

## Dokuz Eylul University SDG Project Mapping Report Institutionally Funded Research Projects (IFRPs) 2021–2026

### 1. Institutional Research Landscape and Academic Unit Distribution

An analysis of Dokuz Eylül University's (DEU) internally funded research portfolio for the period between 2021 and 2026 reveals a sophisticated organizational orientation toward multidisciplinary projects with high impact. Resource allocation is strategically concentrated in units that bridge the fields of clinical health, advanced engineering, and disaster resilience, and this process is managed through specialized funding frameworks developed specifically for the university.

The **Faculty of Medicine** remains the institutional anchor, hosting the most capital-intensive projects in the university's history. It is supported by the **Faculty of Engineering**, which drives technical innovation, and the **Oncology Institute**, a hub for specialized molecular diagnostics.

Academic Unit	Primary Focus Areas	Budgetary Concentration & Strategic Thresholds
<b>Faculty of Medicine</b>	Clinical AI, digital health, pandemic response, neurobiology	<b>Maximum Concentration:</b> Individual projects up to <b>31.9M TL</b> (Targeted Projects).
<b>Faculty of Engineering</b>	Material science, seismic resilience (DEUSİS/TÜRDEMİP), industrial AI	<b>High:</b> Dominant in the Research University category (1M–14M TL).
<b>Oncology Institute</b>	Molecular oncology, "Organ-on-a-Chip" platforms, drug resistance	<b>Moderate to High:</b> Strategic focus on high-tech diagnostic modeling (up to 5M TL).
<b>Faculty of Science</b>	Basic sciences, molecular biology, chemistry, optoelectronics	<b>Moderate:</b> High volume of Research University projects (up to 2M TL).
<b>Buca Faculty of Education</b>	Pedagogical digitization, STEM, inclusive education	<b>Moderate:</b> High social impact focus; Research University projects up to 1.2M TL.

Beyond the primary clusters, the **Veterinary Faculty** has transitioned into a critical "One Health" role, focusing on zoonotic risk management and agricultural sustainability. The **Maritime Faculty** contributes to the institutional KPI metrics through specialized research such as mentorship programs and "Integrating Multilingual Pedagogies in Initial EFL Teacher Education," while the **Buca Faculty of Education** leads the digital transformation of social sciences.

## Internal Research Funding SDG Impact Map (2021-2026)

Visualizing the Strategic Alignment of Dokuz Eylül University's (DEU) Internally Funded Research with the UN Sustainable Development Goals, Demonstrating Institutional Contribution to Global Challenges.

### DOMINANCE OF MEDICAL AND ONCOLOGY RESEARCH

Highest concentration of funding: Clinical trials, molecular biology, cancer research (Faculty of Medicine, Institute of Oncology).



**Molecular Sub-classification in Childhood Medulloblastomas:**  
Precision medicine for pediatric brain tumors (Faculty of Medicine)



**Mobile Lymphedema Self-Care Support Program:**  
Nursing-led initiative for breast cancer-related lymphedema (Faculty of Nursing)

### ARCHITECTURE AND DISASTER MANAGEMENT FOCUS

Research focuses on urban resilience, climate-responsive design, and earthquake preparedness.



**Climate Change Vulnerability in Slum Areas:** Study of Late Neighborhood, Izmir (Faculty of Architecture)



**Earthquake Early Warning System for Izmir (DEUSIS):** Multi-disciplinary project for urban safety against seismic activities



### ENGINEERING FACULTY LEADERSHIP IN CIRCULAR ECONOMY

Projects prioritize resource efficiency, sustainable material production, and waste transformation into value-added products.



**Biobutanol Production from Fruit Processing Waste:**  
Sustainable biofuel production via dark fermentation (Faculty of Engineering)



**Graphene-Supported Carbon Nanofiber Catalysts:**  
Catalysts from vegetable waste for direct methanol fuel cells

### INSTITUTIONAL RESEARCH INFRASTRUCTURE & RESPONSE



**28 MILLION TL Pathological Automation Investment**

Significant infrastructure funding for patient identity control and quality assurance in medical pathology.



**Multi-Disciplinary Pandemic Response**

Surge of internal funding (2021-2023) dedicated to SARS-CoV-2 genome analysis, vaccine response monitoring, and socio-economic impacts.

NotebookLM

## 2. Thematic Pillar I: Health and Global Well-being (SDG 3)

Alignment with **SDG 3 (Good Health and Well-being)** constitutes the largest thematic cluster. The portfolio demonstrates a transition toward "Research University" status priorities, characterized by a move from traditional animal-based models to **advanced in-vitro/in-silico platforms** and **Artificial Intelligence in Diagnostics**.

### Artificial Intelligence and Digital Health Frontier

The 2023-2026 period is marked by high-budget Guided projects that represent the pinnacle of DEU's research output:

- **AI-Assisted Cardiology:** A flagship project starting in 2026, " **Artificial Intelligence-Assisted Stent Boost in Patients Undergoing Percutaneous Coronary Intervention ...**" represents the single largest investment at **31,900,000 TL**.
- **Digital Pathology:** The " **Digital Pathology and Quality Assurance** " project (**13,017,000 TL**) signifies a systemic upgrade in diagnostic precision and informatics.
- **Diagnostic Innovation:** Development of the **SIMOA-based Nrf2 diagnostic kit (6.1M TL)** for Alzheimer's and Bipolar disorder.

### Oncology and Cancer Research

Specialized research within the Oncology Institute and Faculty of Medicine targets high-fatality cancers (lung, colorectal, medulloblastoma) using sophisticated methodologies:

- **Next-Generation Modeling:** Transitioning to "Organ-on-a-Chip" and "Tumoroid" platforms (e.g., **1.9M TL Malignant Pleural Mesothelioma Chip-on-a-Chip Tumor Model**).
- **Precision Medicine:** Investigating CRISPR-Cas targeted amplicons and molecular biomarkers for immunotherapy.

## Neurological and Mental Health

Research addresses neurodegenerative and stress-related conditions:

- **Alzheimer's and Epilepsy:** Exploring neuroprotective agents and connectivity changes in the brain via fMRI.
- **Mental Health:** Longitudinal studies on chronic social isolation and PTSD, alongside AI-assisted psychiatric training.

## Veterinary Health and Zoonotic Risks

The Veterinary Faculty monitors high-risk zoonotic pathogens, specifically identifying **Tacheng tick virus (1 and 2)**, **Jingmen tick virus**, and **Nairoviruses** in farm animals, alongside critical livestock health management (Mastitis, Brucellosis).

### Key Health Impact Areas:

- AI-Driven Diagnostics and Stent Boost Imaging.
- Digital Pathology and Automation in Clinical Workflows.
- Molecular Sub-classification of Childhood Cancers.
- Zoonotic Viral Surveillance and Vaccine Efficacy.

## 3. Thematic Pillar II: Innovation, Industry, and Sustainable Production (SDG 9&12)



Technical research aligns with **SDG 9 (Industry, Innovation, and Infrastructure)** and **SDG 12 (Responsible Consumption and Production)**, with a clear focus on the **Circular Economy**.

## Advanced Manufacturing and Robotics

The Engineering and Maritime units focus on **Additive Manufacturing (3D printing)** for shipbuilding (HDPE-based composites) and dental applications. Autonomous system development includes underwater vehicles (AUV/UUV) and drone coordination for tactical tasks.

## Circular Economy and Smart Energy

Strategic projects emphasize the conversion of waste into high-value energy:

- **Smart Energy Transition:** The " **From Biomass to Smart Energy: Forecasting, Design, and Conversion**" project (1.29M TL) exemplifies the shift toward carbon-neutral bioenergy.
- **Biofuel Production:** Production of biobutanol and hydrogen from fruit and organic waste.
- **Waste Valorization:** Utilizing marble waste and e-waste (WEEE) for green production.

## Infrastructure Anchors

Significant capital has been deployed to modernize the university's technical foundation, most notably the **Food Research and Application Laboratory Infrastructure (18.8M TL)** and the **Dermatology Medical Aesthetics and Cosmetics Research Unit (2.3M TL)**.

## 4. Thematic Pillar III: Resilience, Climate Action, and Sustainable Environments (SDG 11 & 13)



DEU demonstrates a leading regional role in **SDG 11 (Sustainable Cities and Communities)** and **SDG 13 (Climate Action)**, particularly through its responses to seismic risks.

### Seismic Resilience and Disaster Management

The institution has developed a comprehensive disaster-management ecosystem:

- **DEUSİS:** Earthquake early warning system for İzmir (743k TL).
- **FAYOSL:** Innovative dating of fault planes using Optically Stimulated Luminescence (583k TL).
- **İZTİPJEOL:** A multi-disciplinary approach to identifying medical geological risks in İzmir (618k TL).
- **TÜRDEMAP:** A strategic evolution in master planning, moving from **Phase 1 (1.49M TL)** to **Phase 2 (569k TL)** to establish national standards.

### Climate and Urban Planning

Research focuses on urban morphology and climate vulnerability:

- Assessing the vulnerability of **slum** areas to climate change.
- Digital content and programs for youth (ages 11-14) regarding climate awareness.
- Renewable energy transition through solar-assisted hybrid thermal storage and fuel-cell vehicle optimization.

## 5. Thematic Pillar IV: Quality Education and Social Development (SDG 4 & 10)



Social science and pedagogical projects map to **SDG 4 (Quality Education)**, focusing on inclusivity and digital preservation.

## Digitization of Education

- **Immersive Learning:** VR applications for anatomy training (**270k TL**), psychiatric nursing, and pre-clinical dentistry.
- **Strategic Pedagogy:** Digitizing content for Theology and Science teacher candidates.

## Inclusive Development and Heritage

- **Vulnerable Groups:** Development of 3D tactile books for visually impaired students and cyberbullying coping mechanisms for individuals with autism.
- **Cultural Heritage (SDG 11.4):** Extensive documentation of the **Kemeraltı** region (**182k TL**) and the **Digital Archiving of the Manisa and DEU Theology Manuscript Libraries** (**403k TL**).

## 6. Temporal Trends and Portfolio Evolution (2021-2026)

The 2021-2026 funding cycle reveals a "Magnitude Shift" in institutional strategy:

1. **The 2023 Threshold:** 2023 marks a definitive turning point as DEU's **Research University** status began to govern funding. Project budgets surged from a 2020-2021 average of **30k–150k TL** to a new strategic tier of **1M TL to 6M TL+**.
2. **Post-Pandemic Shift:** Early-cycle (2021-2022) COVID-19 research (genome analysis, antibody monitoring) has evolved into broader **Health Technology** and **Digital Transformation** projects (2024-2026), such as AI-assisted stent boost imaging and Digital Pathology.
3. **Methodological Transition:** There is a visible move toward advanced **in-vitro/in-silico platforms**, as seen in the multimillion-lira "Organ-on-a-Chip" and "Tumor-like" projects, reducing reliance on traditional animal models in alignment with global research ethics.

## 7. Strategic Summary of SDG Alignment

The Dokuz Eylül University research portfolio for the 2021-2026 cycle demonstrates a high-maturity alignment with the UN SDGs, characterized by the following dominant areas:

- **SDG 3 (Good Health and Well-being):** The undisputed primary pillar, now driven by massive investments in **Artificial Intelligence and Digital Pathology (up to 31.9M TL)**.
- **SDG 9 (Industry, Innovation, and Infrastructure):** Anchored by the **18.8M TL Food Research Laboratory** and advanced Research University projects in material science and bioenergy.
- **SDG 11 (Sustainable Cities and Communities):** Defined by a sophisticated seismic resilience cluster (**DEUSİS, FAYOSL, TÜRDEMAP**) and extensive cultural heritage documentation.

## DEU Faculty Research Excellence: Internal Funding Hubs (2021-2026)

Strategic distribution and thematic impact of internal research funding across key academic units at Dokuz Eylül University, emphasizing alignment with global Sustainable Development Goals (SDGs) between 2021 and 2026.

**Context Summary:** Dokuz Eylül University (DEU) has strategically channeled internal funding into specialized research hubs focusing on high-impact areas ranging from molecular medicine and digital pedagogy to autonomous engineering and veterinary food security.

### HUMAN WELL-BEING & GLOBAL HEALTH (SDG 3 & 4)

#### Faculty of Medicine



#### Advancing Molecular Medicine and Oncology

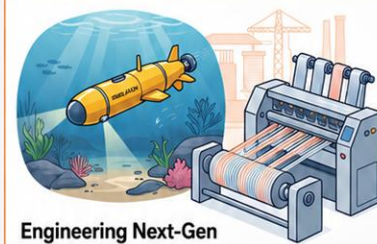
Significant funding supports molecular sub-classification of childhood medulloblastomas and neuroblastoma research to improve survival outcomes.

#### High-Value Health & Education Projects:

Molecular Sub-classification of Childhood Medulloblastomas	Faculty of Medicine
Virtual Reality Applications for History Teaching	Buca Faculty of Education

### TECHNICAL INNOVATION & SUSTAINABLE RESOURCES (SDG 9, 12 & 2)

#### Faculty of Engineering Izmir Vocational School



#### Engineering Next-Gen Industrial Systems

Projects include the design and development of specialized three-filament yarn production systems and autonomous underwater vehicles.

#### Engineering & Agricultural Innovation:

Design and Production of Autonomous Underwater Vehicle (AUV)	Izmir Vocational School	SDG 9 (Innovation)
Three-Filament Yarn Production System Development	Faculty of Engineering	SDG 12 (Production)

#### Faculty of Education Faculty of Theology



#### Training the Next Generation of Educators

Development of digital content production training specifically designed for teacher candidates at the Faculty of Theology.

#### Key Education Initiatives:

Digital Content Production Training for Teacher Candidates	Faculty of Theology
Virtual Reality Applications for History Teaching	Buca Faculty of Education

#### Faculty of Veterinary



#### Enhancing Regional Livestock Health

Research focuses on identifying and treating foot diseases and calf diarrhea in the Küçük Menderes Basin.

#### Veterinary Health Focus:

Prevalence of Foot Diseases in Dairy Cattle	Faculty of Veterinary	SDG 2 (Agriculture)
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*Note: This analysis focuses on the thematic aggregation and unit-based distribution of the 2021-2026 funding cycle; individual project lists have been excluded in favor of strategic institutional synthesis.*



# DOKUZ EYLÜL UNIVERSITY

