King Mongkut's University of Technology Thonburi (KMUTT) envisions becoming a leading science and technology institution committed to advancing educational innovation, research, creativity, and entrepreneurship

The university strives to drive transformative change for Thailand and the global community through research and innovation that foster sustainable economic and social development. Since 2016, KMUTT has prioritized interdisciplinary and collaborative research as a core strategy to address increasingly complex challenges. The university has identified eight Strategic Research Themes, shaped by global and national issues, emerging technological trends, and its accumulated expertise. These themes include:

- CREATIVE & LEARNLING SOCIETY
- DIGITAL TRANSFORMATION
- SMART HEALTHCARE
- SUSTAINABLE BIOECONOMY
- INCLUSIVE AND SUSTAINABILITY RESEARCH
- INNOVATIVE MATERIALS MANUFACTURING & CONSTRUCTION
- SUSTAINABLE ENERGY & ENVIRONMENT
- SUSTAINABLE MOBILITY

These themes align with KMUTT's vision of becoming a world-class technology university, making a high-impact contribution to economic and social development.

STRATEGIC RESEARCH THEMES ROADMAP

These eight strategic research themes are supported by sub-themes that offer more specific focus areas to guide the planning of research, development, and innovation, ensuring maximum synergy. For further details, please contact the Research Strategy and Communication Team at the Research, Innovation, and Partnerships Office (RIPO).

Research, Innovation and Partnerships Office (RIPO)
King Mongkut's University of Technology Thonburi
Pracha Uthit Rd., Bang Mod, Thung Khru, Bangkok 10140,

Tel: (+66) 0-2470-9651

Line Official: https://lin.ee/HBsPEqH
ID: @researchkmutt

Updated: March 2025

KMUTT

STRATEGIC RESEARCH THEMES

ROADMAP

8 STRATEGIC RESEARCH THEMES

Creative and Learning Society

This research theme aims to cultivate a learning society and enhance quality of life under the concept of "Future Living and Learning." It aligns with KMUTT's mission to promote high-quality education through diverse, learner-centered curricula, with a strong focus on lifelong learning. The theme emphasizes research and innovation in new learning approaches and multi-generational education, supporting Thailand's Five-Year National Strategic Plan (2023–2027). Key national goals include increasing GDP through tourism and improving quality of life across all age groups, achieved by integrating digital technology with artistic design and cultural heritage.

Sub-Themes:

1. **Future Living** – Focuses on lighting design for diverse environments, community development, architectural heritage management for tourism, and user experience (UX) design.
2. **Future Learning** – Advances learning models and curricula for all age groups, enhances learning resources and environments, and supports education policy development.

Digital Transformation

This research theme aims to advance research and innovation in digital technologies to enhance Thailand's industrial sector. It focuses on improving production and service efficiency, reducing costs, and streamlining operations. This strategic theme not only boosts business competitiveness but also supports KMUTT's mission to develop a skilled workforce by integrating digital technologies into diverse teaching and learning methods for greater impact.

Sub-Themes:

1. **Robotics and Automation** – Encompasses the Internet of things (IoT), image and signal processing, and virtual reality (VR).
2. **Data Science and Artificial Intelligence** (AI) – Focuses on data communication, machine learning, and theoretical and computational science.
3. **Computational Systems and Cyber-security** – Covers cybersecurity, quantum technology, and educational technology.

Sustainability and Inclusive Research

This research theme aims to achieve excellence in inclusive research that enhances quality of life and promotes sustainable development in KMUTT's target regions including Nan, Chiang Mai, Mae Hong Son, Sakon Nakhon, Buriram, Narathiwat, Ratchaburi, and communities surrounding KMUTT campuses. The strategy focuses on developing local change agents to lead research-driven transformation.

Sub-Themes:

1. **Area-Based Knowledge for Development**
2. **Complex Research Capability**
3. **Adaptive Capacity Building**
4. **Community Sustainable Development and Well-Being**

The strategy emphasizes improving livelihoods for communities, including children and youth in remote areas, by leveraging KMUTT's expertise in three key areas: energy, engineering, and environment to advance agricultural systems (3E4A - Energy, Engineering, and Environment for Agriculture). This also includes promoting biodiversity management to ensure food security and support ecosystem restoration.

Innovative Materials, Manufacturing & Construction

This research theme focuses on developing high-impact research in materials, manufacturing processes, and sustainable construction, with the goal of enhancing the competitiveness and capabilities of Thailand's materials and construction industries. Given the sector's foundational role and its close connections to numerous other industries, it holds significant potential for growth and international expansion.

Sub-Themes:

1. **Advanced Materials** – Research and innovation in metals, non-metals, polymers, and composites, including recyclable materials. This encompasses smart design and manufacturing processes, integrating digital technologies to minimize waste and optimize resource utilization for maximum efficiency.
2. **Sustainable Construction and Infrastructure Systems** – Advances structural engineering, building assessment and monitoring, geotechnical engineering, and conservation engineering.

Smart Healthcare

This research theme aims to advance medical knowledge and innovation in alignment with international standards, with a focus on real-world applications. The initiative aims to enhance Thailand's medical sector, already well known for its high-quality healthcare services, by strengthening the local medical device industry, reducing reliance on imports, and expanding into global markets. The strategy emphasizes the integration of engineering technologies and medical sciences to drive innovation in healthcare.

Sub-Themes:

1. **Innovation in Materials, Medical Devices, and Technologies**
2. **Minimally-Invasive Disease Diagnosis**
3. **Sensor Technology**
4. **Integration of Digital Technologies in Healthcare and Medical Logistics,** including robotics, AI, and IoT.
5. **Personalized Nutrition for Disease Prevention and Rehabilitation**

Sustainable Bioeconomy

This research theme focuses on generating knowledge, advancing research, and driving innovation in food, agriculture, and future medicine to support Thailand's Bio-Circular-Green Economy (BCG) agenda. By leveraging modern biotechnology, this theme aims to enhance high-value product manufacturing and optimize biological waste utilization, contributing to resource sustainability.

Sub-Themes:

1. **Food, Animal Feed, and Pharmaceuticals for the Future**
2. **Agricultural Biotechnology and Bio-diversity**
3. **Biomedical Substances and Vaccine Production**
4. **Bioenergy, Biochemicals, and Bio-materials**
5. **Sustainable Ecology**

Sustainable Energy and Environment

This research theme focuses on developing knowledge and innovation to address energy and environmental challenges, supporting both Thailand and the global community in achieving the Sustainable Development Goals (SDGs), particularly in affordable and clean energy, air quality improvement, and climate action.

Sub-Themes:

1. **Low-Carbon Energy Transitions** – Covers energy storage, energy efficiency systems, bioenergy and biofuels, and transition policy and management.
2. **Circular Economy and Sustainability Transition** – Encompasses climate change adaptation and mitigation, circular economy practices in industry and agriculture, greenhouse gas reduction, and waste management.

Sustainable Mobility

This research theme focuses on developing research and innovation to reduce energy consumption and environmental impact from transportation, enhance safety, and promote public transportation use, paving the way for a sustainable mobility system. It also aims to strengthen the competitiveness of Thai businesses through collaboration with industry partners, advancing the CASE concept (Connected, Autonomous, Shared, and Electric).

Sub-Themes:

1. **Next-Generation Vehicles**
2. **Next-Generation Aerial Vehicles**
3. **Rail System**
4. **Transport Policy**