Funded by
the European Union

TWIN-IT-ROMANS - 101160215

Workshop on Sustainability

@ Turin

Report

Rev-A

26.02.2025

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This report contains the information on all the activities carried out during the Workshop on Sustainability (WoS) organized by the project partner POLITO in Turin, Italy.

The WoS took place in between 5th and 7th of February, 2025 in Turin, Italy.

The on-site attendees were as follows:

- IzTech: 4 Researcher, Gender Equality Manager, 3 ESRs
- UBAH: 2 Researchers
- RWTH: 1 Researcher
- LSBU: 2 Researchers

The online participations were from:

- IzTech: 1 ESR
- HKTM: 1 researcher
- MCI: 2 researchers

An external party from KUKA Robotics was invited to inform the project group on sustainability issues tackled by the robotics industry.

Two presentations on “Sustainability in POLITO” and “Gender Equality Diversity Inclusion in STEM University” took place for the training of IzTech researchers on sustainability and gender equality practices in a center of excellence, POLITO.

In the next page, the schedule of the WoS is given. Following the schedule information, the Sustainability Goals of the TWIN-IT-ROMANS project is defined as they were agreed upon during the WoS. Finally, the draft schedule of the Summer School to be organize during Summer 2025 is presented.

Schedule of the Workshop on Sustainability @ Torino

DAY-1: 5 February 2025 Wednesday		
13:30 – 13:45	Introduction	POLITO
13:45 – 15:15	Good practices on sustainability	All Partners
15:15 – 15:45	30 Minutes Coffee Break	
15:45 – 16:15	Sustainability on manufacturing	Halil TETIK (IZTECH) Büşra KARAŞ (IZTECH)
16:15 – 16:45	Design requirements and sustainability aims of the project	Halil TETIK (IZTECH) Büşra KARAŞ (IZTECH)
16:45 – 17:30	Sustainability: opportunities for the project	Moderated by Giuseppe QUAGLIA (POLITO)
~ 19:30	Dinner	

DAY-2: 6 February 2025 Thursday		
09:15-09:30	State of art related to ESR 1 - Manufacturing process	Büşra KARAŞ (IZTECH)
09:30-9:45	State of art related to ESR 2 - Path planning	Gizem Merve GÜNDÜZ (IZTECH)
9:45-10:00	State of art related to ESR 3 - Quality control	Hasan CEZAYIRLI (IZTECH)
10:00-10:15	State of art related to ESR 4 - Tool head design & adaptable fixture	Berk KURT (IZTECH)
10:15-10:45	30 Minutes Coffee Break	
10:45-11:00	Design requirements related to ESR 1 - Manufacturing process	Büşra KARAŞ (IZTECH)
11:00-11:15	Discussion: on design requirements related to ESR 1 - Manufacturing process	Moderated by Alborz SHOKRANI (UBAH)
11:15-11:30	Design requirements related to ESR 2 - Path planning (~ 15 mins)	Gizem Merve GÜNDÜZ (IZTECH)
11:30-11:45	Discussion: on design requirements related to ESR 2 - Path planning (~ 15 mins)	Moderated by Burkhard CORVES (RWTH)
11:45-12:00	Design requirements related to ESR 3 - Quality control (~ 15 mins)	Hasan CEZAYIRLI (IZTECH)
12:00-12:15	Discussion: on design requirements related to ESR 3 - Quality control (~ 15 mins)	Moderated by Buğra ALKAN (LSBU)
12:15-12:30	Design requirements related to ESR 4 - Tool head (~ 15 mins)	Berk KURT (IZTECH)
12:30-12:45	Discussion: on design requirements related to ESR 4 - Tool head design (~ 15 mins)	Moderated by Andrea BOTTA (POLITO)
12:45-14:15	Lunch	
14:15-15:00	Sustainability at Polito	Patrizia LOMBARDI Vice Rector for Sustainable Campus and Living Lab
15:00-15:45	Gender Equality Diversity Inclusion in STEM University	Arianna MONTORSI Directress of center for Gender Studies
15:45-16:15	30 Minutes Coffee Break	
16:15-17:30	Kuka: robotics for sustainability	Alberto Pellero (Kuka) Head of business development Moderated by Can DEDE (IZTECH)
~ 19:30	Dinner	

DAY-3: 7 February 2025 Friday		
09:30-09:45	Presentation of the work to be carried out by ESR 1 during exchange	Alborz Sokrani (UBAH) Büşra Karaş (IZTECH)
09:45-10:00	Presentation of the work to be carried out by ESR 2 during exchange	Burkhard Corves (RWTH) Gökhan Kiper (IZTECH)
10:00-10:15	Presentation of the work to be carried out by ESR 3 during exchange	Buğra Alkan (LSBU) Halil Tetik (IZTECH)
10:15-10:30	Presentation of the work to be carried out by ESR 4 during exchange	Guiseppe Quaglia (POLITO) Can Dede (IZTECH)
10:30-11:00	Coffee Break (~ 30 mins)	
11:00-12:30	Focused group meetings	All Partners
12:30-14:00	Lunch	
14:00-15:00	Roundtable	All Partners
15:00-16:00	Summer School at MCI	MCI
16:00-17:00	Future projects proposals	All Partners
17:00-17:30	Concluding remarks	All Partners

Attendance information with photo

Sustainability goals set for the project

The TWIN-IT-ROMANS project is committed to advancing sustainability by integrating responsible practices into the hybrid robotic manufacturing system. During the workshop, partners presented their ongoing sustainability initiatives, exchanged best practices in responsible manufacturing and identified key challenges in implementing sustainable solutions. Discussions focused on aligning project objectives with United Nations Sustainable Development Goals, covering both technical sustainability and social inclusion aspects. As a result, the following sustainability goals for the TWIN-IT-ROMANS project were defined:

12 Ensure Sustainable Consumption and Production Patterns

Aligned with SDG 12, this project will aim to develop strategies to minimize material waste, improve energy efficiency and enhance the overall resource efficiency of the hybrid robotic manufacturing. Measurable sustainable targets will be defined with the help of key performance indicators below:

Raw material utilization rate: Percentage of raw material converted into the final product
Scrap rate: Percentage of defective parts per batch
Recycling rate: Percentage of materials reused or recycled in the system
Manufacturing cycle time: Time required to manufacture one unit

9 Build Resilient Infrastructure, Promote Inclusive and Sustainable Industrialization and Foster Innovation

13 Take urgent action to combat climate change and its impacts

Aligned with SDG 9 and 13, this project will aim to explore low-energy and environmentally friendly manufacturing processes for decarbonization efforts. To assess progress, the following KPIs will be tracked:

Energy consumption: The amount of energy consumed per part manufactured
CO2 emissions per unit produced: Direct emissions associated with production
Total greenhouse gas emissions (cradle to gate): a life cycle assessment metric to quantify the overall environmental footprint

10 Reduce Inequality Within and Among Countries

5 Achieve Gender Equality and Empower All Women and Girls

Aligned with SDG 5 and 10, this project prioritizes diversity, inclusion and equitable access to advanced engineering technologies. The following KPIs will ensure meaningful engagement with underrepresented communities:

Outreach activities: number of educational and training activities engaging researchers, students and professionals from diverse backgrounds
Ease of use: time required for an operator with a minimal technical expertise to learn how to use the system
Gender participation rate: Percentage of female researchers, engineers, and students involved in the project.

Summer School Draft Program

The draft program and the dates of the Summer School is discussed during the workshop. The summer school will be organized by the project partner MCI during the dates 26th of July – 3rd of August, 2025. The summer school will take place in the facilities of MCI at Innsbruck, Austria. The summer school will include the following lectures and events:

- Lectures on robot kinematics by Burkhard Corves (RWTH) and Gökhan Kiper (IzTech)
- Lectures on digital twins by Buğra Alkan (LSBU)
- Lectures on sustainable manufacturing by Alborz Shokrani (UBAH)
- Lectures on additive manufacturing by Halil Tetik (IzTech)
- Lectures on soft robotics by Giuseppe Quaglia (POLITO)
- Lectures on human-robot interaction by M. İ. Can Dede (IzTech)
- Lectures on Beckhoff automation systems by MCI
- Lectures on robot assisted milling operation
- Lectures on robot assisted additive manufacturing
- Lectures on online programming of a collaborative robot arm
- Lectures on offline programming of a collaborative robot arm
- A visit to a company that uses large scale robot milling operation

These topics will be finalized and their schedule will be set in the next months before June, 2025. The summer school will be open for external parties to join.