enabling technologies and digitalisation options and consequently, changes in how to manage, develop and operate a business.

The KTH Industrial Transformation Platform was established in April 2019 to support and catalyse interdisciplinary research within the relevant technology fields needed to support the ongoing *industrial transformation for climate and competitiveness*. KTH's Development Plan 2018-2023 establish that "*A leading KTH"* conducts applied research augmented by curiosity – driven by basic research and cross-disciplinary collaborations and creates major social benefits through outstanding collaborations in education and research[2]. The Transformation Platform puts special attention on these two targets while of course all goals are addressed. The platform is related to product development, industrialisation and production, innovation and business models, and enabling technologies with industrial application in mind. Circular economy, sustainability, and digitalisation are areas crossing the aforementioned disciplinary fields of interest. The Transformation Platform facilitates interaction between expertise at KTH and external partners within academia, public organizations and companies with an interest in research and development of new knowledge that supports the industry's critical transformation to become fossil free and sustainable while still being competitive on the global market.

[1] Transformation means going from one particular position to a desired position. According to Andersson & Ackerman Andersson see e.g. www.beingfirst.com, the future state is unknown when you begin, making it impossible to manage transformation with pre-determined, time-bound and linear project plans. It will require operating in the unknown. Furthermore, the future state is so radically different than the current state that the people and culture must change to implement it successfully requiring new mindsets and behaviours. The authors' state that it might even be required to invent the required new future, let alone to operate it. Industrial transformation is a broad concept that can be studied at different system levels, either transforming a sector or an industry, and in the end - individual companies. The transformation concept can be linked to digitalisation and new enabling technologies such as additive manufacturing or the Internet of Things (IoT) that helps facilitating the transformation. Industrial transformation could also be used as a concept in policy contexts to create change in production and consumption structures in order to drive society towards environmental sustainability. In the production context, the term transformation is used to describe the function of the production system, i.e. transforming raw material into a component or finished product. It requires technology, premises, material supply, energy, information and people in the system, and its comprising organization and management.

[2] A leading KTH - A leading technical and international university creating knowledge and competence for a sustainable future, KTH's Development Plan 2018–2023.

The Transformation Platform sets out to visualise ongoing research, facilitate, match-make and otherwise coordinate activities, besides initiating new initiatives and actions found relevant to support KTH's Development Plan and the vision of the platform.

The UN has set up 17 Sustainable Development Goals, SDGs, and **the KTH Industrial Transformation Platform addresses** mainly four of those; **SDG12** – Responsible consumption and production, **SDG9** – Industry innovation and infrastructure, **SDG7** – Affordable and clean energy, and **SDG13** – Climate action. Sustainable development is a key aspect of the research supported by the platform and involves improving the environmental performance of industrial products, production processes, vehicles, buildings and supply systems. Thus, the platform strongly supports KTH's mission to become an even more sustainable university. Strengthening KTH's research that supports industrial transformation will create value for industry and the society as a whole and may, in return, play an important role in strengthening KTH as a sustainable and internationally leading university.

Vision and objectives

The vision of the KTH Industrial Transformation Platform is to use all available means within the academic research portfolio to support the critical transformation of industry needed in order to stay at the 1.5 degree target, while still maintaining the competitiveness. It means becoming fossil free and CO2 neutral, and transforming from a linear to a circular economy – contributing to a sustainable society within the planetary boundaries.

The objectives of the Transformation Platform are to catalyse multidisciplinary research activities, build and maintain internal relations, and enhance external KTH visibility and recognition. This is realised by the use of different mechanisms and initiatives further described in the following. The platform focuses 80% of its resources on research and 20% on professional lifelong learning activities and knowledge transformation. The scientific disciplines in focus are product development, industrialization & production, innovation & business models, and enabling technologies aiming for industrial transformative applications. Digitalisation is considered an important mean to improve efficiency and productivity, a way to increase revenues and competitiveness, and a potential transformation enabler for industry. Fundamental for the scope of the platform is the systems view and the emphasis on creating industrial ability and capability to transform. In order to cover the contextual aspects of different businesses' (sectors') transformation, the platform sets out to identify, catalyse and inspire to transformation processes for prioritised businesses like automotive, pharma/bio production, and construction/community building. In addition, the Transformation Platform intends to support the branding of Stockholm as the industry city of Sweden, and Stockholm Mälardalen as an industry region of national and European importance. The work targets collaboration with Stockholm County Council, municipalities and other universities in the region to create a sustainable and competitive arena. The priorities of the platform are based on the following basic guiding ideas:

- ✓ *To create new networks that build on the engagement of each individual researcher in contributing to the industrial transformation for sustainability and climate purpose*
- ✓ *To put Industrial transformation on the agenda internally and externally*
- ✓ *To be a collaboration partner to the other platforms, centres and Schools contributing with complementary competence, views, approaches and activities*
- ✓ *To stimulate research that creates instant value and use for industry, supporting their transformation for climate and competitiveness*
- ✓ *To be innovative on new formats, methods and instruments that enhances research and competence development within the scope of the platform (e.g. "pilot → roll-out" mechanisms)*

Target Groups

The Transformation Platform addresses the following target groups:

1) **KTH**: Researchers on all levels, relevant research centres and strategic research areas (SFOs), and (line) management.
2) **Swedish industry**: KTH strategic partners. Industry partners in manufacturing industry and its related service sector. Businesses like automotive, bio production and built environment.
3) **Swedish society**: Swedish universities and research organisations, e.g. Chalmers, Uppsala University, Stockholm University, Handelshögskolan, RISE. Stockholm Region and Stockholm city. National and regional politicians influencing industry and academy. Business associations and organisations that supports Swedish industry. Funding agencies such as Vinnova, SSF, Tillväxtverket, Energimyndigheten and EU.
4) **International**: EU entities and funding agencies with focus on industry development. International universities and research organisations with focus on industry development.

Priorities

The following priorities are based on the Guidelines for the KTH Research Platforms* and KTH's Development Plan 2018-2023**:

1) Catalyse multidisciplinary research activities at KTH

1.1 Create and innovate measures to promote new research

- By having a challenge driven focus that drives collaboration between researchers and partners of different disciplines to go across disciplines to develop relevant knowledge to solve the issues.
- By initiating and facilitating opportunities and meeting spots for KTH researchers to meet with the purpose of creating research projects supporting the vision of the platform.
- By working with existing mechanisms to start and execute multidisciplinary research activities.
- By experimenting with new initiatives that could support more cross-disciplinary and challenge driven research applications, and in the end funded projects.
- By supporting external matchmaking activities (EU, VINNOVA etc.)

1.2 Develop the preconditions for the platform to deliver results

- By benchmarking and learning from national & international examples of how similar facilitating structures has succeeded in creating good conditions for the research community.
- By initiating business specific projects to promote researchers from different disciplines to come together to focus on the research necessary for the transformation (similar to challenge driven).
- By initiating structures to further enhance multidisciplinary research, such as researchschools.
- By reviewing the coming KTH RAE 2020/2021 and identifying new research areas that support the platform vision.

2) Build and maintain internal relations

2.1 Create interest for the research scope within the platform

- By creating an interest and "movement" for the vision of the Transformation Platform and motivate researchers in directing all/part of their research effort to support the climate effort.
- By acting as matchmakers and "one door in" for research within the scope.

* See Guidelines for the KTH Research Platforms **See KTHs Development Plan 2018-2023

2.2 Visualise existing research and research structures within KTH

- By using different means and communication channels for presenting and highlighting ongoing research of research centres, research teams and individual researchers.

2.3 Support research groups and structures

- By using the platform where it adds most value in relation to the existing KTH structure (matrix) and the other platforms at KTH.
- By further strengthening the collaboration with, and support to, existing and coming research centres at KTH within the scope of the platform.
- By using different methods to build and support new cross-disciplinary relationships, and especially to support young and promising researchers in their careers.

3) Enhance external KTH visibility and recognition

3.1 Attract attention to KTH in general, and to the activities of the platform in specific

- By collaborating with external partners within selected and prioritised projects.
- By initiating and realising different kind of events that involves external experts/participants and attracts external interest and recognition, and by focusing on relevant outreach activities.
- By utilizing the platform webpage (external) to make it a virtual knowledge hub/node for links, audio and visual recordings, papers and other documentation within the scope of the platform.

3.2 Contribute to external visibility and engagement

- By continuing and expanding the KTH involvement and representation in boards, external teams, steering groups etc.
- By supporting the KTH strategic partners of relevance.
- By stimulating researchers to translate research results and new knowledge into modular and/or digital courses for industry professionals (Life Long Learning).
- By introducing new ways of communicating externally.

Objective of specific KTH-priority: Platform EU-support

The KTH Research Platforms have been given the responsibility to further enhance the chance of our researchers to get EU funding from the new programs. For the Transformation Platform this means:

Influence and create alignment: To support KTH researchers and the KTH Research Support Office to influence and align research agendas, gather KTH experts to provide expertise and advocacy work as well as providing input to policies, draft work programs or coming research calls.

Representation and guidance: The platform will be a contact node to find KTH representatives for EU meetings, events, groups, networks etc. within the scope of the platform.

Follow-up

The objectives will be followed up on a regular basis by the reference team of the Transformation Platform (*2019 – ongoing: Mikael Östling, Jan Gulliksen, Göran Finnveden, Sofia Ritzén and Martin Törngren*), and once a year by the KTH Research Platforms steering group. The platform team will make sure to perform the activities in the action plan so that the objectives within the three areas will be fulfilled. See table 1 for an overview of the follow-up of the objectives.

Table 1. Objectives and plan for follow-up

Objectives	Follow-up by	Frequency
1.1 Promote new research	Reference team	4 times a year
1.2 Develop the preconditions	Platform team	Regularly
2.1 Create interest for the research scope	Reference team	4 times per year
2.2 Visualise existing research	Platform team	Regularly
2.3 Support research structures	Platform team	Regularly
3.1 Attract attention to KTH	Reference team	4 times a year
3.2 Contribute to external visibility	Platform team	Regularly

The KTH Industrial Transformation Platform Activity Plan 2021-2024

The objectives are realised by activities, see table 2. The platform team (PT) is responsible if nothing else is stated. Prioritised activities for 2021 are illustrated in red in the table. Activities in grey are prioritised and *support several objectives*.

Table 2. Overview of activities for 2021. Prioritised activities are illustrated in red and activities in grey support several objectives.

Objectives	Activities	When	Responsible
1.1 Promote new research	Transformation day - Build Environment/Sector Internal calls Newsletters EU support Workshop with the Energy Platform	Annually 2021 2/year 4/year On demand 2021/2022	Platform team (PT) PT & Prof. Eriksson PT PT PT PT
1.2 Develop the pre-conditions	Internal KTH visits Platform materials Business transformation: - Automotive - Bio production - Building - New sector Graduate school: Fordonsdalen	2021 Ongoing 2021 – 2024 2022 – 2021	PT PT & communication Burman & team Rockberg/Holmstedt Eriksson & team PT Bellgran & Burman
2.1 Create interest for the research scope	Researcher of the week Transformation seminars Developing the web Transformation day	2021 → 2021 → 2021 Annually	Researchers network Researchers network Communication PT

2.2 Visualise existing research	Centres & research teams on web Seminars SOTA films - pilot Researcher of the week	2021 On demand 2021/2022 2021→	PT PT PT PT
2.3 Support research structures	Encourage new PhD courses Encourage mobility research positions Internal calls Internal KTH visits	2022 2022 On demand 2021	PT PT PT PT
3.1 Attract attention to KTH	Workshop on Cybersecurity together with DIGI Platform Participate in boards etc. Web: Transformation node - pilot Think Tank - pilot Transformation day	Q3/2021 2021 - 2024 2021 2021/2022 Annually	Digi & Transf. Platforms KTH researchers PT & Communication PT
3.2 Contribute to external visibility	LLL - courses for industry "Good Morning Researcher" - pilot Rolodexes - pilot	2021 – 2021/2022 2021/2022	Burman TBD TBD

Activities

Additional comments on key activities (see table 2) planned in order to achieve the priorities:

1. Catalyse multidisciplinary research activities at KTH

The Transformation Platform organises *biannual calls for KTH researchers to apply for funding* for activities that supports the platform's vision. The call is openly phrased and welcomes strong proposals for activities from multidisciplinary teams at KTH. Examples of activities that can be supported are workshops, centres, arranging or participating in conferences, EU-related research funding activities and similar. New innovative ideas to create excellent applications for funding are especially encouraged.

The annual *Transformation Day* will build on the previous successful format comprising four themes: politics, industrial, academic and "what's next?". The theme for 2021 will be on the Build environment sector transformation for sustainability and circularity.

The platform has created a *network comprising of researchers and research students at KTH*. The network is open for KTH researchers who support the industry's transformation towards being fossil-free and CO_2-neutral with a goal of passing the 1.5 degrees target 2030. The research network creates forums for the KTH-community, industry and general public to meet around multidisciplinary research needed to support a competitive industrial transformation and with a sustainable society as an ultimate goal. The network act as a communication outlet on research-related solutions, methods and strategies. The network reports directly to the platform. The extent of engagement is on voluntary basis and is not funded by the platform. The platform funds activities within the network, such as costs in connection to organizing seminars and workshops (premises, invited speakers, lighter meals, posters etc.). The network has created a LinkedIn page and is planning to create a KTH web page in 2021. The network is managing the **Sustainable Transformation Seminar series** aimed at KTH researchers and KTH partners in collaboration with the IRIS initiative (at the ITM school), and ICES (a KTH centre). The network is also managing the **Researcher of the Week** initiative where KTH researchers introduce themselves and their research and how it contributes to industrial transformation (published on the Transformation-Platform web page). The initiative works on defining industrial transformation, in close collaboration with the platform team, for future publication on Wikipedia.

2. Build and maintain internal relations

The platform will continue to support the initiatives taken within the business of automotive, pharma/bio production, and Build environment. See Appendix for further information.

3. Enhance KTH external visibility and recognition

The platform intends to continue the participation in different steering groups, boards etc. and will further propose KTH researchers to participate in relevant external groups (e.g. Delegation for Circular Economy).

Potential ideas on new formats to be tested in pilots during 2021 and 2022 are:

- ✓ "*Think Tank*", this format allow topics of high relevance to be highlighted and put KTH researchers and the platform scope on the regional and national agenda. Discussions on future trends, state of the art, identifying industry needs etc. could be themes.
- ✓ The concept of "*Good Morning Researcher*" where the researcher provides opinions on contemporary topics and questions of relevance to industry and society during breakfast.
- ✓ The concept of the KTH "*Rolodexes*", providing scientific and fact-based views in media, attracting journalists – finding researchers with a voice.
- ✓ Testing the concept of "*10 minutes State of The Art"* (by digital film modules). The focus will be on the international frontline of research in a broader sense rather than the specific research of an individual researcher.

APPENDIX

Industrial transformation of specific businesses, priority projects of the platform 2021 -2022:

The automotive industry (Fordonsdalen)

The automotive industry is one of Sweden's most important industries and the single largest export sector in Sweden, but this industry sector is facing major challenges. There is a societal change driven by the climate and a rapid technological development that creates new conditions for the entire transport system and entails a change for the automotive industry. In the industry, there is a rapid development in automation, digitalisation, electrification, connected solutions and battery technology. This rapid change contributes to a shift in skills. There are many indications that Sweden is at full speed to an acute, accelerating and structural shortage of skills for a crucial engine for growth: industrial and technology companies as well as industrial services. New knowledge and functions in addition to the traditional ones will be required to gain a competitive advantage in the global market.

Covid-19 has accelerated and clarified the need for change in the automotive industry. There is a need to invest in skill developments, at all levels, so that the automotive industry in the region can be developed with assured growth and maintained international competitiveness. In the Stockholm region, there are many companies with world-leading competence, strong innovation environments, institutes and universities with successful research, all of which need to collaborate and jointly take responsibility for the needs and challenges we face.

The Stockholm Region, together with KTH Royal Institute of Technology, proposes the establishment of *Fordonsdalens Forskarskola*. Our vision with this initiative is to accelerate the automotive industry's transformation towards climate and competitiveness. Our idea is 30 students for a doctoral degree (as industrial doctoral students, 4 years consist of doctoral studies and 1 year of concrete work in the own organization, *i.e.* a total of 5 years) with private and public funding. We believe this offer will attract key people in regional companies and organizations, and will create world-leading expertise. *Fordonsdalens Forskarskola* will have a multidisciplinary approach with doctoral students from different fields but with a common goal. We will focus on cross industry boundaries, and the system perspective and integration are, therefore, central parts. An important aspect is that the doctoral students will spend time being "transformation agents" within their company (*i.e.* train others, test pilots before roll-out, identify transformation gaps internally, *etc.*). An initial pre-study will analyse the problem and the needs, as well as develop a structure for *Fordonsdalens Forskarskola, resulting* in an application for funding. There is a clear need for a unique education at specialist level that transcends industry boundaries and includes not only the classic automotive industry but also tomorrow's vehicle stakeholders. Reconciliation meetings with important industry representatives and authorities have demonstrated a very positive response on the initiative. The pre-study for the *Fordonsdalens Forskarskola* will include a close dialogue with relevant stakeholders on how to best meet needs, shortcomings and challenges regarding the supply of skills in the automotive industry.

Life Science Production/Bio production

Sweden has a strong position in the pharmaceutical sector and the life science research in the Stockholm region is considered being in the top three internationally[2]. The pharmaceutical industry is undergoing an extensive and exciting transformation. Tomorrow's biological drugs (biologics) place completely new demands on production, distribution and communication. These drugs require to a greater extent tailor-made, possibly local, manufacturing in contrast to current drug production. Upon delivery, for example, there are challenges regarding unbroken cold chains. In order to achieve a functioning future market in Sweden, expertise from a wide range of different areas of expertise needs to work together. The platform initiated in 2019 a mapping to identify the challenges and research needed to aid in this transformation. The study was carried out by Prof. Johan Rockberg and Prof. Peter Holmstedt, both affiliated at KTH. The study was followed by organizing the Transformation day of 2020 under the theme: *How do we secure future pharmaceutical production?* This half-day event gathered researchers and company representatives for engaging panel discussions and highlighted a number of important aspects in order to achieve a sustainable and competitive transformation of the sector to meet the demands of tomorrow. It was evident that in order to achieve the transformation the engagement from a large number of different actors are needed[2]. The Transformation day in 2020 was documented by a film and in areport.[2]

Even if the Stockholm region is very strong when it comes to research within life science a consolidation of power is needed for the region to further attract companies to *produce* future generations of drugs. More resources should be directed towards research on the production of drugs.[2] Companies such as AstraZeneca and Pfiser are in the first stages for initiating and starting up production of the second and third generation of drugs.[2] AstraZeneca's production facility in Södertälje comprises a bit more than 40% of the company's global production and 5% of the Swedish export. AstraZeneca has ambitious sustainability goals formulated in Ambition Zero Carbon. As early as 2025, carbon dioxide emissions will be zero, which is an important aspect to consider in the overall transition. The transformation day highlighted two novel Swedish companies and their experiences in commercializing their research from innovation to production. Sweden is strong in research but we need to be better in commercialization of the results.[2] Testa Center in Uppsala offers the possibility to test biotechnology and bio-production in a dedicated environment with fully equipped labs. This test bed centre is an important actor in the region to help small enterprises in their process to commercialise their results. Modern small-scale production is important and has a great potential to keep up with the rapid development in the pharmaceutical market.[2] In conclusion more support for small companies, more research on production and a greater awareness of the importance of production among researchers and entrepreneurs as well as authorities, politicians and financiers are needed to accomplish the transformation in the pharmaceutical sector.

Built environment Construction/Civil Engineering

A new pre-study was initiated 2020 and will continue 2021, focusing on the industrial transformation within the built environment construction/civil engineering business, headed by Prof. Kent Eriksson who is also the Director of the Centre for Building Efficiency.

[2] https://www.kth.se/en/forskning/forskningsplattformar/industriell-transformation/nyheter/rapport-fran-transformationsdagen-2020-hur-sakrar-vi-framtidens-lakemedelsproduktion-1.1015699, accessed 2020-11-15.

Communication Plan

The KTH Research Platforms have a master communication plan. The activity plan below is a specific plan for the KTH Industrial Transformation Platform based on the master communication plan.

Communication Activity Plan 2021

Activity	Target group	Channel	Responsible for communication	When
Internal calls	Researchers at KTH	Internal webpage and newsletter	Platform director send dates to the communicator	2 deadlines per year
Researcher of the Week	Researchers at KTH	Internal webpage and newsletter	Research network send material to the communicator	Once a week
Newsletter	Researchers at KTH	Apsis (newsletter system)	The communicator and platform	4 times per year
Sustainable Trans-formation Seminars	Researchers at KTH and external researchers	Internal and external webpage, newsletter	Platform and the communicator	4 times per year
Transformation Day 2021	Researchers at KTH and external researchers	Internal and external webpage, newsletter, advertisement?	The communicator and platform	September
Platform materials	Researchers at KTH and external researchers	Webpages, internal and external meetings and events	Platform	On demand
Internal KTH visits	Researchers at KTH	Meetings	Platform	According to plan

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Skapat av
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KTH Life Science Technology Platform
Strategic Plan

2021-2024

Summary

This document presents the Strategic Plan for KTH Life Science Technology Platform (in short LST Platform), for the years 2021-2024. KTH is a leading university in many fields of life science, with research of the highest scientific excellence.
This has been achieved largely by multidisciplinary efforts, based on engineering ingenuity and technique development. The life science field is currently transformed by technical advances which opens up totally new venues, e.g. personalised medicine and AI- based diagnosis, but which requires greater interaction between biology and physics, mathematics, engineering, and the computational sciences. In this context, the LST Platform has an important role in the continued work to combine scientific expertise from different fields at KTH into multidisciplinary life science research of the highest excellence and societal value. The platform's main objectives are to catalyse multidisciplinary research activities, build and maintain internal relations, and enhance external KTH visibility and recognition. The platform works towards these objectives by arranging multidisciplinary workshops and networking activities, by funding multidisciplinary research projects, by internal and external communication activities, by assisting KTH management and Research Support Office with life science expertise for expert panels and writing of comment letters, and by representing KTH in research centres, networks and working groups in the Stockholm region. These activities are yearly reported to the KTH Research Platforms steering group.

Content

Background and purpose

Based on existing research excellence and strength, KTH defined six multidisciplinary research focus areas to be covered by research platforms: Digitalisation, Energy, Industrial Transformation, **Life Science Technology**, Materials and Transport. The Platforms reflect the fact that the problems and challenges confronting future society and industry are complex and no single player is capable to solve them alone. It is necessary to deploy a multidisciplinary and multi-stakeholder approach and there must be more emphasis on multidisciplinary research and collaboration with both societal and industrial partners.
The problems and challenges are not unique to Sweden, neither are the solutions. Therefore, it is necessary to adopt a cross-border approach and strengthen collaboration.

The Platforms are virtual entities complementing the school line organisation and they involve many research groups, centres, EIT-KICs and other strategic or multidisciplinary research initiatives within KTH.

The description above, of increasingly multidisciplinary and multi-stakeholder arenas in academy, industry and society, applies considerably to research and development in life science. The life science field, with its basis in medical and biological science, is currently transformed by a set of technical advances which leads to implementations affecting everyone in society. Especially the vastly increased production of biological and health data opens up totally new venues, e.g. personalised medicine and AI- based diagnosis. However, this rapid transformation also presents a challenge, which requires greater interaction between biology and physics, mathematics, engineering, and the computational sciences. Similarly, progress within several other fields, e.g., material science, micro-technology and biological and medical imaging, leads to novel technologies that until recently were perceived as mere science fiction, e.g., 3D printing of human tissue and bioelectronic implants.

It is in this multidisciplinary combination of expertise, based on method and technology development, that KTH plays its major role in Life science. The engineering approach to solving problems and develop new technology is used to address important societal issues and applied to societal use in medicine and health care, environmental monitoring, and sustainable forestry and food production.
Indeed, life science is one of the strongest scientific fields at KTH, with several research groups at the absolute top of their fields. Notably, half of KTH's publications in the last five years in the most prestigious scientific journals (Nature/Science/Cell) were within life science. The LST Platform has an important role in the continued work to combine scientific expertise from different fields at KTH into multidisciplinary Life science research of the highest excellence and societal value.

In 2019, the government established a function for coordination between the life science sector and the government and launched "A national strategy for life science". The goal is that "Sweden will be a leading life science-nation. Life science contributes to improve health and quality of life, secure financial prosperity, develop the country further as a leading knowledge nation and realise Agenda 2030". Similarly, Region Stockholm is now launching a "Life science strategy for the Stockholm region".

In this context, the LST Platform has an increasingly important role to catalyse multidisciplinary efforts at KTH, to support further excellent life science research and innovation in the service of our society. An important task is to increase the awareness in the society about KTH's excellence in life science, to increase influence on government agencies and research funding bodies.

Vision

Life science research is becoming increasingly important for our society, based on recent progress in a multitude of fields, which combine into novel technical solutions. This has resulted in major progress in the medicine and health fields, such as personalised medicine and AI-based diagnosis, and the new technology promises to democratise health and care fundamentally.

KTH is a leading university in many fields of life science, with research of the highest scientific excellence. This has been achieved largely by multidisciplinary efforts, based on engineering ingenuity and technique development. In this context, the LST Platform will strive to further increase the multidisciplinary research efforts in life science at KTH, by catalysing meetings and exchange of ideas among different fields at KTH.

The exceptional scientific excellence in life science at KTH is not fully recognised, neither internally at KTH nor, more importantly, externally among policymakers, research funding bodies, life science industry and colleagues at other universities. To increase funding opportunities and collaborations with academia, agencies and industry, we aim to increase the awareness in society of KTH as an excellent Life science university.

Target Groups

The primary target group for the KTH Life Science Technology Platform is the KTH researchers. Secondary internal target groups are KTH infrastructures and research centres in the life science area, KTH management and the Research Support Office. An additional target group is the society outside KTH, including KTH's strategic partners, Region Stockholm and government agencies, life science industry, other universities, funding agencies and foundations and the general public.

Priorities

Our main mission is to help scientists in different fields to meet and exchange ideas, in order to catalyse novel scientific ideas and facilitate new multidisciplinary collaborations where different areas of expertise can be combined. Related aims are to help scientists identify possibilities for research funding and form research constellations and consortia.

The platform communicates important funding opportunities, news and policies, and seminars and workshops within the life science domain through a newsletter and the platform webpages. Since the exceptional scientific excellence in life science at KTH is not generally recognised at KTH, one aim is to improve our work in raising the awareness of KTH as an excellent Life science university.

Based on our good overview of life science at KTH, the platform also assists KTH management and Research Support Office with identifying competence for scientific expert panels and working groups, and for input to drafts of policy documents and calls.

Externally, the platform represents KTH in several centres and networks working for multidisciplinary efforts within life science in the Stockholm region.

By our world-leading research and development in the life science sector, KTH makes important contributions to health and well-being in the society. A goal for the LST Platform is to increase awareness in society, not least among research funding bodies, about KTH excellence in life science and about the importance of technique and method development as a basis for applications in life science.

Follow-up

The platform director and vice-directors have regular meetings for planning and discussions, where the implementation of objectives is followed up. Monthly, the platform reports about the ongoing activities to the KTH Vice President for Research, the platform administrator and the other platforms at the platform coordination meetings. Annually, the platform presents a written report about the past annual activities and a financial report to the KTH Research Platforms steering group.

KTH Life Science Platform Action Plan 2021-2024

Activities

Here follows a listing of planned activities during the next four year-period, aimed at achieving the objectives and aims of this Strategic Plan.

Workshops
The platform arranges multidisciplinary workshops with the ambition to bring together researchers across fields which previously have no or little interaction. We strive to identify fields with possible synergies and to visualise intellectual and facility capacity. The workshops can be arranged by the platform alone or in collaboration with another research platform. The main target is KTH researchers but relevant external participation, e.g., from KI and Region Stockholm, is also desirable for forming multidisciplinary collaborations outside KTH.

Seed funding of multidisciplinary research projects
The platform funds multidisciplinary research through open calls to KTH scientists for projects including researchers from different fields. The goal is to encourage formation of multidisciplinary collaborations which may open up new scientific venues and inspire to novel research ideas. We especially support collaborations between early career-researchers for which small grants may have a great impact for enabling testing of ideas, and for encouragement.

Support to researcher networks
The platform also encourages formation of multidisciplinary researcher networks through open funding calls to KTH scientists. This is to support funding of workshops, conferences and activities for multidisciplinary network building, e.g., discussion fora.

Support and highlighting of research infrastructures
The platform encourages the use of the research infrastructures at KTH by arrangement of communication activities, e.g., workshops, and information in the platform newsletter and webpage, and by funding the joint initiative (with the KTH Materials and Energy Platforms) for supporting the logistics of electron microscopy analysis at KTH.

Communication to KTH researchers
The platform has two main tools for communication: the life science newsletter and the platform webpages. The platform publishes a newsletter approximately every 6 weeks during semesters, thus around 6 times per year. The newsletter is targeted at KTH scientists within the life science domain and intends to highlight important funding opportunities, news and policies, and seminars and workshops. This information is published also on the platform webpages, together with information about the platform activities. The webpages will now be further developed to give a better overview and presentation of excellent life science research at KTH, and one new item will be presentation of new scientists at KTH who introduce novel research fields or technologies to KTH. To enhance both the visibility of the LST Platform and the knowledge across KTH about the excellence in the life science field, the platform will reach out to all school management groups to arrange visits for information and discussions.

Assistance to KTH with expertise on life science
Through its overview of life science at KTH, the platform acts as a coordinator of life science expertise, to serve KTH in its internal prioritizing and external relations. Thus, the platform assists KTH to identify expertise and to coordinate writing of comment letters for consultations from authorities and from European and Swedish research funding bodies, and to identify competence for scientific expert panels and working groups. The platform also assists Research Support Office with expertise for their EU related work in expert groups, networks and collaboration events, and with input to drafts of policy documents and calls.

Work for influence and visibility
The platform works with influencing life science in the Stockholm region and on increasing the visibility of the life science performed at KTH, by activities in several research centres, networks and working groups in the Stockholm region. For example, the director and vice directors are represented in the steering groups of MedTechLabs, AIMES and the KTH-KI joint doctoral education programme. The director is also the KTH representative in the working group for the "Life science strategy for the Stockholm region", an initiative by Region Stockholm to coordinate Life science among care givers, academia and industry, and the vice director is member of the expert group for MedTech4health. In order to increase the influence on government agencies and research funding bodies, the platform works to inform the society about KTH as a Life science university, and about the importance of technique development in the life science field, through presentations to institutions outside KTH. The platform also assists Research Support Office with input to drafts of EU policy documents and calls, and will initiate discussions about influencing funding bodies.

Work for multidisciplinary collaboration with strategic partners and other universities
Through the representation in the steering groups of MedTechLabs, AIMES and the KTH-KI joint doctoral education programme, the platform works to support multidisciplinary research collaboration and education. At MedTechLabs and AIMES, KTH scientists collaborate with scientists and clinicians at KI and Region Stockholm, to put KTH methods and technology into clinical use. With the KTH-KI joint doctoral education, the two universities unite to give PhD students a combined technical/clinical expertise of great importance for the future clinical research in the Stockholm region.

Concrete Action Plan for 2021

- Arrangement of one to two multidisciplinary workshops.

- Publication of around six newsletters.

- Improvement of the platform webpages, by creating a better overview and presentation of excellent life science research at KTH and by introducing presentations of new scientists and novel research fields at KTH.

- Administration of two open calls for funding of multidisciplinary research projects and for support to researcher networks.

- Economic support to the joint initiative (with the KTH Materials and Energy Platforms) for supporting the logistics of electron microscopy analysis at KTH.

- Arrangement of visits to the school management groups, to inform about the platform and the life science activities at KTH, and to exchange ideas.

- Representation in the steering groups of MedTechLabs, AIMES, the KTH-KI joint doctoral education programme and Biomex, to work for influence and visibility and for multidisciplinary collaboration with strategic partners and other universities.

- Assistance to KTH management and Research Support Office for writing of comment letters, for identification of competence for scientific expert panels and working groups, and for input to drafts of policy documents and calls.

- Increased outreach to strategic partners and other bodies of society to inform about the exceptional scientific excellence in life science at KTH and about the importance of technique development in the life science field.

- Collaboration with Research Support Office for matching KTH scientists with research networks and consortia, and with multidisciplinary calls.

Follow-up

The activities in the action plan are continuously followed up by the platform director and vice-directors at regular meetings. The platform reports monthly about the ongoing activities to the KTH Vice President for Research and the other platforms at the platform coordination meetings. The activities of the platform are yearly reported to the KTH Research Platforms steering group, in a written report about the past annual activities and a financial report.

Responsibility

The platform director monitors the platform activities and has overall responsibility for follow-up of the action plan, and for yearly reporting to the KTH Research Platforms steering group.

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	2020-11-23	X-ÅÅÅÅ-XXXX

Skapat av
Jonas Weissenrieder, Director

KTH Materials Platform Strategic Plan

2021-2024

Summary

This document presents the KTH Materials Platform Strategic Plan for 2021-2024. Materials-oriented research is a very active research area at KTH, with several world-leading research groups in diverse fields of materials research and strong links to Swedish industry. The activities of the Materials Platform during the period will primarily be aimed at stimulating, facilitating and/or initiating multidisciplinary research activities with a special focus towards promoting inter-school research activities and collaborations. The Materials Platform will continue to work towards expanding the opportunities for external funding by facilitating researcher-initiated activities expanding the competitiveness of KTH material researchers in competitive application procedures. The Materials Platform will also provide strategic input for planning and organization of existing infrastructure, efficient utilization of large-scale infrastructures, and future investments in infrastructures. The Materials Platform will support activities within the Research Assessment Exercise and activities of the Research Support Office. The Materials Platform will strive to establish the yearly Materials Platform Day as an attractive venue for networking and dissemination to all material researchers at KTH. During the period, efforts will be made to improve both the internal external communication. The objectives and activities will be evaluated annually.

Content

Background and purpose

Based on existing research excellence and strength, KTH defined six multidisciplinary research focus areas to be covered by research platforms: Digitalisation, Energy, Industrial Transformation, Life Science Technology, **Materials** and Transport. The Platforms reflect the fact that the problems and challenges confronting future society and industry are complex and no single player is capable to solve them alone. It is necessary to deploy a multidisciplinary and multi-stakeholder approach and there must be more emphasis on multidisciplinary research and collaboration with both societal and industrial partners. The problems and challenges are not unique to Sweden, neither are the solutions. Therefore, it is necessary to adopt a cross-border approach and strengthen collaboration.

Materials oriented research is a particularly active research area at KTH, with several prominent research groups and a tradition of strong links to Swedish industry. Materials constitute a foundation for emerging technologies and is necessary for development of a future sustainable society where environmental and energy related challenges require new innovative solutions within transport, health, and communication technologies. The breadth of material applications decides that materials research is inherently multidisciplinary, and its full potential can only be realised within close collaborations of expertise from several fields. Constructive collaboration with Swedish and international industry is also necessary, as is access to state-of-the-art research infrastructure. All five KTH schools are active within the field of materials research.

Materials research at KTH covers a wide spectrum of materials and applications. Research activities have often developed from historically important applications or industry foci such as mining and processing of metals, electronics, transportation, chemical processing, or the wood fibre industry. Over time the activities have, guided by scientific curiosity and competition for funding, become increasingly specialised. At KTH developed expertise in for example metallic alloys, nanostructuring, and polymeric materials have resulted in research endeavours with applications in such diverse research areas as medical technology (e.g. nanostructured metallic coatings on implants or medical devices made from artificial spider silk) and renewable energy (e.g. nanostructured thermoelectric materials or organic solar cell materials).

Here, we mention six broadly defined fields covering most (but not all) activities within materials research at KTH:

(1) Engineering materials – construction and infrastructure materials, processes for 3D printing, specialised alloys, corrosion and hard materials.

(2) Polymeric materials – Bio-based, synthetic and hybrids.

(3) Emerging materials – Quantum materials, plasmonics and magnonics.

(4) Materials for energy applications – Photovoltaics, catalysis, thermoelectric materials, storage and transmission.

(5) Sustainable materials – Recycling, purification, geological materials, combustion and design for circularity.

(6) Materials for communication technologies – Semiconductor technologies, photonics and thin films.

In all these research fields, KTH has demonstrated outstanding research quality as demonstrated through, e.g., the research assessment exercises carried out at KTH in 2008 and 2012. An important purpose of the Materials Platform is to, through coordination activities, stimulate further development of the already strong research and multidisciplinary activities within materials science.

MAX IV, the European Spallation Source, The European XFEL, PETRA III, Molecules and Materials at Interfaces Laboratory (2MILab), clean-room facilities, and computational resources (national centres such as PDC and NSC, and international resources such as PRACE) are examples of large-scale infrastructures critical for materials research at KTH. The complexity and cost of these infrastructures widely exceeds the capacity for a single research group to sustain. However, timely, efficient, and ample access to these infrastructures is critical for KTH researchers to capacity to produce world-leading research. A central task for Materials Platform is to coordinate efforts at KTH to ensure such access.

Well-educated junior researchers (Master and PhD students) are a prerequisite for successful and vibrant research. Important subject areas include for example quantum mechanics, numerical analysis, computational physics, thermodynamics, organic and inorganic chemistry, and solid state physics/chemistry. Some of these subjects have, for various reasons, unfortunately become increasingly marginalised over the years. The subjects may be viewed as difficult, and/or require expensive experimental infrastructures. An important strategic goal for KTH should be to ensure access to high-quality relevant education. Although education is not explicitly mentioned as a focus for the KTH Research Platforms, we still choose to mention this perspective in this background, since it is of central importance for the long-term goal of continuous production of excellent materials research.

The Platforms are virtual entities complementing the school line organisation and they involve many research groups, centres, EIT-KICs and other strategic or multidisciplinary research initiatives within KTH.

Vision

The Materials Platform strives to fulfil its vision where KTH is valued as one of the leading institutions for materials research in Europe. KTH is able to attract and retain top talent within the research area. The materials research at KTH is transformative and identifies new technical solutions to global challenges. The Materials Platform operates as an enabler of intra-organizational collaboration, increasing the competitiveness of KTH research groups to external funding agencies, and strengthens KTH's position at the forefront of materials research. The Materials Platform serves as a portal for external bodies, facilitating ease of access to the wealth of materials researchers at KTH. Materials researchers at KTH consider the Materials Platform as a helping hand to relevant information and facile source of support for initiating research ideas and activities.

Target Groups

This Strategic Plan is an internal document targeted at KTH management and the materials research community.

Priorities

During the present period will the KTH Materials Platform work to fulfil the following objectives:

- **Catalyse multidisciplinary research activities**
  The Materials Platform will facilitate and enable collaboration between KTH materials researchers, centres of relevance for materials research, EIT-KIC Raw Materials, research infrastructures and other strategic initiatives within the area of materials research. This will be achieved by providing an arena for collaboration and interaction across schools and departments, acting beyond the conventional channels of the linear organization. The Materials Platform will stimulate multidisciplinary research activities through organization of workshops tailored to attract researchers active in different fields, facilitate bottom-up initiatives through internal call procedures, and work towards an efficient utilization of local and large-scale infrastructures serving a plethora of fields of relevance to materials.

- **Build and maintain internal relations**
  The Materials Platform will build and maintain internal relations across schools and departments, centres of relevance to materials, EIT-KIC Raw Materials, research infrastructures and other strategic initiatives and to coordinate and provide strategic input from the focus area to KTH management. The Materials Platform Day will function as a venue for networking and dissemination to all material researchers at KTH.

- **Enhance external KTH visibility and recognition**
  The objective is to create and maintain strong lasting relations with relevant external partners in order to establish KTH as a natural strategic partner, increase KTHs impact on society and industry within the area of materials research and to increase participation in decision-making bodies and strategic groups (on a regional, national and international level).

Follow-up

The objectives will be followed up in analysis presented at the KTH Research Platforms steering group meetings (2 times per year) and in the yearly report.

Materials Platform Action Plan 2021-2024

Activities

During the period 2021-24 the KTH Materials Platform will work on improving its visibility and efficiency in serving all materials researchers at KTH. These objectives will be achieved through execution of the detailed activities listed below:

During 2021 the Materials Platform will establish clear roles for each platform team member. All activities in the platform will be documented to facilitate efficient follow-up andevaluation.

In 2021 the Materials Platform will work towards establishing a collaboration with Chalmers Area of Advance in Materials Science. The aim of this collaboration will be to utilise research synergies of the two universities in the area of materials research over the relevant time period and preferably beyond. Such collaboration is also expected to yield insights and reflections on how to improve the internal organization of the Materials Platform and how to better improve intra-KTH collaboration.

The website will be updated in 2021, in collaboration with communication officers. The goal is to transform the webpage to a useful portal for Materials Research at KTH. The realization of this of this goal may take the entire period and will involve continuous improvement of the communication.

In 2021 the Materials Platform mailing list will be improved through manual collection of addresses by the platform team and reference group.

During 2021 the Materials Platform plans to launch a dissemination effort with interviews with materials researchers and disseminate information of their research at the webpage. This activity will form a contact area for feedback on how the Materials Platform may facilitate the work of individual researchers.

The Materials Platform will intensify activities aimed at improving internal recognition. Visits to all schools (in person or remote) will be arranged during the year 2021.

The Materials Platform plans to announce two internal calls per year, one in the spring and one in the fall. The supported activities should describe a plan for how the funds may be used to increasing success rates of KTH researchers in competitive calls for funding and/or establishing inter-school activities with a more long-term impact. The recipients of the support will be requested to send in a report on the activity.

The Materials Platform will work towards efficient use and easy access for KTH researchers to large scale infrastructures.

The Materials Platform will provide guidance to the KTH strategy and advocacy work to ensure KTH materials researcher's interests at large research infrastructure, in particular ESS (e.g. through Swedness), MAX IV (e.g. representation at FASM), and Petra III (e.g. CeXS).

The Materials Platform will continue its organization of the yearly workshop Materials Platform Day with a vision to establish the workshop as an attractive venue for networking and dissemination to all material researchers at KTH.

The Materials Platform will support activities aimed at improved utilization of local research infrastructure (LIMS development at the schools, centres, and local infrastructures). The platform will take part in the evaluation of the joint initiative (with the KTH Energy and Life Science Technology Platforms) for electron microscopy at KTH.

The Materials Platform will assist Research Support Office in finding appropriate KTH expertise for activities such as participation in EU related events, in expert groups, and networks (e.g. groups and events identified by the forthcoming Brussels office).

The Materials Platform will collaborate with Research Support Office in advocacy work on upcoming EU programs and calls within the platform area. Such activities may include input from the platform's reference group to policies and on draft programs associate to calls.

The Materials Platform will initiate activities aimed at assisting individual research proposals to EU and KAW.

In December every year, the platform team informally reflects on the work and achievements during the year and makes a list of what to improve and change next year. This exercise also provides input to the yearly report. Throughout the year, information is collected on all activities (for instance by requesting reports from the receivers of Materials Platform support).

Follow-up

Activities are followed-up at the KTH Research Platforms steering group meetings. At the end of each year, the platform team reflects on the work and achievements during the year and makes a list of what to improve and change the following year. This exercise also provides input to the yearly report. Throughout the year, information is collected on all funded activities. The objectives will be followed up in analysis presented at the KTH Research Platforms steering group meetings (two times per year) and in the yearly report.

Responsibility

The Material Platform’s director holds the main responsibility for follow-up and reporting to the KTH Research Platforms steering group and KTH management.

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	ÅÅÅÅ-MM-DD	X-ÅÅÅÅ-XXXX

Skapat av
Peter Göransson
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KTH Transport Platform Strategic Plan

2021-2024

Summary

The overall objective of the KTH Transport Platform is to contribute to the multi-disciplinary research culture that characterises transport research at KTH. Collecting input in the form of societal needs and trends as a basis for joint multi-disciplinary research ideas and in an integrated approach define applications for funding for the planned research.

The KTH Transport Platform is a vehicle for integration of transport related research from almost all of the Schools of KTH, in the form of individual researchers, multi-disciplinary oriented research centres as well as infrastructure in the form of laboratories etc.

The KTH Transport Platform is one the focal points in the collaborations with KTH's Strategic Partners with activities related to the transport field.

Content

Background and purpose

Based on existing research excellence and strength, in 2009 KTH defined six multidisciplinary research focus areas to be covered by research platforms: Digitalisation, Energy, Industrial Transformation, Life Science Technology, Materials and **Transport**. The Platforms were established to facilitate the coordination of research activities across KTH and to increase the preparedness for addressing complex inter- and multidisciplinary calls for funding.

The KTH Research Platforms reflect the fact that the problems and challenges confronting future society and industry are complex and no single player is capable of solving them alone. It is necessary to deploy a multidisciplinary and multi-stakeholder approach and through this build multidisciplinary research and collaboration including both societal and industrial partners.

Scope of the KTH Transport Platform

With the ongoing globalisation, a growing world population and an increasing urbanization in some regions of the world while others start to see a reverse trend, the transport of people and goods is facing a tremendous challenge worldwide. Growing concerns related to the environment, natural resource depletion and space allocation are becoming more and more complex to address. At the same time, the disruption caused by the pandemic that hit the world in 2020 dramatically reduced the global and regional mobility. Questions related to necessity of travelling or shift between modes of transport are becoming increasingly important.

With the current uncertainties and the challenges we are facing, we need to continue building and strengthening a broad competence base breaking the disciplinary/thematic research paradigm through joint collaborative efforts. These involve all stake-holders industry, society and academia; together we formulate a new approach among others involving an increasing degree of multi-disciplinarily in research as well as education and training.

The transport research field includes:

> *transport infrastructure (design, construction and maintenance of bridges, tunnels, railways, roads, harbours and airports), supporting telecommunication and energy supply networks, vehicles, vessels, and aircraft that transport, or help to transport, goods or people, as well as related aspects such as human-centred design, systems engineering, transformation and change of systems, policy, governance, management, investment, procurement, pricing, deployment, operations and retirement/recycling and its consequences, including those on environment and climate, which impact overall transport system performance such as safety, security, reliability, accessibility, mobility, customer satisfaction, comfort and joy.*

More than 800 researchers at all schools at KTH are actively involved in transport related research. In a complex organisational structure, they are members of a large number of research groups and in parallel numerous centres of excellence.

The transport system is all over the world facing major changes, partially driven by the challenges listed above, but also by new technology providing opportunities for dramatically different ways of transport in the future. Some of these are:

- Automation, not only related to the operation of the vehicles themselves but also infrastructure.
- Electrification – electric roads, electric vehicles, charging and interfaces to the overall energy system
- New business models – selling products vs. providing services, ownership.
- New vehicles – urban vehicles for flexible and efficient mobility, increasing use of water transport, high speed regional and long-distance transport.
- Institutional and political changes – congestion charges, vehicle taxation, fuel taxes, energy prices, maintenance, planning, increasing competition.
- Connectivity – Big data, remote control and surveillance, security, etc.

To meet these changes in the transport system, we need to build knowledge and competence for an increasingly complex and intricate system architecture. In a long-term perspective, transport related research covers all levels, i.e. basic research, applied research, demonstration and field tests; in order to understand, identify and evaluate the innovative solutions that lie in the interfaces between traditional transport disciplines, covering all aspects of the transport system.

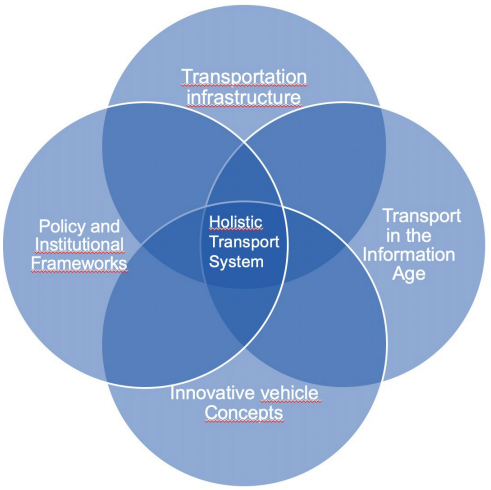
Vision

KTH Transport Platform is an instrument for integrating research, providing an arena for joint innovation. The vision is:

Creating momentum for sustainable transportation research

To achieve this vision the platform's mission is to:

- Provide meeting places in a multi-disciplinary research culture setting.
- Encourage research activities, involving industry, government agencies and relevant academic institutions worldwide, in joint collaborative efforts.
- Connect researchers in activities with the potential for leading to innovative solutions derived from a joint policy-systems-technology approach.



The corresponding integrating activities are managed through 5 thematic areas each contributing with a technology oriented vision:

Holistic Transport System

Enables the transition to a reliable, efficient and resilient transport system that is sustainable in environmental, economic and societal dimensions

Innovative vehicle concepts

Explores and displays solutions for efficient, inclusive and sustainable mobility.

Policy & Institutions

Investigates processes, rules, and choices affecting transportation performance.

Transportation Infrastructure

Enables the paradigm shift in which smart transportation infrastructure becomes an enabler for a sustainable society.

Transport in the Information Age

> *Improve the accessibility, efficiency and safety of the transportation system by developing services capitalises on the rapid advances in sensor, information, and communication technologies for real-time management, planning and control.*

Objectives and Priorities

The long-term objectives of the KTH Transport Platform are:

Objectives	*Description*
O1	Catalyse multidisciplinary research activities integrating transport researchers from all over KTH
O2	Build and maintain internal relations
O3	Enhance external KTH visibility and recognition in Transport related research

KTH Transport Platform Action Plan 2021-2024

Activities

Actives	*Targeting objectives*	*Responsible*	*Time*	*Description*
A1	*O1, O3*	*Director, co-directors, thematic area leaders*	*Fall 2021*	*Organise Transport Day, gathering transport researchers at KTH*
A2	*O3, O2*	*Director, co-directors, senior advisor*	*Continuously*	*Representing KTH at the Boards of centres related to transport: ASP Scania-KTH, ASP SLL-KTH, ASP Bombardier-KTH*
A3	*O2, O3*	*Director, co-directors*	*Fall 2021*	*Organise joint workshops with other platforms*
A4	*O2, O3*	*Director, co-directors, thematic area leaders*	*Starting January 2021, one story per month*	*Start writing "Transport research stories" and publish on the web page*
A5	*O2, O3*	*Director, co-directors*	*Continuously*	*Work with web page and publish news in various channels*
A6	*O3*	*Director, co-directors*	*Annually Spring and Fall*	*Monitor publication trends*

A7	*O2, O3*	*Director, co-directors*	*Bi-annually*	*Calls for support of workshops, conferences organised by KTH within Transport*
A8	*O3*	*Director, co-directors*	*Annually*	*Organise workshops on Horizon Europe calls related to Transport*
A9	*O3*	*Director, co-directors*	*Annually*	*Sponsor student activities at KTH within Transport*
A10	*O3*	*Vice-director*	*Starting January 2021*	*Mentors program for researchers KTH within Transport*
A11	*O3*	*Director, co-directors*	*Launched Fall 2021*	*Postdoc network at KTH within Transport*
A12	*O3*	*Director, co-directors*	*Bi-annually*	*Calls for sponsoring of strategic coordination activities within specific transport topics*
A13	*O3, O1*	*Director, co-directors, senior advisor*	*Continuously*	*Participate to EU wide organisations such as: EARPA, ERTRAC, ERRAC, …*

Appendix - Thematic Areas within the KTH Transport Platform

Holistic Transport System

The holistic perspective recognises the need to understand how advances in the areas of transport infrastructure, vehicle concepts, policy and institutional frameworks, and information and automation technology can be harmonised to achieve a better outcome overall. Transport in the holistic perspective moves from a sub-system to a system-of-systems for the movement of goods and people. This allows for changing the root demand patterns underlying current adverse effects beyond the demand management of transport itself. Furthermore, the perspective highlights the role of transport as a component of the wider societal framework that also includes energy systems, digitalisation, materials and industry.

The transformation to a sustainable transport system requires a massive and rapid reduction of negative climate and environmental effects. There is a need to consider personal accessibility of cities and rural regions that can be delivered when and where needed, in the modality that balances service quality, reliability, price, emissions and safety to enhance the inclusiveness and competitiveness of society. This includes non-physical forms of interaction, mobility as a service, and models with private ownership of the transport mode. Being able to offer attractive living environments, attractive city centres and good communication will continue to be important factors.

To cope with future uncertainties and shocks, the transport system must be resilient and adaptive for swift transformations. Disruptions such as pandemics can drastically change travel and purchasing patterns. Systemic changes in society, like aging population, smaller households, in some parts urbanisation while in other signs of an emerging de-urbanisation and the quantified self, need to be taken into account when assessing the holistic future options of transport. The ability of emerging modes such as micro-mobility and ride sharing services to complement existing modes should be explored and developed. The transport services that are provided should be fair from a gender, spatial and social perspective.

For freight transport, growing e-commerce, fossil-free fuels and electrification create new opportunities and challenges. The holistic perspective enables synchromodal logistics that facilitate both old and new business models in a way that is energy efficient, affordable in relation to the value of goods transported, and non-disturbing to both city and rural environments.

Globally, the holistic vision pays attention to the innovation shift from western, industrialised societies towards more spread innovation power. This means that solutions for transport issues may no longer be developed for similar contexts as found in the Nordic European countries. The shift in innovation forces will also change the agency and ownership questions, engaging new and different stakeholders in the transport system of the future.

Innovative Vehicle Concepts

The thematic area, Innovative vehicle concepts, strives for development of existing and future, not yet seen, solutions for efficient, inclusive and sustainable mobility. Thus, encourages out of the box solutions for the vehicles as well as for the transport system as a whole and its mobility services. Possibly by interaction of different vehicle concepts and cross-modal functionality in an economic landscape characterised by sharing, circular, etc. and where innovation may be stifled by long operational lifecycles.

Research topics range a wide span from; vehicle design, lightweight structures and performance optimisation to simulation of systems, sub-systems or functions. A key issue is evaluation and assessment of how concept implementation in fact influences the complex set of efficiency, sustainability, equality and accessibility parameters. For instance, modelling effects on the cargo or traveller flow due to the new vehicles or conceptual changes, or studying how new concepts effect people and the local and global environment as well as traditional costs and the needs for future infrastructural investments. To this, the societal context and people's needs and preferences constitutes both key data and research topics.

The thematic area, Innovative vehicle concepts, is multidisciplinary and interrelated with the other platform thematic areas. Knowledge and skill to address the research topics exist at numerous departments and centres at KTH and other places. Sometimes, a strong tool is physical demonstration. The role of the thematic area, is to direct our human power to solutions for efficient, inclusive and sustainable mobility.

Policy & Institutions

The efficacy and performance of transportation systems depends not only on its physical specifications and conditions, but also on the norms, laws, regulations and innovation capacity. The thematic area Policy & Institutions deals with formal and informal rules and processes for development, administration, and maintenance of transport systems. It also includes the rule of norms according to innovations and integration of transport systems.

Key actors and interests include local and national governments, business, public authorities, civil society organizations, academy and users. The focus is on how key decisions are made and how collaboration between different actors contribute to develop and innovate the transportation system related to social, economic and ecological sustainability.

Research spans such topics as the division of responsibilities for planning, regulations, financing models, public and private investment and innovation policies.

Transportation Infrastructure

A paradigm shift is occurring in the role that physical infrastructure has within the transport sector and the built environment. With the advent of smart mobility, digitization of urban areas and enhanced availability of data, future transportation infrastructure has a possibility like never before to contribute to improved sustainability of society. From supporting new fossil free transport modes, to reducing production and transportation of materials that are needed for infrastructure maintenance, the potential of smart transport infrastructure is large and urgently needed to reach our climate goals. With this change of approach, however, infrastructure can no longer be seen as a static part of the solution, in which possible 'smart' IT components are merely merged within the existing infrastructure systems. Nor can 'the infrastructure' and its associated industry longer be operating as a separate part of the transport equation, as more integrated systemic solutions are needed.

As historically transportation infrastructure has not been optimised beyond its mobility function; premature failures, enhanced down times of the system and a reduced sustainability of the smart solutions as a whole can result from a simple integration of smart technology in the infrastructure as-is. Where a structural failure of a traditional infrastructure would mostly affect the infrastructure users in a reduced quality and speed of their mobility, failing of a smart infrastructure has larger systemic consequences. A smart infrastructure also means namely an increase in functions and services that are provided and/or depend on the infrastructure. Payment services, data handling, infrastructure access control, infrastructure investments, technology procurement, legal responsibilities, maintenance models and modal- versus systemic-handling of the infrastructure all are an integrated part of our future transportation infrastructure.

Making our future transportation infrastructure sustainable thus requires partnership between infrastructure owners, operators, electricity companies, vehicle manufacturers, transport and logistics companies as well as technology suppliers in digitalisation. Part of this change process has to do with an integration of technologies, but a large part also has to do with a cultural change in which individual stakeholders have to realise and implement the long-term benefits of cross-disciplinary collaboration and adjust their operations to this. As none of the stakeholders has a systemic responsibility, this process is not subject to a natural market mechanism and we run a societal risk of it not being managed at all. The successful implementation of digitalisation developments in the transport infrastructure domain therefore relies, not only on the availability of new technology and data, but largely also on empirical evidence of their potential and possible risks. For this reason, eco-system demonstrators are needed that not only demonstrate the technical advancement, but also enable the systemic analyses of bottlenecks, missing interfaces and socio-technical complexities associated with our future transportation infrastructure.

Transport in the Information Age

The digital transformation will potentially change the way transportation is organised and managed. New services are innovated and new business opportunities are created based on the value of data and information. The value chains are changing, enabling cooperation between new actors and across industry sectors. This should allow for better utilization of the transport infrastructure and other resources in order to provide fair, accessible and efficient mobility (of people and goods) at a reduced societal cost.

Many technology-related challenges are necessary to overcome for this transformation to take place. Mobile communication networks must provide reliable and fast connectivity in a large, complex and dynamic environment. Privacy and data security must be ensured. Connecting a safety-critical system such as this to the internet is an inherent risk that needs proper attention. Analysing the massive amount of data, maybe in real-time, requires access to massive computational resources. And we need efficient methods for statistical data analysis and modelling, for example from large-scale optimization and machine learning.

The information and communication technologies can provide very detailed data on the state of the transport system, and of the behaviour and movement of people and goods, at resolutions and scales we never had in the past. Access to such data offers unique opportunities for research and development of intelligent, optimised and automated systems for decision-making, planning and control. The data is also a valuable source of input for fundamental research on the dynamic properties of the transport system and its impact on society and environment.

The aim of the research is a deeper understanding of how digitalisation, connectivity, automation and AI could be used for creating clean, safe and effective transportation systems that meet the sustainability goals.

Policy & Institutions

The efficacy and performance of transportation systems depends not only on its physical specifications and conditions, but also on the norms, laws, regulations and innovation capacity. The thematic area Policy & Institutions deals with formal and informal rules and processes for development, administration, and maintenance of transport systems. It also includes the rule of norms according to innovations and integration of transport systems.

Key actors and interests include local and national governments, business, public authorities, civil society organizations, academy and users. The focus is on how key decisions are made and how

collaboration between different actors contribute to develop and innovate the transportation system related to social, economic and ecological sustainability.

Research spans such topics as the division of responsibilities for planning, regulations, financing models, public and private investment and innovation policies.