

FINAL REPORT ON SEED-FUNDED PROJECT

Digital Manufacturing Impact on Desirable Management of Production Process

The Team:

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Project Duration: September 2022 – August 2023

The Project -- Layperson's Description:

Digital manufacturing, designing at the “speed of thought,” enables the flexibility to respond expeditiously to evolving needs. This is good. However, speed is not necessarily better: it creates the risk of management thrashing about uncontrollably. We need a new paradigm for planning and managing production that will implement flexibility effectively.

Our MIT-Portugal team proposes to build on our history of collaboration to define a follow-up research program into the most desirable strategies to transition industry efficiently to digital manufacturing. It will integrate design procedures to identify significant uncertainties, define design and management flexibilities, and implement desirable future production processes.

Project Context

Associated with its Covid recovery process, the European Union granted Portugal very significant sums of money to engage in digital transformation of industry, to invest in what in Europe is commonly referred to as “Industry 4.0”.

The underlying concept of the seed-funded project was to ride the wave of the anticipated digitization efforts, to set up collaboration with industry associations, and to define coherent projects to learn from the expected approaches to implementation.

Project Activities

The MIT team spent a lot of time in Portugal, working with our Portuguese partners to identify both existing and expected digitization efforts in manufacturing, and industrial partners with whom we could collaborate. Specifically, we spent approximately 9 person-weeks in country, mostly based in Porto, but also in Lisbon.

Our more tangible achievement was to build up our relationship with INESC TEC -- Institute for Systems and Computer Engineering, Technology and Science, University of Porto, which is the leading academic based organization for applied research in Portugal. This should be a continuing mutual benefit, and indeed we are expecting professional visits to MIT from both Portuguese team members after the end of the project, specifically in November 2023.

Our second achievement was to establish the basis for an ongoing collaboration with PRODUTECH, which is a network cluster of more than 70 members of Production Technology stakeholders, deploying advanced manufacturing solutions and equipping the current factories for the future. Its mission is to promote the sustainable development and internationalization of the Portuguese industry of manufacturing technologies. (<http://www.produtech.org/>).

However, the anticipated “wave of digitization projects” has not been occurring. The distribution of the money for this general process has not been flowing to industry and practice. While digitization efforts may well gather momentum in 2023/24, the collaboration with industrial partners to understand the possibilities for effective implementation was not imminent by the end of the initial project.

Our team was prepared to further build on the possibilities for a second year. Given that conditions on the ground were not favorable, we understand why this option was not funded.