



2022
Sustainability Report
SDG9

9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE



ABDULLAH GÜL
UNIVERSITY



SUSTAINABLE DEVELOPMENT GOALS

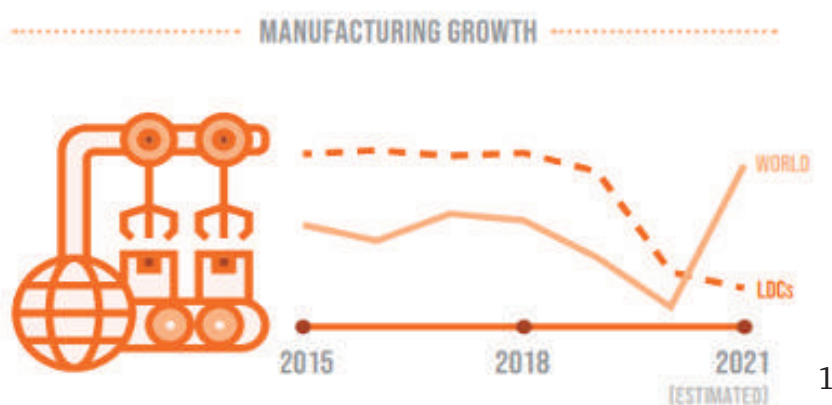
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



SDG9: Industry, Innovation, and Infrastructure

SDG9 aims to **build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation**. In 2021, manufacturing value added grew by 7.2% and increased to 16.9 . With the effect of Covid 19, investments in industry, innovation, and infrastructure have increased. Despite this increase, UN SDG Statistics show that infrastructure services in the least developed countries are still growing slowly and the share of manufacturing in GDP in the least developed countries was 12.5% in 2021.

GLOBAL MANUFACTURING HAS REBOUNDED FROM THE PANDEMIC BUT LDCs ARE LEFT BEHIND



According to surveys covering the period from 2010 to the present, only one in three small-scale industries benefit from loans or lines of credit, which enable them to integrate into local and global value chains.

After three years of stability, global carbon dioxide emissions from fuel combustion started to rise again in 2017, reaching 32.8 billion tons, underpinned by economic growth and a slowdown in efficiency improvements. However, the intensity of global carbon dioxide emissions has declined by nearly one quarter since 2000, showing a general decoupling of carbon dioxide emissions from GDP growth. The same trend was visible in manufacturing industries after 2010, with global manufacturing intensity falling at an average annual rate of 3% until 2017. After falling 1.3% in 2020, global manufacturing output rose 7.2% in 2021.

Inclusive and sustainable industrialization, together with innovation and infrastructure, can unleash dynamic and competitive economic forces that generate employment and income. However, the world still has a long way to go to fully tap this potential.

¹ <https://unstats.un.org/sdgs/report/2022/Goal-09/>

Least developed countries, in particular, need to accelerate the development of their manufacturing sector if they are to meet the 2030 target, and scale up investment in scientific research and innovation. Innovation and technological progress are key to finding lasting solutions to both economic and environmental challenges, such as increased resource and energy efficiency. Globally, investment in research and development (R&D) as a proportion of GDP increased from 1.5% in 2000 to 1.7% in 2015 and remained almost unchanged in 2017, but was only less than 1 % in developing regions. Although the rate of R&D in GDP was 2.6% in the world in 2020, this rate is still below 1% for most of the least developed countries.

In terms of communications infrastructure, more than half of the world's population is now online, and almost the entire world population lives in an area covered by a mobile network. It is estimated that in 2021, 88% of the world's population had access to a 4G network.

Exploring how universities drive innovation through links to the industry is highly important²

AGU'S POLICIES AND PRACTICES

Abdullah Gül University (AGU) was established as an R&D project called "Socio-Technical University Model for Higher Education," an ongoing initiative started by the Turkish Ministry of Development and supported by the Turkish Higher Education Council. The project was defined with the help of about 20 search conferences and 40 workshops and has aimed at pioneering the new generation university model in Türkiye, with unique and innovative curricula and educational processes, thus disseminating its findings across all higher education institutions in the country and beyond in order to inspire and trigger the implementation of new educational and administrative systems/processes/policies.

Investments in infrastructure transport, irrigation, energy, information, and communication technology are crucial to achieving sustainable development and empowering communities in many countries. AGU, as a research university seeking solutions to global challenges through partnerships and learner-centered approaches, aims to develop citizens who can contribute to societies and shape the future by converting knowledge into personal and social values. Under the title of societal impact, one of the goals of AGU is "Ensuring that the university is in close and collaborative working processes with national and international society, business and industry world, public institutions and non-governmental organizations." For this purpose, AGU has Technology Transfer Office (TTO), Fly For Future (F3 Incubation Centre), and Model Factory.

Abdullah Gül University Technology Transfer Office (AGU TTO)

AGU TTO was established in 2014. AGU TTO carries out its activities with the aim of transforming the scientific research outputs obtained at AGU into economic value, increasing university-industry cooperation, making higher use of national and international support mechanisms, developing entrepreneurship, and managing and commercializing intellectual property rights.

² <https://sdgs.un.org/goals/goal9>

<https://www.un.org/sustainabledevelopment/infrastructure-industrialization/>

F3 Incubation Centre

AGU TTO serves researchers with its F3 Incubation Centre. Candidate entrepreneurs who are either not ready to realize their ideas as a business model or have reached a certain stage and stepped into the maturation phase can benefit from the services of AGU F3 Incubation Center. AGU F3 Incubation Center offers open office space usage, training, consultancy, mentoring, and prototyping services for candidate entrepreneurs.



Incubation Center

Model Factory Project

AGU is collaborating with United Nations Development Program (UNDP), the Ministry of Science, Industry, and Technology, the Kayseri Chamber of Industry, and the Kayseri Chamber of Commerce in the context of the Model Factory Project. AGU supports the development of sustainable businesses via its Model Factory Project, where participants are helped with the start-up of promising sustainable SMEs through consultancy, training, and financial support; improving SMEs' processes by training them on lean manufacturing techniques, optimization of productivity, energy efficiency, and waste management; and enhancing SMEs' competitiveness on the international arena by accessing Industry 4.0 technologies.



Model Factory

AGU'S PROGRESS

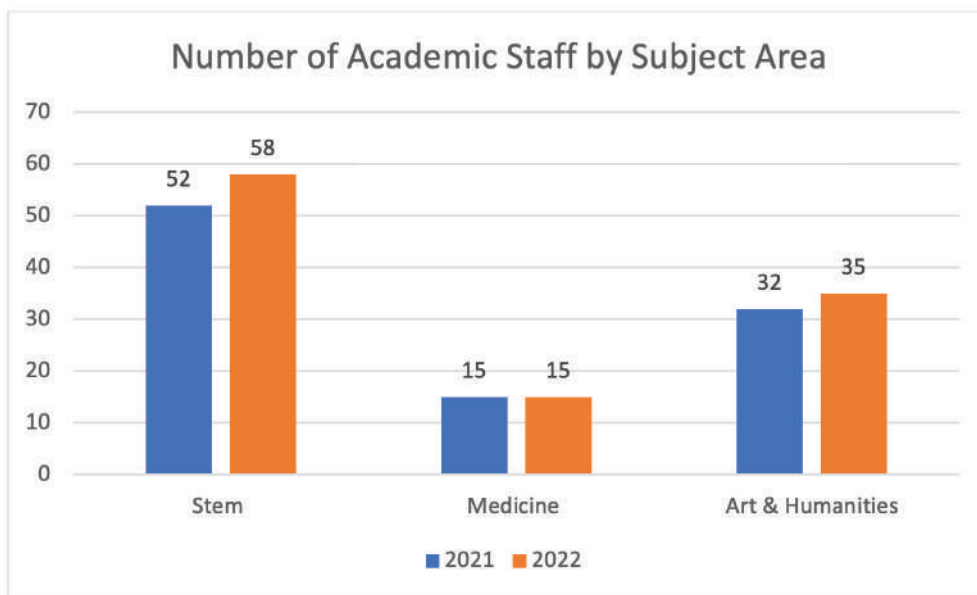


Table 1 Number of Academic Staff by Subject Area

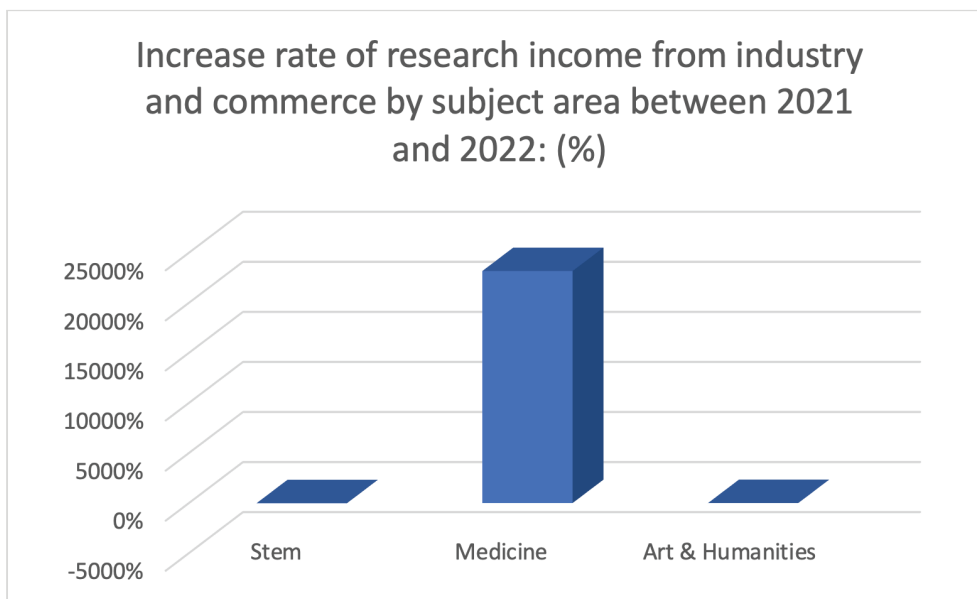


Table 2 Increase Rate of Research Income From Industry and Commerce

AGU supports developments in the industry, innovation, and infrastructure. For this reason, by increasing its collaborations every year, it provides access to its knowledge in the industry and trains its students in partnership with the industry. Moreover, AGU adopts the principle of making available the latest technological infrastructures and industry for its students and aims to prepare them for the industry by increasing the number of competent academics in relevant fields.

Cooperation and Events

Projects Realization within the Design Center and University-Industry Cooperation

Professor Burak Asiliskender, Assoc. Prof. Vacide Betül Kurtuluş and Lecturer Nihan Mus Ozmen have been decided to serve as academic consultant within the framework of University-Industry cooperation signed between Mondi A.Ş. and AGU TTO within the scope of the project consultancy agreement on “Projects Realization within the Design Center and University-Industry Cooperation”.



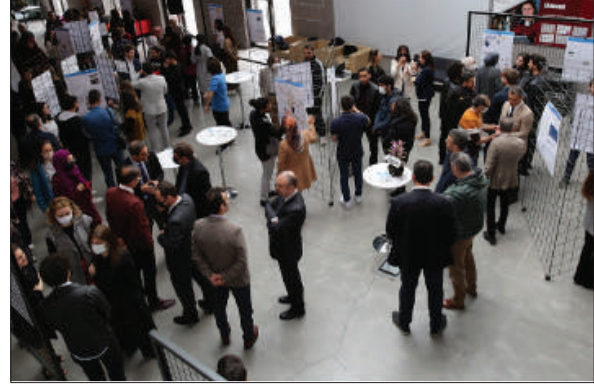
Projects Realization within the Design Center and University-Industry Cooperation

Industry-Focused Student Projects Fair by AGU Industrial Engineering

The Department of Industrial Engineering of AGU organized the Industry-Focused Student Projects Fair.

At the fair, held for the third time this year, graduate and undergraduate degree students of Industrial Engineering showcased 35 different projects realized with various companies, including AK Frigo, Aspilsan, Bamen, Bellona, Boyçelik, Delphi metal, General Directorate of State Airports Authority in Kayseri, Doqu Home, Durlum, Ferre, HES Kablo, Insider, İstikbal, Kumtel, LC Waikiki, Mars Logistics, Migall, Mundo, Mondihome, Ödül Trophy, Simfer, Selçuk Ecza Deposu, and Yataş. The fair was held at the Exhibition Hall on the Sümer Campus, and presentations for the fair were in the form of posters prepared within the scope of the courses of Mathematical Modeling, Deterministic Optimization, Decision and Risk Analysis, Business Process Analysis, System Simulation, Business Analytics, and Production and Service Systems Management offered at Industrial Engineering in the 2020-21 and 2021-22 academic years.

The students promoted their projects with poster presentations to other students and guests during the fair. In his opening remarks, Rector Prof. Gengiz Yılmaz stressed the importance of cooperation between the industry and business. He stated that the Department of Industrial Engineering established such cooperation successfully.



Industry-Focused Student Projects Fair

Capstone Fair and Contest of AGU Industrial Engineering

At the “Capstone Fair and Contest” of the Department of Industrial Engineering at Abdullah Gül University (AGU), student projects undertaken with companies Bellona, Kumtel, Metro Market, Simfer, Stryker, and Yataş competed. Six projects done with Bellona, Kumtel, Metro Market, Simfer, Stryker and Yataş were on display for the contest. They were carried out throughout the 2021-2022 academic year by the students under the academic guidance of Prof. Dr. İbrahim Akgün, Chair of Industrial Engineering, and faculty members Dr. Selçuk Gören, Dr. Gökmen Kara and Dr. İsmet Söylemez. Academics and students from various universities, managers and employees from Abra Teknoloji, Ak Profil, Almila Mobilya, Arkopa, Aspilsan, Bellona, Boyteks, BRN Yatak, Denge Kulübü, Gümüşsuyu, Kaytim Akademi, Kilim Mobilya, Kipaş Holding, KOSGEB (Small and Medium Industry Development Organization) Kayseri Directorate, Kumtel, Metro Market, Mondi Home, Orta Anadolu, Proaks Yazılım, Serhat Mobilya, Simfer/Sersim, Somçelik, Spectrum Bilişim, Stryker, United Doors, and Yataş, and many other invitees joined the fair.



Capstone Fair and Contest of AGU Industrial Engineering

Public Educational Seminars

Series of public educational seminars of AGU continued with a publication on the theme of urban renewal. In the fourth seminar of the series, which was held live (on-line) from YouTube, Faculty of Architecture Faculty Member Dr. Ömer Devrim Aksoyak gave a seminar on "Evaluation of the Concept of Urban Change/Transformation within the Scope of the EU Green Deal".

Dr. Aksoyak explained the concepts of urban transformation/change at the seminar. Giving various examples of applications from the world and our country related to urban change and transformation processes, Dr. Aksoyak also touched upon the Green Memorandum, which is an important part of the European Union's strategy to implement the UN Sustainable Development Goals.



Public Educational Seminars

Pathways to Sustainability: The Role of Emerging Technologies Conference

Dooyung HAH from Computer Engineering Department served as a Program chair for an upcoming conference (EKC2022: Europe-Korea Conference on Science and Technology). The theme of the conference is "Pathways to Sustainability: The Role of Emerging Technologies"



Day	Time	Topic	Speaker	Chair
1	9:00	Registration and Welcome		Dooyung HAH
1	10:00	Keynote: The Role of Emerging Technologies in Sustainability	Dr. [Name]	Dooyung HAH
1	11:00	Panel Discussion: Challenges and Opportunities	Dr. [Name]	Dooyung HAH
1	14:00	Workshop: Emerging Technologies in Smart Cities	Dr. [Name]	Dooyung HAH
1	17:00	Networking and Dinner		Dooyung HAH
2	9:00	Registration and Welcome		Dooyung HAH
2	10:00	Keynote: The Role of Emerging Technologies in Sustainability	Dr. [Name]	Dooyung HAH
2	11:00	Panel Discussion: Challenges and Opportunities	Dr. [Name]	Dooyung HAH
2	14:00	Workshop: Emerging Technologies in Smart Cities	Dr. [Name]	Dooyung HAH
2	17:00	Networking and Dinner		Dooyung HAH

The Role of Emerging Technologies Conference

Ph.D. Thesis Defense related to SDG

Research Assistant at department of Industrial Engineering Betül Kayıçoğlu has successfully defended his Ph.D. dissertation at AGU, entitled “Development of Models and Solution Methodologies for Tree-Shaped p-Hub Median and Capacitated p-Hub Median Problems”. The application areas of the problems ‘multiple allocation tree of hubs location problem’ and ‘multiple allocation arc capacitated hub location problem’ that studied in her dissertation. Scope of the range optimization of fiber internet backbone to the exact configuration of the physical road network of the transportation networks of the cargo companies, from the improvement of computer or wireless communication networks to the establishment of smart electricity, water or gas distribution networks in the most efficient way, from efficient airway and railway transportation systems to smart public transportation systems with different transportation modes. These problems are directly applicable to a wide range of systems that serve to achieve two Sustainable Development Goals (SDGs), namely, ‘building resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation’ and ‘making cities and human settlements inclusive, resilient and sustainable’.

According to these two goals, it is utmost importance that urban and public transportation systems, gas, water and electricity distribution systems, and telecommunication network systems are smart, resilient and sustainable. Moreover, it is proposed a new modelling approach for these problems that allows to use the structure of the real physical network directly in the formulation of the problems. This approach provides more flexibility in modeling several characteristics of real-life hub networks. The developed models will find more application areas because they better represent real life problems. Moreover, one main challenge arising in real-life applications is the problem size. Mostly it is not possible to solve them with the standard optimization softwares. However, proposed solutions able to solve large-size problems that arise in real life with methodologies. To sum up, the modelling approach and solution methodologies that proposed by Kayıçoğlu will help to achieve the goals of building resilient infrastructure, sustainable transportation systems, sustainable cities and human settlements.



R.A Betül Kayıçoğlu defended her Ph.D. thesis related to SDG

