



TECHNICAL UNIVERSITY OF CLUJ-NAPOCA

ACTA TECHNICA NAPOCENSIS

Series: Applied Mathematics, Mechanics, and Engineering
Vol. 66, Issue Special I, September, 2023

THE ROLE OF UNIVERSITIES IN INCREASING AWARENESS OF CHALLENGES RELATED TO SUSTAINABLE DEVELOPMENT GOALS. CASE STUDY: TECHNICAL UNIVERSITY OF CLUJ-NAPOCA

Anca STAN, Emilia BRAD, Ionut-Adrian CHIS, Costan-Vladut TRIFAN

Abstract: Universities play a crucial role in promoting awareness of the Sustainable Development Goals (SDGs) and engaging students, faculty, and staff in sustainable practices. They facilitate partnerships with various sectors, fostering cross-sectoral collaboration for SDG advancement. Universities also reach out to communities through education and outreach, raising public awareness and encouraging sustainability. By implementing sustainable practices in their operations, they set an example. The Technical University of Cluj-Napoca recognizes the importance of integrating sustainability principles. As a leading higher education institution, it has the intellectual capacity to contribute to environmental solutions through sustainable education, research, and practices. Their strategy emphasizes sustainability and inclusivity, aiming to strengthen institutional protocols and showcase successful sustainable development practices.

Key words: sustainability, SDGs, education, university, challenges, sustainable practices, development

1. INTRODUCTION

Universities play a significant performance in promoting sustainable development through research. They conduct studies on various topics related to sustainable development such as climate change, resource preservation, environmental preservation, economic advancement and social equity. This research aids in identifying the underlying reasons for sustainability challenges and developing solutions based on evidence which can be implemented at various levels.

Universities support sustainable development through education as well. By including sustainability in their curricula and providing students with hands-on learning experiences, universities can prepare future leaders with the necessary knowledge, abilities and mindset to tackle sustainability challenges and build a more sustainable future.

Lastly, universities can advance sustainable development by interacting with the broader community. This can involve collaborating with local groups, governments and businesses to tackle sustainability challenges, as well as

interacting with civil society organizations and the general public to increase awareness of sustainability issues and advocate for sustainable practices [1].

In summary, the role of universities in advancing sustainable development is essential and by collaborating, universities can make a substantial impact in creating a more sustainable future for all. They are uniquely positioned to promote sustainable development and raise awareness of challenges related to the SDGs due to their diverse resources and capabilities [1].



Fig 1. Pillars on which universities promote sustainable development

As seen in figure 1, one of the keyways that universities promote sustainable development is

through their research capabilities. Universities are centers of research and innovation and they study a wide range of sustainable development topics such as climate change, resource management, environmental protection, economic growth and social equity. This research helps identify the underlying causes of sustainability issues and develop evidence-based solutions that can be applied at various levels.

Another important aspect of how universities promote sustainable development is through education and training. By including sustainability in their curriculum and offering hands-on learning experiences, universities can prepare future leaders with the knowledge, abilities and mindset needed to tackle sustainability challenges and create a more sustainable world.

Third, universities have a broad impact and are able to connect with various stakeholders including local communities, government agencies, private sector entities, and civil society groups. This allows them to disseminate information about sustainability and encourage sustainable practices to a diverse population.

Fourth, universities are respected institutions that are trusted to provide accurate and unbiased information and knowledge on sustainability issues. They create a space for open and constructive dialogue and debate and bring together diverse perspectives to address the challenges of sustainable development [2].

Universities are well-suited to advance sustainable development and increase understanding of the challenges associated with the SDGs due to their research and innovation strengths, educational and training programs, broad reach and impact, and reputation as reliable sources of information and expertise.

2. CASE STUDY

2.1 General overview

In Romania, a comprehensive plan called the National Action Plan for the Implementation of the NSSD of Romania 2030 [3] has been created to guide the implementation of the 2030 National Strategy of Sustainable Development (NSSD). This plan includes recommendations for actions that aim to enhance and expand the governance structure for sustainable

development, in order to align with the ideals and values of the SDGs. The National Action Plan for the Implementation of the NSSD of Romania 2030 is a guide for the execution of the NSSD, with a focus on four main priority areas and twelve specific objectives. The plan [3] includes 22 actions to be taken in order to achieve the targets related to the 17 SDGs, and advocates for a comprehensive and multi-faceted approach to sustainable development.

In Romania, the TUCN, along with other universities, faces both challenges and opportunities for sustainable development as it works to align its educational, research, and innovation efforts with the country's NSSD through the National Action Plan [4]. This requires a practical and realistic approach that addresses the needs of the regional and national socio-economic environment.

2.2 Material database

The TUCN, with a student population of over 20,000 and a staff of 1,000 teachers and researchers, as well as 888 support personnel, is one of the largest and most well-funded universities in Romania. It offers a wide range of educational programs, including 95 undergraduate programs, 103 graduate programs, 14 doctoral fields, and continuing education and professional development opportunities [4].

Fundamental or applied scientific research, technological development and innovation position this university as one of the advanced national education and research universities with a wide national and international visibility and recognition. Research topics cover engineering, exact sciences and humanities and are approached through 89 accredited research structures (Centers, Research Groups and Laboratories) [4].

The university's material base has significantly expanded and diversified, with buildings in the two university centers: Cluj-Napoca and Baia-Mare, as well as in the four university extensions (Zalău, Satu-mare, Alba-Iulia and Bistrița) totaling an approximate total area of 200,000 sqm. The quality of the Campus spaces (10 student dormitories, 3 restaurants, 4 libraries, a bookstore and a printing house) has been constantly improved. In addition to these,

the sports base includes: swimming facility, two sports halls and three sports fields for various activities, where a series of intervention have been performed in recent years in terms of energy efficiency [4].

2.3 TUCN's SDG principles

The TUCN recognizes and applies the value of sustainable development principles. Sustainable development involves a set of social, economic and environmental principles that aim to meet the needs of the present without compromising the ability of future generations to meet their own needs. In this context, the TUCN, through its own missions and goals, aims to contribute at increasing awareness of challenges related to the SDGs [4].

The TUCN aims to advance sustainable development by raising awareness of the SDGs and promoting gender equality. This is achieved through a variety of initiatives such as implementing policies that support the inclusion and advancement of women in academia and research, incorporating a gender perspective into its curricula and research, and collaborating with external organizations to promote gender equality. Additionally, the university incorporates sustainable development principles into its educational and research programs to contribute to a more sustainable and equitable society.

The TUCN views its students as key players in promoting sustainable development by being active in implementation, innovation, entrepreneurship, and being responsible and engaged citizens. This perspective is reflected in the university's plan of measures for sustainable development, which is a commitment of the university's management.

The TUCN understands the importance of incorporating sustainable development principles into its institution. As a higher education institution, the university is well-equipped to tackle environmental challenges and promote sustainable practices through education, research, and operations. The university's strategy is focused on promoting sustainable and inclusive development, by implementing policies and highlighting successful examples of sustainable practices [4]:

- elevating sustainable and inclusive development to the highest echelon of its professional and university management activities
- establishing an atmosphere conducive to the imparting of education, the pursuit of research, the fostering of innovation, and the promotion of artistic creation
- promoting lifelong learning opportunities, by adapting the educational offer to the needs of the labor market
- cultivating a sustainable development culture focused on students, a culture that is informed, current, and has a practical focus
- consciously involving the entire community (academic staff, students and administrative staff) in initiatives and actions related to sustainable development, with the aim of becoming active citizens for a sustainable community
- energy efficiency and reduction of energy consumption in all buildings in the university's patrimony
- collaborating with various local and international groups and communities, especially with the municipalities through joint projects.

The vision of the TUCN is to become one of the top 3 most sustainable universities in the country, ensuring that everything they do is sustainable: the education they offer to students, research and innovation, as well as all processes that take place on campus [4].

The mission of the TUCN is to implement sustainability initiatives in an integrated approach by involving the entire academic community in the development of best practices that have the ability to become a positive force in building a sustainable society for all [4].

The TUCN is committed to designing a sustainable development plan that aligns with its vision, with the core values of excellence in education, research and innovation, good governance, and strategic partnerships. These efforts are guided by the principles of integrity, diversity, and inclusion.

As the main promoter and provider of accredited courses at the regional level, complementary to the energy efficiency, renewable sources and circular economy

research-innovation projects developed and implemented at the national and international level, the TUCN aims to become a national leader in the field of sustainable energy engineering, decarbonization and sustainable development.

By integrating the principles and mechanisms that promote sustainable development into the culture, operational policies and governance, the TUCN aims to achieve international recognition in the process of transitioning to a sustainable future.

2.4 Areas of focus

The TUCN incorporates the principles of sustainable development into its operations, as reflected in the United Nations' SDGs. The university's endeavours in various areas are steered by these [4]:

1. Energy

In the TUCN, addressing a major challenge such as climate change requires a truly collaborative perspective across society. This university is a key and actively involved partner in educating, creating, and supporting policies and their implementation in campus and diverse communities, including in direct relationship with the Municipality of Cluj-Napoca, a community that has committed to decarbonizing its current level by over 80% by 2030.

In the context of the current need for an energy transition towards renewable sources, decarbonization, and a low-emission environment, the university, through all its actions and policies, fully supports the objectives, financial allocations, and actions of decision makers in Romania and at the European level, the most important of which is improving energy efficiency by at least 45% by 2030 and introducing local renewable sources for self-consumption.

They have also committed to acting as an example of best practices at the local and regional level and to playing a leading role in the transition to a green campus.

2. Campus and community

The TUCN is committed to promoting sustainability and creating a sustainable society for all. As a higher education institution, the university recognizes its role in educating and inspiring future generations to take action in

addressing environmental challenges. Through its policies and practices, the university aims to lead by example and become a national leader in sustainable energy engineering, decarbonization, and sustainable development. The university is also dedicated to collaborating with various local and international groups and communities to actively contribute to the creation of sustainable communities and participate in joint projects. Additionally, the university is committed to involving the entire academic community in the development and implementation of best practices for sustainability.

3. Governance and partnerships

The TUCN understands that addressing sustainable development requires a collaborative effort across all areas of the institution. This means involving all members of the university community, including teaching and research staff, technical and administrative staff, and students, to address the complex issues that arise and implement sustainable initiatives on campus. Through this integrated approach, the university can effectively use its strengths to address social and environmental challenges.

They continuously aim to expand partnerships in order to increase opportunities for transdisciplinary research in sustainability, to increase the visibility of the university's activities in this field, and to access valuable international practices.

The strategic goal of the university is to optimize opportunities for sustainable development and to integrate environmental and sustainability concerns into inter-university or socio-economic partnerships, as seen in figure 2 [4].

In the TUCN, educational and research-innovation activities constitute the foundation for training the next generation of students, researchers, and innovators to address the evolutionary challenges of society in the context of sustainable development. As a university with a significant research component at the national and European level, the University integrates and supports a large number of multidisciplinary research centres aimed at sustainable development.

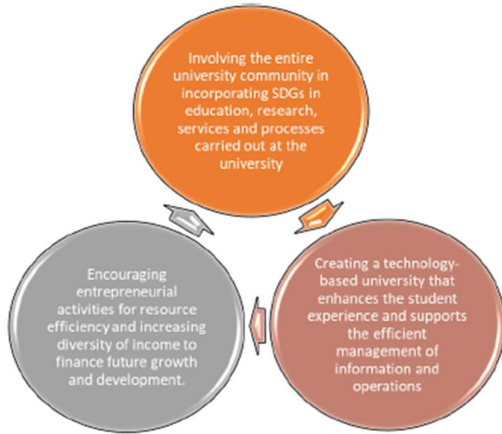


Fig 2. Strategic objectives of TUCN

Among the implemented measures, one can find the following [4]:

- Identifying and documenting in the current academic programs, the curricular content that promotes sustainability
- Providing non-formal learning opportunities about sustainability - general courses for a wide audience and for the Community, so that it becomes an active player in the process of transitioning to a Green Campus
- Promoting and facilitating the multidisciplinary and perspective generated by sustainable development in all research activities where possible
- Integrating concepts, mechanisms, and approaches related to sustainable development in the University's educational programs
- Proposing and implementing institutional research and development projects in fields related to sustainable development [5]
- Supporting and promoting pilot demonstrative projects in the university's own buildings, aimed at energy efficiency, renewable sources, smart buildings, etc.
- Monitoring energy consumption on Campus. Installing smart thermostats (temperature, humidity, CO₂)
- Implementing energy-efficient lighting systems
- Green Building certification for new spaces undergoing renovation
- Promoting the integration of sustainable development principles in the curricula of all

programs and in the research agenda of the University

- Supporting the University's participation in local, national and international networks and initiatives related to sustainable development
- Developing and implementing a policy on the use of resources in the University, which aims to reduce waste and optimize the use of resources, promoting the use of environmentally friendly technologies and products.

Furthermore, the TUCN, in partnership with the Polytechnic University of Bucharest, has been awarded a significant project to establish a National Centre for Competences for Climate-Neutral Smart Cities. This ambitious project, with a funding allocation of 6 million euros, aims to establish a multi-disciplinary center to support the development of intelligent and climate-neutral cities. The TUCN has been granted the maximum allocation of 500,000 euros, and its position as a leader in Romania for the evaluation of SDGs in the area of Energy has been further solidified. The university also has a strong partnership with the City of Cluj-Napoca, which is actively engaged in the 100cities mission to become a climate-neutral city.

Also, the university is actively engaged in international initiatives related to sustainability, energy transition, and climate neutrality, with a focus on smart cities. They currently have 9 ongoing or completed projects in these areas, including pilot demonstrations in Cluj on topics such as buildings, mobility, and hydrogen-based systems, as well as green airports and district heating.

3. CONCLUSION

Based on the European and national context, the need to concretize the concept of sustainable development within the TUCN has been identified, in our opinion.

The TUCN is well-positioned to address environmental challenges through an innovative approach to sustainable education, research, and operational practices. With the collective efforts of faculty, staff, and students, the university has

the ability to implement, practice and promote the principles of sustainable development, which aims to minimize the impact on the environment and reduce the ecological footprint.

The SDGs defined by the United Nations are the main instruments and direction they need to focus on, providing the community with an appropriate environment for education, research, and development.

By adopting the SDGs at a strategic level, the university can contribute to the formation of a sustainable society, in which higher education is connected with the business environment and entrepreneurs, industry, and international partners.

The TUCN, through the cultivation of an intricately crafted plan for sustainable development and the assimilation of sustainable practices in its quotidian operations, has positioned itself as a leader among its peers in Romania and various universities abroad in raising awareness pertaining to the SDGs. While there remains a considerable journey ahead, the

university's diligent endeavors in promoting sustainable development are commendable and will undoubtedly serve as a catalyst for its continued progress.

4. REFERENCES

- [1] McKeown, R., Thomas, C., Maher, P., Tilbury, D., Ryan, A., Scott, G. and Wigboldus, L., Higher Education Institutions and the Sustainable Development Goals: A Call for Collaboration and Action, Journal of Education for Sustainable Development, vol. 12, no. 1, pp. 99-111, 2018
- [2] Nutakor, D., and Stott, R., Higher Education Institutions and the Sustainable Development Goals: A Global Perspective, Palgrave Macmillan, ISBN 978-3030508126, 2020
- [3] <https://dezvoltaredurabila.gov.ro/planul-national-de-actiune-final>, Accessed April 2023.
- [4] <https://www.utcluj.ro>, Accessed April 2023..
- [5] <https://www.un.org/>, Accessed April 2023.

Rolul universităților în creșterea conștientării provocărilor legate de obiectivele de dezvoltare durabilă. studiu de caz: Universitatea Tehnică Cluj-Napoca

Universitățile joacă un rol crucial în promovarea conștientizării Obiectivelor de dezvoltare durabilă (ODD) și în implicarea studenților, profesorilor și personalului în practici durabile. Ele facilitează parteneriate cu diverse sectoare, încurajând colaborarea intersectorială pentru promovarea ODD. Universitățile ajung, de asemenea, către comunități prin educație și sensibilizare, creșterea gradului de conștientizare a publicului și încurajarea durabilității. Implementând practici durabile în operațiunile lor, ei dau exemplu. Universitatea Tehnică din Cluj-Napoca recunoaște importanța integrării principiilor sustenabilității. Ca o instituție de învățământ superior de top, are capacitatea intelectuală de a contribui la soluții de mediu prin educație, cercetare și practici durabile. Strategia lor pune accent pe durabilitate și incluziune, având ca scop consolidarea protocoalelor instituționale și prezentarea practicilor de succes de dezvoltare durabilă.

STAN Anca, Ms, Senior Lecturer, Technical University of Cluj-Napoca, Design Engineering and Robotics Department, anca.stan@muri.utcluj.ro, 0264401767

BRAD Emilia, Ms, Professor, Technical University of Cluj-Napoca, Design Engineering and Robotics Department, emilia.brad@muri.utcluj.ro, 0264401767

CHIS Ionut Adrian, Mr, Senior Lecturer, Technical University of Cluj-Napoca, Design Engineering and Robotics Department, ionut.chis@muri.utcluj.ro, 0264401767

TRIFAN Costan Vladut, Mr, PhD student, Technical University of Cluj-Napoca, Design Engineering and Robotics Department, vladut.trifan@ipr.utcluj.ro, 0264401767