

Contributing to the digital transformation of manufacturing SMEs

PARTNERSHIP



Background

» [Conteúdo deste minisite em português](#)

For the past several years, the **Universidad de Matanzas** - UM (Cuba), through its Centro de Estudio de Fabricación Avanzada y Sostenible (Centre for Advanced and Sustainable Manufacturing Studies - CEFAS), has collaborated with bilateral academic and scientific initiatives on advanced manufacturing methods with the other Partnership entities, producing a significant number of papers at international scientific events and articles in specialised journals, as well as co-authoring doctoral theses.

With the **Centro de Automática y Robótica** (Centre for Automation and Robotics - CAR) of the Universidad Politécnica de Madrid - UPM (Spain) - Centro Superior de Investigaciones Científicas (Spanish National Research Council - CSIC), this collaboration included several study visits, thus enabling the exchange of in-depth knowledge between the two institutions.

With the **Universidad Autónoma de Nuevo León** - UANL (Mexico), in particular the Facultad de Ingeniería Mecánica y Eléctrica (School of Mechanical and Electrical Engineering - FIME) and the **Centro Universitario Teresa D'Ávila** (UNIFATEA), several study visits also took place, and the collaboration framework was formally endorsed through inter-university partnership agreements.

In addition to their renowned academic and scientific excellence, CAR, UANL and UNIFATEA are known for their permanent dialogue and interaction with the business sector and industry in their respective contexts; adapting their academic and research strategies to the challenges and demands of the business sector, while involving the entire university community in the process.

Faced with the challenge posed by the current process of transformation of the Cuban economy and the opportunities presented in the new legislation on SMEs, industrial SMEs were called upon to move towards the transformation of their manufacturing processes in order to become more sustainable and more competitive. In this context, the UM sought to take a step forward and contribute to this challenge on a national scale, using its line of research 'Sustainable manufacturing for SMEs' as a blueprint.

To this end, its relationship with the aforementioned academic entities has been strengthened, having opted for the creation of a partnership that will add value to the mutually beneficial bilateral collaboration currently in place.

Entities and roles

BENEFICIARY ENTITIES



Universidad de Matanzas

Cuba

FIRST PROVIDER ENTITIES



[Universidad Autónoma de Nuevo León](#) [Centro Universitário Teresa D'Ávila](#)

Mexico

Brazil

SECOND PROVIDER ENTITIES



[Centro de Automática y Robótica \(UPM-CSIC\)](#)

Spain

Development challenges

Thanks to this Triangular Cooperation Initiative, the University of Matanzas (UM) was able to maximise all of the knowledge and experience of the Centro de Automática y Robótica (CAR), the Universidad Autónoma de Nuevo León (UANL) and the Centro Universitário Teresa D'Ávila (UNIFATEA) in interacting with the business sector and industry, as well as adapting academic plans and research strategies, in order to lend its academic expertise to the current process of economic transformation in Cuba.

In particular, CAR's cutting-edge, state-of-the-art research (largely due to its participation in several advanced European Union research projects) was combined with research from the UANL and UNIFATEA, and specifically adapted to respond to the challenges of less technologically developed contexts, in order to find joint solutions that are pertinent to the UM and Cuba.

As a result of this triangular approach, the UM now has greater capacity for dialogue and coordination between the academic sector and the other sectors. This will help identify the digital transformation needs, as the first step towards the development of advanced technological solutions for manufacturing processes, including digital transformation processes for manufacturing SMEs. The aim is to generate a

model that can be applied in the rest of the country. In turn, this experience has placed the UM at the centre of a highly relevant topic, making the university a leader in this field at the national level.

At the same time, this exercise provided the other entities with a vision and insights regarding less technologically developed contexts, which will allow them to join forces and contribute to additional scientific and inter-university cooperation processes in other countries in Latin America and the Caribbean, as well as in other regions.

It is also worth highlighting a number of representatives of SMEs in the province of Matanzas as key actors in this initiative, both from the manufacturing sector and other areas, who have participated in various activities and contributed to promoting dialogue with the business sector from the outset. It is also worth highlighting the follow-up and support of several Cuban authorities in charge of public policies to stimulate SMEs, who have shown a great deal of interest in this process. As a result, they will give momentum to scaling up the initiative at the national level.

INITIATIVE

» [Conteúdo deste minisite em português](#)

This Triangular Cooperation Initiative strengthened the capacities of the Partnership member entities to engage in dialogue with the business sector, and to respond to their needs related to manufacturing processes, particularly in terms of the digital transformation processes of manufacturing SMEs, thus positioning the university as a key player in the productive sector and in sustainable economic growth.

Triangular approach

There is broad consensus on the importance of SMEs in the process of transforming the Cuban economy, and there is an urgent need for them to adapt to the new legislation and new economic, social and environmental challenges. Specifically, in the case of manufacturing SMEs, their transformation towards digital manufacturing processes must be addressed, aiming for greater productive capacity through more sustainable and competitive manufacturing methods.

The Initiative tapped into the knowledge and expertise of European and Latin American academic institutions that have extensive experience in engaging in dialogue and fostering synergies with the business sector. In the search for adapted technological solutions, the Universidad de Matanzas was able to benefit from this knowledge, enabling it to contribute effectively to the challenges of transforming the Cuban economy and promoting the sustainable economic growth of the province and the entire country.

The entire exercise has led to valuable insights for the other Partnership entities, which they can apply to their own processes as well as to other scientific cooperation activities in contexts similar to those of the UM.

Sectoral approach - Contribution to the 2030 Agenda

PRIMARY SDG



Goal 8.1 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries

Goal 8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors

SECONDARY SDG



Goal 9.2 Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries

ADELANTE SDG

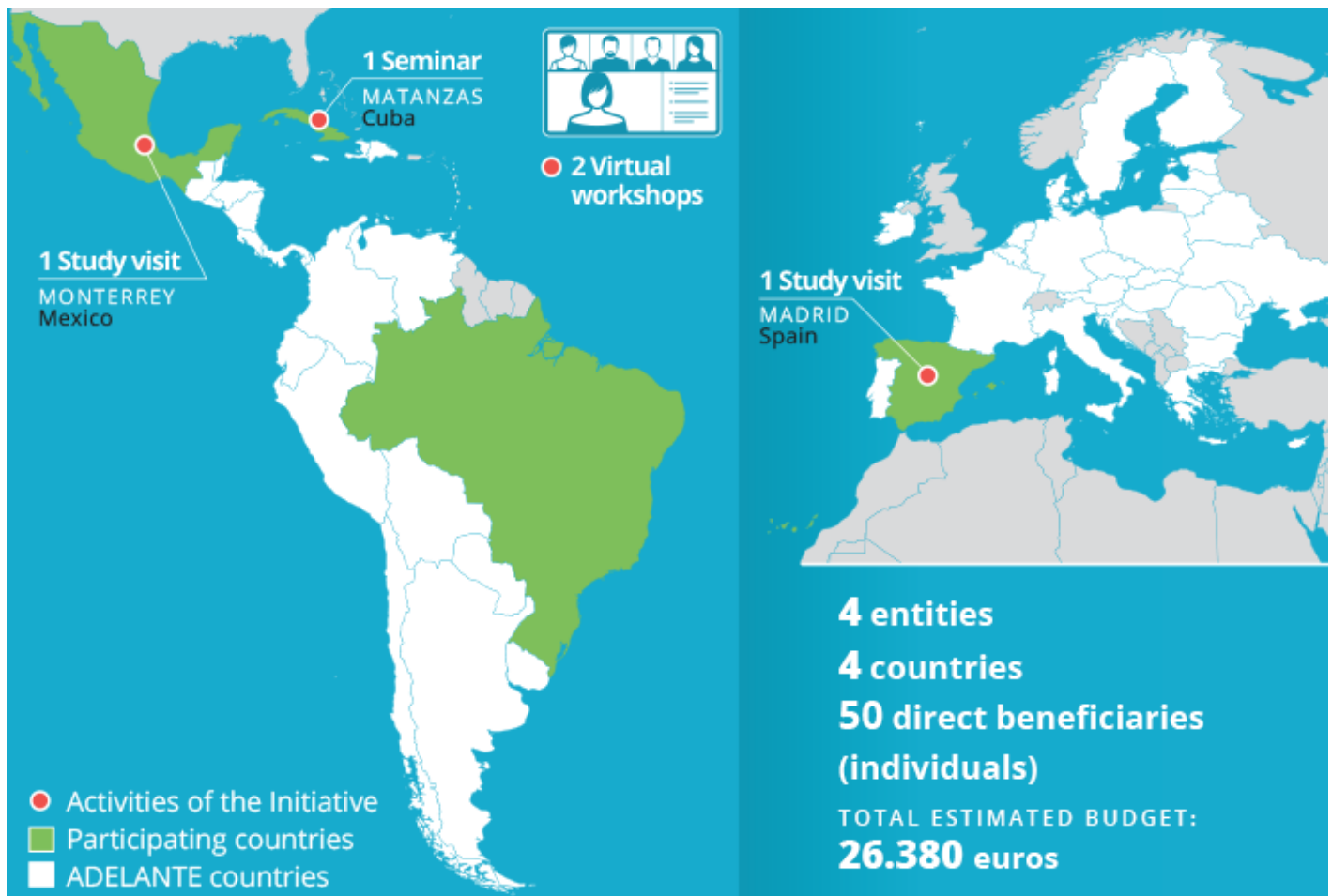


Goal 10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status



Goal 17.9 Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the sustainable development goals, including through North-South, South-South and triangular cooperation

Territorial approach



Intervention methodology

From a scientific point of view, the intervention methodology of this Initiative was based on the joint work between professors and researchers of the Partnership entities, with the two study visits providing a significant added value. From the outset, the experience of the Partnership entities highlighted the importance of engaging in dialogue and liaising with the business sector, which is why a specific activity was planned to foster this type of interaction, in addition to setting aside time for dialogue with SME representatives in the context of the more specialised activities.

The Initiative kicked off with an internal virtual **workshop**, providing a glimpse of the potential of each of the entities and directing their efforts towards addressing the challenges of the UM.

After a fine-tuning exercise of the Initiative's activities, carried out in the initial workshop, a **seminar** was held in a hybrid format with representatives of Cuban SMEs from the manufacturing sector and other areas. It was highly useful to learn first-hand about their current situation, their challenges, expectations and potential contribution to the process, to harness the full potential of the Partnership entities and to remain fully aligned with the current and short-term needs of Cuban SMEs. Business representatives from the other Partnership countries also participated virtually, sharing their transformation experiences and lessons learnt through peer-to-peer exchange.

The seminar aimed to ensure that Cuban decision-makers involved in public policies to support SMEs could maximise all of the insights and knowledge, and apply it throughout the country. To this end, the authorities

working in this area also participated in these efforts.

Building on the results of these two previous activities, **two highly specialised study visits** took place. The first visit was made to the Centro de Automática y Robótica (CAR) of the Universidad Politécnica de Madrid (UPM) / Centro Superior de Investigaciones Científicas (CSIC) in Madrid, while the second was made to the Universidad Autónoma de Nuevo León (UANL) in Monterrey.

The visit to the Centre for Automation and Robotics (CAR) focused on enabling technologies based on robotics and artificial intelligence, featuring a state-of-the-art platform for digital transformation. The visit to UNAL focused on tools and technologies for additive manufacturing (3D printing), as well as methods of metrology and quality control of the products obtained through these methods. In addition, each of the visits included direct dialogue and on-site visits with business sector representatives who had previously participated in the seminar.

To complete the Initiative, a new **workshop** was held, with the aim of consolidating and systematising the knowledge generated, both in terms of dialogue with the business sector and the technological solutions for manufacturing processes. As a result, specific materials with general guidelines were produced to continue developing instruments that help identify the needs of SMEs.

The workshop also served to consolidate the relationship between the Partnership entities, which was further strengthened through the study visits. This served as the first step towards forging a stable relationship, as well as fostering collaboration and development that is useful for all involved, with the possibility of an 'Ibero-American network to support the digital transformation of small and medium-sized enterprises' on the horizon.

Direct beneficiaries (individuals)

According to Rule 9 of the Guidelines for Applicants: all persons participating in the activities of the Initiative.

The Initiative had **41 direct beneficiaries** from three different groups: professors and researchers from the academic sector of all the Partnership entities, who participated consistently in all the planned activities (approximately 18), along with representatives of manufacturing SMEs in the province of Matanzas (approximately 20), and Cuban authorities in charge of public policies to promote SMEs (approximately 3).

It is worth noting that the study visits and the seminar provided opportunities for exchange with the business sector in Cuba, Mexico and Spain, allowing for the participation of 37 people from the business sector in the study visits. In addition, 8 self-employed individuals and entrepreneurs participated, as well as 6 individuals from MYPIME and non-agricultural cooperatives and 9 individuals from various levels of the government.

Budget

EU contribution: 16,056.29 €

Co-financing - Triangular Cooperation Partnership: 6,816.97 €

Total budget: 22,873.26 €

IMPACT

The information gathered in this IMPACT section is the result of the first **'joint ex post analysis exercise'** of the Initiative which, as foreseen in the policy framework of the ADELANTE Window, took place **one year after the end of the implementation period**.

For more information on these exercises, please consult the [ADELANTE Window 2021 Impact Report](#).

Continuity of the Partnership

STARTING POINT: Existing North-South and South-South relationship that was strengthened by the combination of both modalities (the Beneficiary entity being the unifying partner).

The Partnership, as such, has been strengthened and maintained over time.

The dynamic of collaboration and joint work between all the Partnership member entities in the core areas of the Initiative has been maintained.

In addition, new entities are in the process of being incorporated.

Application of generated knowledge

The knowledge generated has been applied by the Beneficiary entity.

This application of knowledge has allowed them to lead important processes at the regional and national level, as well as the development and dissemination of numerous academic and specialised initiatives.

 **Agreement with the Scientific and Technological Park of Matanzas for the creation of a small and medium-sized enterprise (SME) providing 3D services for the biomedical sector.**

 **Award from the Territorial Delegation of the Ministry of Science, Technology, and the Environment of Cuba.**

During its implementation, the Initiative involved final beneficiaries (SMEs in the region).

The Beneficiary entity has maintained and even reinforced a close working relationship with these groups, who have benefited and have applied the knowledge generated during the Initiative and afterwards.

 **Technological initiatives in four SMEs in the region.**

Impact

Applying this knowledge has enabled the Beneficiary entity to successfully tackle the development challenge that gave rise to the Initiative, with the necessary quality and guarantees.

FACTORS THAT HAVE ENABLED THE IMPACT:

The relevance of the knowledge generated as a response to the challenges of the Beneficiary entity.

The relevant partnership framework designed during the implementation of the Initiative. The establishment of lines of action with a timeframe beyond the implementation period.

FACTORS THAT HAVE HINDERED IMPACT:

The complex socio-economic situation in the beneficiary country.

Future perspectives

Continue the Partnership's work dynamics and openness towards new entities.

Keep up the momentum of applying the knowledge generated by the Beneficiary entities.

Continue to make progress in the transfer of knowledge to the beneficiary groups, monitoring and evaluating the impact in their respective areas of intervention.

Maintain the communication and visibility dynamics associated with the ADELANTE Window as a guarantee of quality.

NEW EX POST EXERCISE:

Yes (2024)