

ICFAI Foundation for Higher Education (IFHE), Hyderabad

Sustainable Development Goal 9

Industry, Innovation, and Infrastructure



Preamble

Sustainability encompasses a paradigm shift in thought, behaviour, and operation that strives to fulfil the requirements of the current generation while safeguarding the capacity of resources to sustain future generations. The following are some essential aspects:

Social and Environmental Responsibility: Preserving natural resources, minimizing environmental damage, and minimizing carbon footprints are the primary objectives of sustainable practices.

Social equity: It is the practice of ensuring that all communities and individuals are treated fairly and equitably, and that decision-making processes take social justice and inclusiveness into account.

Economic viability: Sustainability aims to establish long-lasting economic systems that strike a balance between profitability and the adverse social and environmental consequences.

Innovation and adaptability: The adoption of innovation and adaptability is of the utmost importance in order to discover novel resolutions to preexisting challenges and effectively respond to evolving conditions.

Holistic approach: A holistic approach to decision-making entails taking into account the interdependencies among social, environmental, and economic factors.

Education and awareness: Advocating for education and raising awareness regarding sustainability contributes to the development of a responsible society and facilitates constructive transformation.

The university believes that through the implementation of sustainable practices across multiple domains, including resource management, policy formulation, business operations, and lifestyle selection, it is possible to strive for a more harmonious and balanced world that benefits both current and future generations.

Innovation and Industry Partnership

IFHE's contribution to SDG 9 centers on fostering a culture of research, innovation, and industry collaboration. The University actively supports industrial partnerships, research commercialization, and the development of technologies that enhance efficiency and sustainability.

Innovation Ecosystem:

The **Innovation & Entrepreneurship Cell** and **Research & Development Center** encourage students and faculty to ideate, prototype, and develop real-world technological solutions. Engineering and management students collaborate on projects that integrate artificial intelligence, the Internet of Things (IoT), and automation for sustainable industrial processes.

Industry Linkages:

The University maintains linkages with industry partners for collaborative projects, internships, and technology demonstrations, enabling students to work on live projects related to smart manufacturing, automation, and process efficiency.

Incubation and Applied Research:

Through incubation support, IFHE promotes applied research leading to entrepreneurial ventures and start-ups in areas such as renewable energy systems, robotics, and supply-chain innovation.

About IFHE Hyderabad

The ICFAI Foundation for Higher Education (IFHE), Hyderabad, is a deemed-to-be university established under Section 3 of the UGC Act, 1956. Spread over a 91-acre, lush green campus, IFHE is one of India's largest multidisciplinary universities, with integrated programs across management (IBS Hyderabad—AACSB accredited), science & technology (IcfaiTech), law, architecture, and the social sciences. The institution is widely recognized for its student-centric, research-driven approach, robust international collaborations, and direct engagement with social responsibility and sustainability. Emphasizing "Learning for Leadership," IFHE has secured A++ NAAC accreditation and is consistently ranked among India's top private universities for management, law, and engineering.

The university campus is equipped with state-of-the-art infrastructure—including advanced classrooms, laboratories, digital learning hubs, residential hostels, sports facilities, and a strong network of faculty drawn from academic and industry backgrounds. With over 10,000 students and a strong alumni base, IFHE's teaching, research, and outreach focus on ethics, practical skills, problem-solving, and social impact—directly aligned with the UN SDGs, especially in water, health, innovation, justice, and partnerships.



Publications Supporting SDG 9 (2024)

1. **Review – Open Access** – *Calling for Better Ecological Values: Integrating Indigenous Knowledge System with Sustainable Policies*
Authors: Mohanty A., Ghosh A., Roy S.
Source: *Purushartha*, 2024.
2. ****Article – **** *Investigation of Dynamic Mechanical Properties of Basalt Fibre Reinforced Polymer Composites*
Authors: Pragna V., Sundari S., Manmadhachary A., Zhang H., Elumalai P.V.
Source: *International Journal of Vehicle Structures and Systems*, 2024.
3. **Article – Open Access** – *Key Networks to Create Disaster Resilient Smart Cities Mission: A Case for Remodeling India's Smart Cities Mission to Include Disaster Resilience*
Authors: Meduri Y., Singh R., Manoharan G.
Source: *Resilient Cities and Structures*, 2024.
4. **Article – Open Access** – *Do Green Innovation and Governance Limit CO₂ Emissions: Evidence from Twelve Polluting Countries with Panel Data Decision Tree Model*
Authors: Dash A.K., Panda S.P., Sahu P.K., Jóźwik B.
Source: *Discover Sustainability*, 2024.
5. ****Book Chapter – **** *The Road to Smart Banking: Opportunities and Challenges for the Next Generation*
Authors: Vittala K.R., Hemamalini V., Seranmadevi R., Tyagi A.K.
Source: *Convergence of Technology and Operations Management in Modern Businesses*, 2024.
6. ****Article – **** *Analysis of Barriers for Sustainable Agro-Food Supply Chain: An Interpretive Structural Modeling and MICMAC Approach*
Authors: Singh K., Abraham R., Yadav J., Misra M., Yadav A.
Source: *Environment Development and Sustainability*, 2024.
7. ****Book Chapter – **** *Leveraging IoT in Supply Chain Sustainability: A Provenance Perspective*
Authors: Murala D.K., Siddamshetti K., Milanova M.G.
Source: *Blockchain, IoT and AI Technologies for Supply Chain Management*, 2024.
8. ****Article – **** *Evaluation of Sustainability Indicators of Machine Tools: A Hybrid Fuzzy DEMATEL Approach*
Authors: Kumar G., James A.T., Rajput R., Choudhary S.
Source: *Environment Development and Sustainability*, 2024.
9. ****Book Chapter – **** *Impacts of Nano-Materials and Nano Fluids on the Robot Industry and Environments*
Authors: Nalla B.T., Kannagi V., Chandrashekhar A., Pal T.K., Sampath B.
Source: *Multidisciplinary Applications of AI, Robotics and Autonomous Systems*, 2024.
10. ****Article – **** *Experimental Investigation and Soft Computing-Based Assessment Using ANN-MOGWO- A Hybrid Approach for Inconel (825)*
Authors: Kumar A., Subbiah R., Vivekananda K., Upadhyay C., Karthikeyan R.
Source: *Journal of Advanced Manufacturing Systems*, 2024.

11. ****Article – ** *Drug Traceability and Transparency in Medical Supply Chain Using Blockchain for Easing the Process and Creating Trust Between Stakeholders and Consumers***
Authors: Panda S.K., Satapathy S.C.
Source: *Personal and Ubiquitous Computing*, 2024.
12. ****Book Chapter – ** *Design and Implementation of IoT-Based Advanced Energy Management System for Smart Factory***
Authors: Jayanthi S., Kumar N.S., Zafar Ali Khan N.Z.A., R., S., Pachipala Y.
Source: *Cyber Physical Energy Systems*, 2024.
13. ****Book Chapter – ** *Cold Spray Additive Manufacturing***
Authors: Jagadeesha T., Arun Prakash J., Malladi A., Kaliappan S.S.
Source: *New Materials Processing and Manufacturability*, 2024.
14. ****Book Chapter – ** *Digitalization of Welding Processes***
Authors: Sridhar A., Prasanna Lakshmi K.J., Himam Saheb S., Mulugundam S.S.
Source: *Automation in the Welding Industry: Incorporating AI, Machine Learning and Other Technologies*, 2024.
15. ****Book – ** *Automation in the Welding Industry: Incorporating AI, Machine Learning and Other Technologies***
Authors: Moinuddin S.Q., Himam Saheb S., Dewangan A.K., Cheepu M., BalaMurugan S.
Publisher: 2024.
16. ****Book Chapter – ** *Harnessing Innovation for Sustainable Urban Futures: A Deep Dive into Smart Cities and Sustainable Urban Development***
Authors: Singh S., Rai A.
Source: *Nexus of AI, Climatology and Urbanism for Smart Cities*, 2024.

Research Overview and Relevance

The 2024 research output from IFHE demonstrates a diverse engagement with **industrial technology, automation, infrastructure resilience, and digital transformation**.

- *Investigation of Basalt Fibre Reinforced Polymer Composites* (Pragna et al., 2024) and *Cold Spray Additive Manufacturing* (Jagadeesha et al., 2024) contribute to material-science innovation for stronger, more sustainable manufacturing components, aligning with **Target 9.4** on upgrading industries for resource efficiency.
- *Key Networks to Create Disaster Resilient Smart Cities Mission* (Meduri et al., 2024) provides evidence-based recommendations for urban infrastructure resilience and digital readiness, supporting **Target 9.1** on developing reliable and resilient infrastructure.
- *Leveraging IoT in Supply Chain Sustainability* (Murala et al., 2024) and *Drug Traceability and Transparency in Medical Supply Chains* (Panda & Satapathy, 2024) advance digitalization and transparency in logistics systems, aligning with **Target 9.C** on increasing access to information and communication technology.
- *Evaluation of Sustainability Indicators of Machine Tools* (Kumar et al., 2024) applies hybrid Fuzzy DEMATEL analysis to assess industrial sustainability, contributing to the advancement of eco-efficient production models.

- *Automation in the Welding Industry* (Moinuddin et al., 2024) and *Digitalization of Welding Processes* (Sridhar et al., 2024) document AI-driven process automation that enhances safety and productivity in industrial operations.
- *Do Green Innovation and Governance Limit CO₂ Emissions* (Dash et al., 2024) connects industrial policy and environmental outcomes, highlighting governance mechanisms for sustainable growth.

Together, these works establish a verified academic base supporting sustainable industrialization and technological advancement in line with the global SDG 9 framework.

Institutional Practices Complementing Research

Beyond publications, IFHE promotes SDG 9 through active innovation practices:

- The **Faculty of Science and Technology** integrates project-based learning on automation, robotics, and energy systems.
- The **Innovation & Entrepreneurship Cell** facilitates prototype development and patent applications for student projects in engineering and applied sciences.
- Industry workshops and hackathons are regularly hosted to foster collaboration between academia and enterprises in sectors such as smart manufacturing, IoT, and AI-based monitoring systems.

These practices ensure that research and teaching contribute to tangible improvements in technological capability and industry relevance.

Integration into Teaching and Learning

Engineering and management programs embed innovation, industrial systems, and sustainable infrastructure concepts into coursework and capstone projects.

Students in **Mechanical Engineering, Computer Science, and Electronics and Communication Engineering** engage in applied research aligned with smart-factory management, clean energy, and industrial automation. Courses such as **IoT Applications, Industrial Robotics, Operations Management, and Technology and Innovation Strategy** use case studies derived directly from 2024 IFHE publications.

This integration bridges theoretical instruction with real-world industrial innovation. Helps during accidents.

Student Internships with respect to SDGS:

S. No.	Name of the student	Company/Organisation	Project Title	SDG
1.	S Athool Kumar	Tamil Nadu Apex Skill Development Centre For Healthcare	The Influence First Aid On Halving The Number Of Deaths And Injuries From Road Traffic Accidents In Tamil Nadu	3
2.	Rohit Kumar	Lakshmi Hospital	Life Pulse	3.4
3.	Seelam Sharon Powell	We Are With You Charitable Trust	Promoting Mental Wellness: Addressing The Silent Epidemic	3
4.	Nihal Kumar Singh	Jamshedpur Notified Area Committee	Swachh Survekshan Sop Award Survey	3, 11
5.	Khan Mohammed Kaif Mohammed Nasim	Jivika Healthcare	A Project Report On Sustainable Development Goals (SDG 3 – Good Health & Well Being)	3
6.	Ritika Saxena	Golden Empathy Foundation, Bhilai, Chhattisgarh	A Study On SDG 3: Reducing The Maternal Mortality Rate, By 2030 To Less Than 70 Per 100,000 Live Births	3
7.	Ayush Srivastava	Lions Club Sangam, Prayagraj	A Study On Sustainable Development Goal With Lions Club Sangam	3
8.	Preetham M S	Jivika Healthcare, Pune	Protecting The Food Chain: A Perspective On Vaccination In The Food Processing Industry & Engaging Key Stakeholders	3
9.	Agrawal Udit Suraj	Lokmat Media Pvt Ltd.	Early Warning, Risk Reduction And Management Of National And Global Health Risks	3
10.	Riddhi Chauhan	Umeed – A Drop Of Hope	Sustainable Development Goals Target 3.8- Achieve Universal Health Coverage	3.8
11.	Aditi Thakur	Society For Advancement In Tribes, Health, Education And Environment, Godda	Good Health And Well Being	3
12.	Ishika Yadav	Naya Sawera	A Study On Ngo Naya Sawera Initiative In Reducing Maternal Mortality (Sustainable Development Goal 3)	3
13.	Akshat Agrawal	–	Vaccine Access & Awareness	3
14.	Gyanvi Bagwani	Jivika Healthcare	Tackling Vaccine Hesitancy: Stakeholder Engagement In Food Processing & Cervical Cancer Awareness	3
15.	Geetika Jain		Promoting Healthy Lives And Well-Being: Exploring The Path To Achieving SDG 3	3
16.	Ankur Malik	Jivika Healthcare	Vaccine Hesitancy In The Food Processing Industry	3
17.	Mansi Kushwaha	Teens Of Gods	Charting Menstrual Health Awareness For Overall Reproductive Health	3.7
18.	Mehak Khanna	People's Recovery Initiative For Solutions & More (Prism)	SDG Report	3
19.	Ananya Dogra		Promoting Well-Being For All	3
20.	Yashika Saraf	Aarogya Lifestyle Centre	Sustainable Developmental Goals Of Aarogya Lifestyle Centre	3,8
21.	Harsh Jain	Jivika Healthcare, Pune		3,8
22.	Shubham Sharma	Lion's Club International, Burhanpur		3.6, 4.0

S. No.	Name of the student	Company/Organisation	Project Title	SDG
23.	Talla Harichandana Goud	Marpu Foundation Youth For Seva	Harmony For Health, Education And Sustainability:A Holistic Approach Towards SDGs 3,4 And 12	3,4, 12
24.	Pranju Jain	Jivika Healthcare, Pune	Addressing Vaccine Hesitancy In Food Processing Industry In Giridih	3,8
25.	Anto Jovin Nadar	Jivika Healthcare	SDG Journey	3.3,8.3, 8.5, 8.6
26.	Mansi Batra	Pratham Education Foundation, Kapurthala Under ITC Mission- Sunehra Kal	Inform, Educate And Empower: Enabling Youth Through Skills Development And Health Education	3,8
27.	Akanksha Garg	Umeed: A Drop Of Hope	Sustainable Development Goal	3.8
28.	Rudrani Banerjee	Abhivyakti Foundation	Health For All: Achieving Universal Health Coverage A Comprehensive Analysis On SDG 3.8	3.8
29.	Vakacharla Sharan Preeth	Jivika Healthcare	Safeguarding The Food Chain: A View On Vaccination In The Food Processing Industry And Engaging Key Stakeholders	3
30.	Nainar Radha	People's Action for Social Service (PASS), Tirupati	"Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol"	3.5
31.	Swarnima Sapre	Robin Hood Army	Advancing Global Health And Nutrition Through A Sustainable Development Approach	2,3
32.	Samiksha Manoj Shrivastav	Assisi Bhavan (NGO)	Sustainable Development Goals	3.4
33.	Dibyendu Sarkar	Simla Old Age Home	"Social Contribution Of "Simla Old-Age Home" On SDG"	3
34.	Sarthak Singla	Lyness Youth Wing Club (Panipat)	Sustainable Development Goals	3
35.	Ansari Shahin Mohammadarif	Indianoil Corporation Ltd.	A Study On Indian Oil Corporation Ltd. Initiative In Sustainable Development Goals	3,8,9
36.	Darji Daksh Kapil	Rotaract Club Of Bombay Uptown	Study On The Impact Of Injury And Death Caused Due To Road Accidents On Quality Of Life	3

ICMR Case Studies (2023–2024)

Sl. No.	Academic Year	Title	Author(s)	SDG Goal(s)	Weblink
1	2023–2024	Maria Klawe – Promoting Gender Diversity and Inclusion in STEM Education at Harvey Mudd College	Anirudhan, Anil; Dutta, Sanjib	SDG 5	Link
2	2023–2024	PepsiCo's Sustainability Strategy to Build a Positive Value Chain	Kumari, Shwetha; Nair, Jitesh	SDG 13; SDG 17	Link
3	2023–2024	SAP's Innovation Approach: Boost Startups and Intrapreneurship	Prasad, Namratha V	SDG 9	Link
4	2023–2024	Starling Bank's Anne Boden – The Founder and CEO of a 'Profitable' Challenger Bank in the UK	Anirudhan, Anil; Dutta, Sanjib	SDG 5	Link
5	2023–2024	Hilfr's Labor Model: A First for Gig Workers of the Platform Economy	Nair, Jitesh; Pasala, Balaswamy	SDG 8	Link
6	2023–2024	Psudo – Setting New Standards for Sneaker Manufacturing	Zafar, Faria; Perepu, Indu	SDG 12; SDG 13	Link
7	2023–2024	SHEIN: Ethical Cost of Ultra-Fast Fashion	Zafar, Faria; Perepu, Indu	SDG 12	Link
8	2023–2024	Shubham Housing Development Finance – Social Impact through Financial Inclusion	Kumar, KBS; Perepu, Indu	SDG 10	Link
9	2023–2024	Back Market and the Global E-Waste Crisis	Qumer, Syeda Maseeha	SDG 12	Link
10	2023–2024	Hemalatha Annamalai: Woman Pioneer of India's Electric Vehicle Revolution	Koti, Vinod Babu; Prasad, Namratha V	SDG 5	Link
11	2023–2024	IKEA Builds Smaller Format Stores – Comes Closer to Customers	Anirudhan, Anil; Dutta, Sanjib	SDG 9	Link
12	2023–2024	You Mawo: Using 3D Printing Technology to Introduce a New Eyewear Concept	Koti, Vinod Babu; Prasad, Namratha V	SDG 9	Link
13	2023–2024	Climeworks – Empowering People and Companies to Fight Global Warming with DAC Technology	Anirudhan, Anil; Dutta, Sanjib	SDG 13	Link
14	2023–2024	Nepra's "Let's Recycle" Initiative – Tackling India's Solid Waste Management Problem	Anirudhan, Anil; Dutta, Sanjib	SDG 12	Link
15	2023–2024	Cotopaxi: Creating Sustainable Social Impact	Kumari, Shwetha; Nair, Jitesh	SDG 10; SDG 12	Link
16	2023–2024	Ecokaari: Up-Cycling Waste Plastics into Fabrics	Kumari, Shwetha; Nair, Jitesh	SDG 9; SDG 12	Link
17	2023–2024	Marut Drones – Using Technology to Solve Social Issues	Zafar, Faria; Perepu, Indu	SDG 9	Link
18	2023–2024	Nestlé's Diversification through Palforzia: The Setback and Lessons	Koti, Vinod Babu; Prasad, Namratha V	SDG 3	Link
19	2023–2024	Science Based Targets Initiative (SBTi) – A Scientific Approach to Define and Achieve the Carbon Emissions Reduction Targets	Vijaya, Lakshmi S; Nagendra Kumar, MV	SDG 13	Link

Sl. No.	Academic Year	Title	Author(s)	SDG Goal(s)	Weblink
20	2023–2024	Unilever's Sustainable Sourcing	Samantarai, Munmun; Dutta, Sanjib	SDG 12; SDG 13	Link
21	2023–2024	VAAST Bikes: Building a Niche Brand through Sustainable Products and Processes	Nair, Jitesh; Pasala, Balaswamy	SDG 9; SDG 12; SDG 13	Link
22	2023–2024	Adidas: Sustainability Bond	Nagendra Kumar, MV; Perepu, Indu	SDG 9	Link
23	2023–2024	Enbridge: A Diversity, Equity & Inclusion (DEI) Leader in the Energy Industry	Nair, Jitesh; Pasala, Balaswamy	SDG 8; SDG 10	Link
24	2023–2024	Etsy's Growth Strategy in India: Empowering Artisans	Koti, Vinod Babu; Prasad, Namratha V	SDG 8	Link
25	2023–2024	H&M – Can the Fast Fashion Giant Transition into a Green Future?	Kumar, KBS; Perepu, Indu	SDG 12; SDG 13	Link
26	2023–2024	LEAD's Integrated EdTech Solution: Combining Technology, Curriculum and Pedagogy to Transform Traditional Education	Nair, Jitesh; Pasala, Balaswamy	SDG 4; SDG 9; SDG 10	Link
27	2023–2024	Pesky Fish's 'Port to Plate' Technology Platform: Reinventing the Seafood Supply Chain	Kumar, KBS; Perepu, Indu	SDG 8	Link
28	2023–2024	Blueland: An Innovation-Led Solution Addressing Global Climate Challenges	Kumar, KBS; Perepu, Indu	SDG 13	Link
29	2023–2024	PhysicsWallah – A Disrupter in the Indian EdTech Industry	Zafar, Faria; Perepu, Indu	SDG 4	Link
30	2023–2024	Pure Harvest Smart Farms – A Technology-Enabled Agribusiness Startup Addressing the Food Security Challenges in the Middle East	Zafar, Faria; Perepu, Indu	SDG 2; SDG 9	Link
31	2023–2024	Zipline: Navigating the Rwanda Skies to Make Medical Supplies Accessible to Millions on Land	Samantarai, Munmun; Dutta, Sanjib	SDG 3	Link
32	2023–2024	Danone: Realigning Sustainability for Profitability?	Kumari, Shwetha; Nair, Jitesh	SDG 12	Link
33	2023–2024	India's Moon Mission Chandrayaan-3: From Failure to Success	Harish, R; Dutta, Sanjib	SDG 9	Link

Alignment with SDG 9 Targets (2024)

UN Target	Corresponding IFHE Activity / Evidence (2024)
9.1 – Develop resilient infrastructure	<i>Key Networks to Create Disaster Resilient Smart Cities Mission (Resilient Cities and Structures, 2024).</i>
9.2 – Promote inclusive and sustainable industrialization	<i>Investigation of Basalt Fibre Reinforced Composites and Evaluation of Machine Tool Sustainability Indicators.</i>
9.4 – Upgrade infrastructure and industries for sustainability	<i>Cold Spray Additive Manufacturing and Automation in the Welding Industry.</i>
9.5 – Enhance scientific research and innovation capacity	<i>Leveraging IoT in Supply Chain Sustainability and Drug Traceability Using Blockchain.</i>
9.C – Increase access to ICT and innovation	<i>Design and Implementation of IoT-Based Advanced Energy Management System and related digitalization research.</i>

Conclusion

In 2024, the **ICFAI Foundation for Higher Education (IFHE)**, Hyderabad, demonstrated measurable and verified engagement with **Sustainable Development Goal 9 – Industry, Innovation and Infrastructure** through research, teaching, and applied technology development.

Its publications covered areas such as smart manufacturing, automation, supply-chain digitalization, sustainable materials, and urban resilience. Institutional initiatives like innovation cells, student hackathons, and interdisciplinary research collaborations complemented these scholarly contributions by fostering real-world technological application and entrepreneurship.