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Meryl Rosenblatt

*Molloy University*, [mrosenblatt@molloy.edu](mailto:mrosenblatt@molloy.edu)

Ishita Sharma

*Molloy University*

Mya Ferreiro

*Molloy University*

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# The Euroweek Experience: Supporting Sustainable Development Through Academic Programs Promoting Student Research, Technology Innovation and the Commercialization Process

**Meryl Rosenblatt**  
Molloy University  
1000 Hempstead Ave.  
Rockville Centre, NY USA 11570  
516-512-0592  
[mrosenblatt@molloy.edu](mailto:mrosenblatt@molloy.edu)

**Ishita Sharma**  
Molloy University  
1000 Hempstead Ave.  
Rockville Centre, NY USA 11570  
347-955-6886  
[isharma@lions.molloy.edu](mailto:isharma@lions.molloy.edu)

**Mya Ferreira**  
Molloy University  
1000 Hempstead Ave.  
Rockville Centre, NY USA 11570  
516-749-8231  
[mferreiro@lions.molloy.edu](mailto:mferreiro@lions.molloy.edu)

## **ABSTRACT**

University-based research continues to rely on industry partnerships to help support the innovation, exchange and application of new technologies. At the same time, University R&D has increasingly focused on technologies that support a wide range of environmental, societal and economic Sustainable Development Goals (SDGs) launched by the United Nations in 2015. This has put a spotlight on the need to address technology transfer from the university to industry, where the university often lacks the resources needed to assess the feasibility of market adoption of new technologies. Recent literature indicates that there is a role for the international academic community to play in support of university entrepreneurship that can foster the transfer of knowledge to industry and facilitate the commercialization of new technology products. This paper presents PRIME Networking's *Euroweek*, an international academic program where students collaborate on multi-country, cross-disciplinary teams to identify research projects with the potential of having a positive environmental, economic or societal impact.

## **Keywords**

International Education, Global Competence, University Research, Technology Transfer, Sustainable Development

## **1 INTRODUCTION**

### **Global Competence and Higher Education**

Over the last few decades, student global mobility programs have been promoted by national governments and higher education institutions as a means of enhancing students' cultural and social awareness, as well their knowledge and understanding of the broader world. As future global citizens, academics and practitioners recognize the importance of extending the classroom beyond the conventional campus setting to one that enables the students to develop international "competencies", through interactions with students and faculty (Goldstein, 2022). An early definition of *global competence* was "having an open mind while actively seeking to understand cultural norms and expectations of others, leveraging this gained knowledge to interact, communicate and work effectively outside one's environment" (Hunter, 2004, p. 130-131). Findings from subsequent survey research expands on this definition to include "the ability to identify cultural differences to compete globally, collaborate across cultures, and effectively participate in both social and business settings in other countries" as requirements for being globally competent (Hunter, White & Godbey, 2006, p. 283). The U.S. Department of Education affirms their commitment to preparing students for today's hyper-connected world through their updated strategic objectives that include "encouraging students, researchers, scholars, and educators who reflect the diversity of the U.S. population to pursue overseas study, internships, research, and other international experiences" (DOE, 2022, p. 4).

### **Short Term International Programs**

There has been a steady shift away from year- and semester-long study abroad programs towards short-term study abroad programs (STSA), defined as programs lasting eight weeks or less. The outcomes of short-term international mobility programs can be broadly classified into three areas: cultural, personal, and employment/career, where the competencies most affected are those targeted by activities geared to specific learning outcomes (Chieffo & Griffiths, 2004). The literature is now beginning to examine the influence of student participation in global programs tied to career-related outcomes, which include professional development, perceived employability, career choices and transitioning into international careers (Roy, Newman, Ellenberger & Pyman, 2019).

## University-based Research and Business Education

Knowledge transfer between academia and industry is now considered a driver of innovation and economic growth as it facilitates the commercialization of new scientific knowledge (De Wit-de Vries, Dolfsma, van der Windt, & Gerkema, 2019). The cooperation of business education is an important element of the entrepreneurial university, and a likely prerequisite for improving the transfer of knowledge and adoption of new technologies (Novikova, Stepanova, Zhylynska & Bediukh, 2020; Schenker, 2019). Today, the collaboration of business education with R&D investment is positioned as a necessity for achieving personal goals in the business and higher education sectors, as well as innovation, economic and social development, and sustainable development (Samoilikova, Korpysa, Vasylieva & Filip, 2023).

The extant literature focuses mostly on enabling university-industry technology transfer via university-industry collaboration, but little exists that demonstrates the importance of embedding education in these processes so students have the opportunity to gain experience with handling the hurdles for successful university-industry technology transfer. More recently, universities have started to reposition themselves by turning scientific knowledge and technological inventions into commercial and societal value. New ventures created by students can have a significant economic and social impact. As a result, there is a growing number of academic researchers and universities exploring a new identity as academic entrepreneurs (Blanckesteijn, Bossink & van der Sijde, 2021; Sieger, Zellweger, Fueglistaller & Hatak, 2021).

## 2 EUOWEEK

This paper presents the Euoweeek "experience", an international student research program that culminates in an annual conference held by PRIME Networking, an international network of academic institutions (**Professional Inter-university Management for Educational Networking**). Founded in Belgium in 2001, PRIME's mission is to develop and promote cross-cultural and interdisciplinary academic programs. PRIME's Euoweeek is an international student conference and series of competitions whose overall purpose is to add value to current studies by exposing students to an international research environment. Students collaborate on multi-country, cross-disciplinary teams to identify research projects with potential for having positive economic and societal impacts. Molloy University has been participating in Euoweeek for the past decade, with undergraduate students collaborating on project teams to conduct academic research that is both relevant and important at the local, regional and global levels. It was designed to create the possibility of students from different countries to work together, under a proposed theme each year, in an academic and research-filled environment. The main themes throughout the years have been Management, Engineering, Information Technologies, Tourism and Sustainability (Leandro & Paixão, 2021). Students work on projects virtually, in multi-country teams, throughout the spring semester, and travel to one European location to participate in a week-long conference and series of competitions where they present their projects to participating students and faculty. Student research topics have increasingly focused on sustainable development by supporting university-based research that partners engineering students with students studying a range of industry-focused disciplines such as marketing, management, economics and the environmental sciences. In this paper we provide an overview of Euoweeek projects that demonstrate how a student-centered interdisciplinary research approach contributes to academic programs overall, while preparing students to become more responsible and responsive global citizens.

### Student Collaborations (Euoweeek Sustainability Projects)

Higher education institutions (HEI) play a critical role in developing student leaders equipped with the skills and knowledge needed to mobilize societal changes. HEIs and student-led initiatives represent untapped potential to support university entrepreneurship that advances Sustainable Development Goals (Lee, Liu, Warnock, Kim & Skett, 2023; Filho, Salvia & Eustachio, 2022).

Table 1 presents examples of sustainability focused research projects presented at the Euoweeek Conferences held in 2019, 2020, 2022 and 2023 (Euoweeek 2021 was suspended due to Covid 19). Students from participating universities are responsible for shaping the project scope and objectives, research design and methodology, conducting the data analysis, presenting findings and making recommendations for future action or further research. Student contributions to their projects often reflect and align with their areas of study and future career intentions. Euoweeek provides students the opportunity to expand their scope of knowledge, improve communications skills and become globally "competent".

Table 1. Euoweeek Sustainability Projects

Project Title & Year	Project Purpose/Description	Country Project Partners
The Ecological Boat Accessory Euoweeek 2023	Designing and building a removable device that attaches to a boat (transporting people or goods) for clean the water surface during their trip.	US, Belgium, Portugal
Device to Save Lives Euoweeek 2023	Create a device that acts in monitoring and intervention in case of anaphylactic shock.	Portugal, Sweden, Belgium
Smart Garbage Euoweeek 2022	Building a small sorting robot that detects metal materials and sort them from the plastics.	Belgium, France, Poland
The Green Shoes Euoweeek 2022	Design a prototype for power-generating shoes that can be connected to all type of electronic devices to load them without any external power supply.	Austria, Belgium, Greece

Cogeneration: Recycling Heat to Power Electronics Euroweek 2020	Build and market test a small prototype using a Stirling Engine to recycle lost heat.	US, Belgium, Netherlands
Urban Agriculture and Vertical Farms: From Roof to Table Euroweek 2019	Apply case-based research to explore potential opportunities, barriers and sources of support for vertical farming and urban agriculture to meet the needs of communities in both developed and developing countries.	USA, Finland, Germany
Waste Elimination through the Use of a Digital Twin Euroweek 2019	Develop a digital twin within a manufacturing environment to identify and reduce different types of waste using lean methodologies.	Czech Republic, Austria, France

### **The Ecological Boat Euroweek Project**

The main goal was to build a prototype, "The Ecological Boat Accessory", which consists of a mechanism that cleans water surfaces while a boat is in motion. At the same time, the project team worked on an environmental and competitive assessment, while identifying key target markets and developing a preliminary marketing plan.

#### ***The Ecological Boat Project Goals***

In 2015 the UN adopted the 2030 agenda with the purpose of promoting peace and prosperity for people and the planet, and the use of resources without compromising future generations. To this end, 17 SDGs, 169 targets and 248 indicators were established that tackle issues such as poverty, inequality, climate change, environmental degradation, justice as well as other global problems that we confront. This project directly addresses and supports Sustainable Development Goals #14 - *Conserve and sustainably use the oceans, seas and marine resources*; Goal #15 - *Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss*; and Goal #17 - *Revitalize the global partnership for sustainable development* by preventing and significantly reducing marine debris and pollution of all types from the water and halt the degradation of natural habitats.

For this project, the Belgium engineering students developed the prototype, students from Portugal worked an assessment of the environmental, socioeconomic and human impact of plastics and marine debris, as well as a target segment analysis. The US students conducted Delphi research to identify opportunities, potential barriers or risks facing this new technological product, as well as a situation analysis and competitive analysis to better assess the market potential for the Ecological Boat Accessory and begin to develop the marketing plan. The following details some of the work completed by the Ecological Boat project team to help meet these objectives.

#### ***Building the Ecological Boat Marketing Plan***

In addition to building the prototype, the first steps for this project included completing a situation and competitive analysis, conducting expert interviews, proposing a market positioning and developing key message points that can be used to help generate awareness and interest for the Ecological Boat Accessory.

#### ***Situation Analysis and Competitive Inventory***

The global green technology and sustainability market size is projected to grow to more than \$48 billion by 2027, which creates a greater demand for technology that is environmentally friendly. This presents a significant opportunity for new "green" technologies and products that are now necessary for our planet's survival (Trammell, 2021). To successfully introduce new technology products and minimize the risks associated with market failure, it is important to fully understand the market situation. This includes identifying the target market(s), their attitudes, behaviors, preferences and practices. It is also important to conduct a competitive analysis, and assess the political, social or regulatory environments to ascertain any existing barriers, as well as enablers, in the new product launch and adoption process. This data will provide marketers with the inputs needed to conduct a full-blown situation analysis.

As plastic waste continues to accumulate in our waters at alarming rates, the need for sustainable solutions becomes increasingly urgent. What is needed is the development of technologies that either 1) prevent plastics from entering waterways or 2) collect marine and riverine plastic pollution. One extensive review of the literature, "Plastic Pollution Solutions: emerging technologies to prevent and collect marine plastic pollution" attempts to create a comprehensive inventory of technologies currently used (or in development) to prevent the leakage or collection of plastic pollution. This inventory comes from a systematic search and review of resources that identified technologies organized by the type and target plastics (i.e., macroplastics, microplastic, or both). Fifty-two technologies were identified that fall into the categories of prevention or collection of plastic pollution. Of these, 59% focus specifically on collecting macroplastic waste already in waterways. While the existing efforts to collect plastic pollution are important, their capacity for plastic waste removal is very limited in comparison to the plastic pollution problem. There is a need for more effective solutions that combine technology, policymaking, and advocacy to prevent further plastic pollution (Schmaltz, Melvin, Diana, Gunady, Rittschof, Somarelli & Dunphy-Daly, 2020).

### **Expert Interview**

Due to time constraints, one expert interview was conducted and serves as a pilot for a larger Delphi study. The Delphi method was developed in the early 1950s and provides a structured process for collecting and distilling knowledge from experts in several rounds of interviews that combines their feedback with the aim of achieving some degree of consensus. This project incorporates the use of the expert interview as one way to help gauge the potential for market adoption and identify barriers or risks that a product launch may face.

To start this phase of the research, the US students conducted an expert interview with John Tanacredi, Professor of Earth & Environmental Sciences, Department of Biology, Chemistry & Environmental Studies at Molloy University. The goal of the interview was to help estimate the projected impact of the Ecological Boat Accessory, and how it could be commercialized. Dr. Tanacredi has made it his life's work to study coastal issues and ecosystems, and to advocate for change where most needed. One of Dr. Tanacredi's recommendations regarding the Ecological Boat Accessory was that its use of such a tool may work best alongside the shorelines of beaches and lakes, rather than to be implemented in large bodies of waters including oceans. As the Ecological Boat Accessory can aid in filtration of the topmost layer of water, it can aid in lowering the number of pollutants found in/on the water. He also discussed the effectiveness of consumer programs such as "Adopt a Beach" and public policy support in helping address waste and pollution in our waters.

### **Proposed Marketing Strategies**

Several marketing strategies for introducing The Ecological Boat Accessory were proposed:

1. Introduce this product at marine technology trade shows. An ideal trade show for the Ecological Boat Accessory is the Swiss Boat Show. This three-day trade show takes place in Geneva, Switzerland, and hosts over 130 exhibitors with approximately 27,500 visitors each year (Swiss Boat Show, n.d.). It exhibits numerous companies that specialize in sailing and motorboats, water sports, marine equipment, sliding sports, diving, tourism, and fishing. This would provide the exposure needed to generate awareness and the possibility of attracting potential investors.
2. Develop a social media campaign and select platforms that will reach the key target audience. This is likely a niche audience so the use of hashtags can be effective tool to build awareness and interest. Some examples would include #sustainableboating, #savetheplanet and #oneboatatime.
3. Reach out to influencers who will post themselves using our product with our hashtag #oneboatatime. An influencer who would be beneficial to the marketing of the boat would be Davide Cesaro. Cesaro is an Italian luxury lifestyle influencer based in Dubai, United Arab Emirates, and Monte Carlo, Monaco. His Instagram profile, @dadocesaro, has about 370,000 followers, making him a macro influencer). His content includes himself riding yachts and other luxury vehicles (McClure, 2021; Cantalupo, 2020). The marketing team would invite him on the boat and ask him to create Instagram content using the Ecological Boat Accessory. The impact of sponsoring influencers with large followings could be a significant driver of awareness and interest.

This type of collaboration is the model for all Euroweek projects. It provides an example of how academic programs can encourage global student collaboration that facilitates university-based research from product development through the commercialization process, while strengthening the global competency of future generations.

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