

European Service Network of Mathematics for Industry and Innovation (EU-MATHS-IN)

Strategy Document

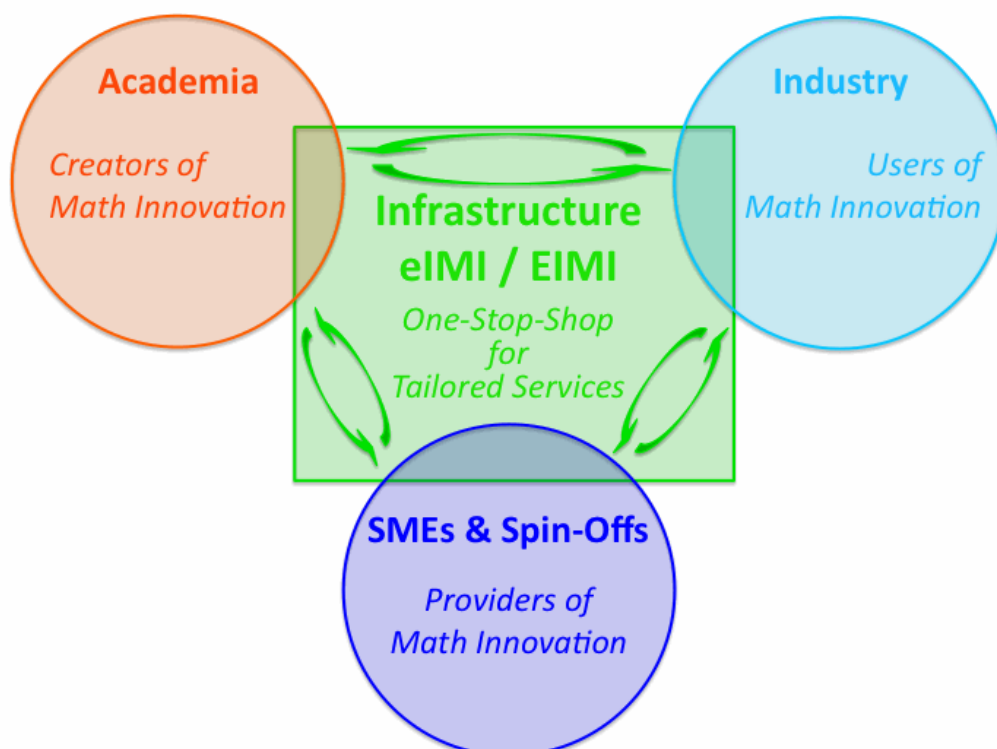
Background: To leverage the impact of mathematics on innovations in key technologies it requires *enhanced communication and information exchanges* between the following categories of key players:

- R&D-staff in industry, science and society (i.e. the end-users of mathematical tools and expertises);
- Mathematicians in academia (i.e. the creators of novel mathematical tools and expertises);
- SMEs and spin-off companies with large mathematical content in their products and activities (i.e. the missing link between “creators” and “end-users” that transform mathematical innovations from academia into production-level software to be provided to industry).

Furthermore, as the challenges to be dealt with are increasingly complex and multi-faceted, the *integration* on a European level of a large variety of mathematical expertises from different institutes is required.

Mission Statement and Aims:

EU-MATHS-IN aims to leverage the impact of mathematics on innovations in key technologies by enhanced communication and information exchange between and among the involved stakeholders on a European level. It shall become a *dedicated one-stop shop* to coordinate and facilitate the required exchanges in the field of application-driven mathematical research and its exploitation for innovations in industry, science and society. For this it shall build an *e-infrastructure* that provides tailored access to information and facilitates communication and exchange by player-specific sets of *services*. It will *act as facilitator, translator, educator and link* between and among the various players and their communities in Europe.



More specifically, EU-MATHS-IN pursues the following long-term goals:

- a. Establish strategic connections among the national networks and centers working in the field of industrial mathematics and mathematics for innovation;
- b. Create a European service unit that can foster the competitive advantage of the European industry through international cooperation;
- c. Promote the technological aspects of mathematics raising public awareness;
- d. Stimulate the cooperation at European level of mathematical research with companies and administrations;
- e. Establish a one-stop-shop at European level for industrial users of mathematical scientific research results;
- f. Provide European industry, in particular SMEs, with a competitive advantage taking profit of the scientific excellence of the continent (give Europe the possibility to cash a “scientific dividend”);
- g. Acquire funding for the performance of activities that serve the realisation of the Association’s aims.

Service Portfolio:

EU-MATHS-IN may undertake, alone or in collaboration with third parties, directly or indirectly, all activities directly or indirectly related to the realisation of its purpose and aims.

Potential activities may include but are not limited to the following items:

- a. Online platform providing the following information (*Yellow Pages* of mathematics for innovation / industrial mathematics):
 - What kind of mathematical methods are suited and/or available for the various kinds of real-world challenges?
 - What kind of real-world (technological) challenges are (mathematical) solutions being sought for?
 - Who can provide which kind of mathematical expertise?
 - What kinds of algorithms, codes and software can be found where (both in academia and in industry)? Thus creating a physical or virtual repository for numerical software and computational codes.
- b. Online depository (or integrated online access to a variety of existing depositories) of preprints and technical reports relevant to application-driven mathematics for innovation, including an open [peer review](#) “MATH in Industry” ArXiv that also documents a summary of success stories of industry collaborations. [\(complementing the ECMI Journal of Mathematics in Industry\)](#);
- c. Online job market place covering supply and demand in both academia and industry;
- d. Online maintenance framework for mathematical tools, algorithms, codes and software;
- e. Facilitate definition and promotion of standards for mathematical methods, software and algorithms to support exchange and sharing of these;
- f. Create an ontology of SME’s and spin-off companies with large mathematical content in their methods and activities to allow for enhanced know-how transfer, market access and business opportunities by standardised ontology, documentation, quality management and benchmarking;
- g. Networking and community building both among and between the various stakeholder communities to share expertises, methods, codes and projects;
- h. Facilitate the team-up of different groups at different institutes in different countries to come to the required integration of distributed mathematical expertises;
- i. Online support for researchers, their communities and industrial R&D for fund acquisition for joint projects (including match-making facilities);
- j. Continuous professional development services for mathematicians in industry;

- k. Content and services to integrate application-oriented mathematics in academic mathematical curricula;
- l. Dissemination activities;
- m. Promotion of the role and potential contributions of mathematics to innovation and to key technological and societal challenges (lobbying and policy advice);
- n. Cooperation and support of ECMI activities in the field of training (ECMI modelling weeks, ECMI Master Degree in Industrial Mathematics, PhD in Industrial Mathematics);
- o. Cooperation with the Applied Mathematics Committee of EMS in proposing/organising EMS Lectures, EMS Mathematical weekends, EMS Summer Schools and other activities having the aim of involving the whole mathematical community in problems posed by industrial and scientific innovation;
- p. Periodical organisational conferences (to be organized each time at a different node of the network) gathering representatives of all members;
- q. Host initiatives, projects or organisations under the legal and fiscal responsibility of the Association and administer such hosted initiatives, projects or organisations, including, but not limited to, employing staff servicing such initiatives, projects or organisations;
- r. Create separate legal entities to develop other types of activities;
- s. Any other activity deemed to serve the realisation of the Association's purpose and aims.
- t. Cooperation with the ECMI council in promoting ECMI research activities especially the Special Interest Groups.
- s-u. Cooperation with the ECMI council in support of the European Study Groups with Industry ESGIs and the biennial ECMI research conference.

The implementation of these activities shall be prioritised according to the needs and the availability of resources.

Short-term goals:

1. Set-up of EU-MATHS-IN portal.
2. Start job portal.
3. Start thematic software depositories.
4. Continuing Professional Development Exchange Market.
5. Continuation of "Success Stories in Industrial Math"