AMable

Eco-Sytem Description & Connection Guide

Exploit AM to the full

Whether you're an entry-level or advanced user; our mission is to help overcome the challenges you face to make your vision a reality. AMable is an innovative eco-system that provides access to finance and technical guidance to European SMEs and mid-caps for their uptake of Additive Manufacturing (AM).

Get involved and see what is in it for you.

Talk to us. We are here to help.

Expertise	Postion in value chain	Technology	Materials
•Aerospace •Automotive •Construction •Consumer goods •Electronics •Energy •Health •Industrial equipment •Tooling •Education •Defence •Oil & gas	•R & D •Service bureaus •OEMs •Materials provider •Software provider •Design •Business strategy & development •RTO •Education and training •Post-processing	•Powder bed fusion •Vat photo polymerisation •Material jetting •Material extrusion •Directed energy deposition •Binder jetting •Industrial data space •Cold-spray •Post-processing •Direct write technologies	•Metals •Polymers •Ceramics •Composites •Ceramics as MMC

What is AMable?

Today, we are a network of more than 20 expert partners spread across Europe in 10+ countries and growing. Together we form an additive manufacturing eco-system offering a range of services that can be tailored to specific needs. We can help guide company owners, designers and engineers through the AM value chain from product conception to printing of the final product.

We offer expertise in a wide range of AM technologies such as filament extrusion, powder bed fusion and direct energy deposition and across a variety of materials including polymers and metals. AMable aims to be fully technology-agnostic that is why we have experts for each technological area. Our aim is to:

- Support you through a sustainable, open-source eco-system to help your AM uptake
- Run idea assessments, business case evaluations, training & exhibition events to increase awareness of AM capabilities
- Provide a comprehensive range of AM technical, educational and business services to increase your AM competitiveness
- Support and develop “best in class” AM data handling tools and approaches, to ensure you are helping to lead the way in digital AM

Discover what AMable can do for you. Find out more about the AMable partners, the full range of services, about how to get access to finance and who we are in detail.

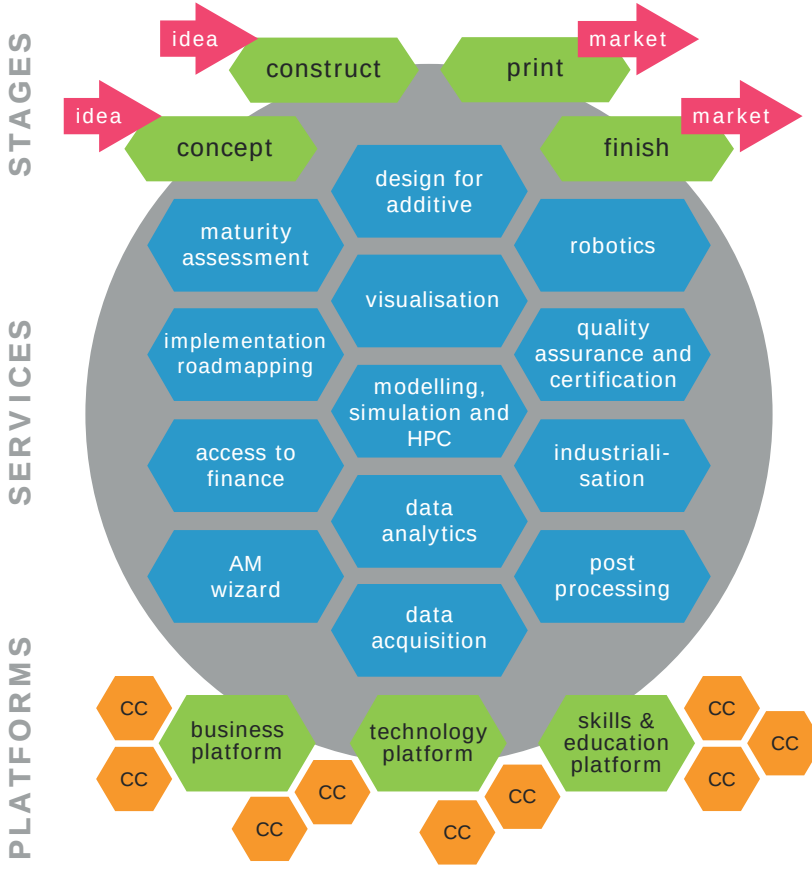
Get involved in this exciting new platform.

Who is AMable for?

Additive Manufacturing (AM) is a way to transform many aspects of product design and manufacture and add value to businesses. However, in many ways AM is still in its infancy when it comes to some industrial applications and uptake of AM, especially by SMEs and mid-caps can therefore be a challenge. In particular, the expense of investigating the full capabilities of AM and determining the feasibility of introducing AM into your business can be discouraging.

AMable aims to provide the expertise and support that will allow you to overcome these barriers. We have created a framework that offers education & training in key skills and provides access to expertise in a comprehensive range of AM technologies and platforms. We can assess your current capabilities and knowledge-base to provide you with tailor made services to help fast-track AM into your business. Our partners cover many different industries such as aerospace, automotive, oil & gas, consumer goods. Thus, they have a strong expertise in a variety of materials, AM technologies and different points in the AM value chain.

If you're a European SME or mid-cap and you're interested in incorporating AM into your business then AMable can help you do just that. We cover the full AM value chain so whether you're an entry-level or a more advanced user, we can help you make full use of AM.


STAGES
SERVICES
PLATFORMS
idea
construct
print
market
idea
concept
finish
market
design for additive
maturity assessment
robotics
visualisation
implementation roadmapping
quality assurance and certification
modelling, simulation and HPC
access to finance
industriali-sation
data analytics
AM wizard
post processing
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business platform
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skills & education platform
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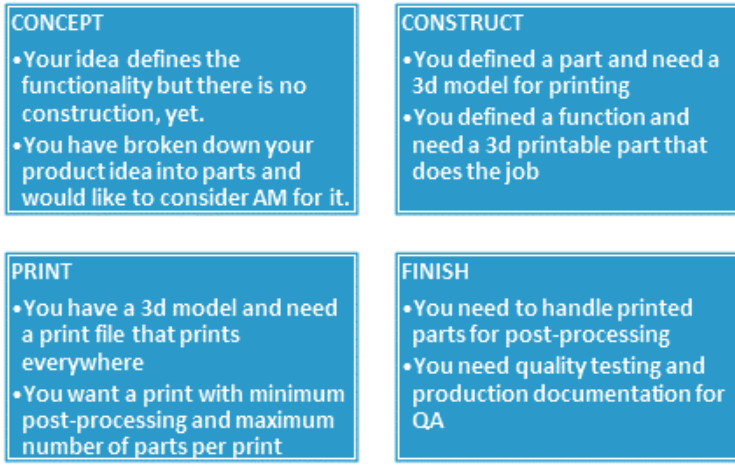
The AMable Eco System

Overview

AMable is a flexible and sustainable eco-system which covers the entire AM life-cycle from initial concept through to printing and finishing stages of a product. You can use this eco-system by sending us your idea for evaluation. We call this “idea assessment”. Once you have a solid idea, you can use services to develop this idea. Following that, you could utilise our ‘access to finance’ service for further funding.

The eco-system encompasses a wide set of offerings from the partners that are based on three platforms; BUSINESS, TECHNOLOGY and SKILLS & EDUCATION.

AMable has defined 4 key STAGES which act as entry points to the eco-system. We then help guide you through the different STAGES using our SERVICES, which are supported by the three PLATFORMS. These help us easily define your AM product maturity, what type of guidance and services you require and how they can be tailored to suit your needs. The platforms also allow us to link you to partners that are the best suited to bring your concept to market.



Stages

The STAGES are your entry point to best address your needs:

The concept stage deals with the very beginning of the AM product lifecycle – with your idea or innovation. We provide business case assessments to assess the market conditions of your product so that the economic viability becomes clear. We offer maturity assessment to determine the technological environment that you are in to identify the requirements for going into production. But, predominantly we discuss

the benefit of AM to your idea to drive the right design.

The construct stage transfers your design into a construction. It covers optimisation efforts to enable cost effective printing with a maximum level of quality. At this stage, simulation can be employed to predict functionality of the printed part before you print. It can also be used to simulate the printing process itself in order to optimise design for print speed and quality.

At the print stage we help you transfer your construction into a real part. After slicing, build simulations can be used to pinpoint and remedy any potential issues before they occur. With well specified material properties, proper handling of the base material and suitable process parameters, your quality requirements will be matched perfectly.

In the finish stage we help you to finalise your part. Requirements for such post processing that was identified during construct stage already are transferred to physical production chains here. Milling, grinding and drilling on the one hand and thermal treatment of the printed part will be aligned to automatic handling requirements and quality assurance processes for final validation.

Which stage do I need just now?

We can lead you through all 4 of the stages from concept to finish where necessary, but you can join the AMable eco-system at any of the four stages, depending upon your AM experience and AM maturity.

Defining which stage best applies to your situation allows us to connect you to the most suitable AMable partners and services.


Access to finance
Maturity Assessment
Implementation roadmap
Business Platform
AM Wizard
Visualisation
Design for AM
Data Analytics
Modelling, simulation and HPC
Robotics
Data Acquisition
Industrialisation
QA and path to certification
Materials for AM
Post-processing
Technology Platform
Experience Labs
Skills & education

AMable Platforms

Across AMable, we offer a variety of AM resources and experience. These are organised into 3 **PLATFORMS;** *Skills & Education, Technology* and *Business,* with the purpose of creating a European-wide framework which is simple to access and navigate. The services within each **PLATFORM** are easily tailored to your needs. We hand-select which AMable partner is best suited to help you in your experiment by matching your material and technology requirements. This means that you and your AM concept receives its own unique journey through to final product.

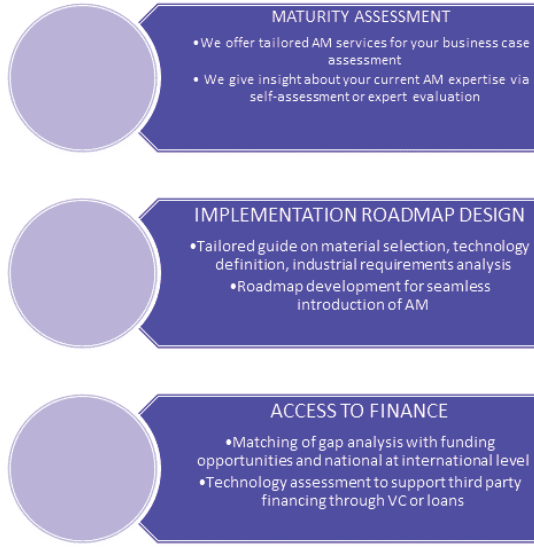
Business Platform

Introducing AM into a company portfolio or a new AM product the market can have a large impact on your business. Through the business platform we can assess the implications of AM within your business and the market requirements and ensure that you are able to take full advantage of what the technology can offer.

The platform is a collection of business-focussed resources provided by our partners including;

- Business case assessment
- Market research
- Compliance requirements
- Change management
- Recruitment, learning and training
- Supply chain management
- Resource allocation
- Operational efficiency/ capacity utilisation
- Support for implementation
- Technology roadmap
- Environment, health and safety
- Energy and waste management
- Quality Management
- Funding Roadmap
- Technology access

The resources are grouped together in our business oriented services which are; *business case assessment, maturity assessment, implementation roadmap design* and *access to finance.* These have been specially designed to accurately assess your current AM capabilities and help you develop AM specific business models.



Skills and Education Platform

The *Skills & Education* platform provides opportunities for training and education in AM topics to ensure your employees have all the required skills for successful uptake of AM. Together, the AMable partners have an extensive array of education and training resources across all AM disciplines from design through construction down to practical topics in technologies such as powder bed fusion, direct energy deposition and cold-spraying. We also have expertise across a wide variety of different equipment manufacturers.

AMable Experience Labs

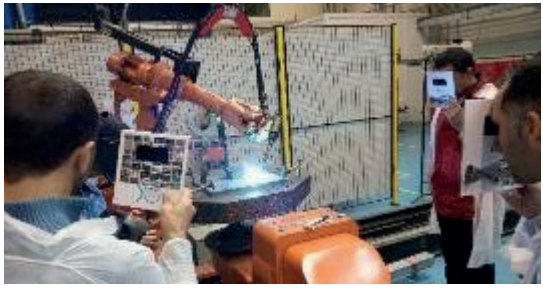
The AMable experience labs are important part of this training and are offered at entry-level or advanced so you can choose according to your expertise. The Experience Labs cover a wide variety of relevant topics, designed to introduce you to AM fundamentals as well as the implications for production. Previous topics included:

- Design for AM
- Modelling
- AM materials
- AM technologies
- Cost of printing

The experience labs are hosted at partner institutions across Europe and provide a combination of classroom teaching, hands-on activities and interaction with AM systems. The labs are run for small groups, meaning that there is time for more one-on-one discussion with the experts.

Due to the variety of host countries, the experience labs encourage cross-border collaboration and discussion, as it brings together SMEs from all across Europe. They also provide an opportunity for you to engage with potential experiment tutors or service providers.

AMable is continuously running Experience Labs at member centres. If you are interested in visiting one, then register at https://www.amable.eu/labs



Technology Platform

AM technology is rapidly developing, and our partners are at the cutting-edge of research and technology development in this area. Through AMable you will gain access to the experts in AM design, modelling, materials and more.

Currently, we have 11 AM technology-specific services which are key aspects to your successful uptake of AM. These cover the technical aspects of AM across all 4 of the eco-system stages from design of your product through to a pathway to certification. From the feedback you provide us we are always looking to add new services for you to use.

Two modes of service operation and support

AMable aims to support the uptake of AM. This uptake can be approached in two different ways: by learning and doing it yourself on the one hand or on the other by briefing and receiving a result.

For the first one, we provide services offerings in "skill-up" mode. This means that our service providers tell you how to do the job. They teach you how to use digital tools, they ask questions to guide you through the challenges that you are facing. This includes for example the discussion about potential market segments and sales volumes for your anticipated product under the business platform. On the technology platform, this will probably touch on the selection of suitable materials, potential implementation paths for a design

AM DECISION SUPPORT WIZARD

Rapid assessment of a pre-existing design to see if it's viable to produce via AM

DESIGN FOR AM

Enable creation of an Additively ManufacturABLE part by exploiting AM capabilities

VISUALISATION

Pre-assessment of product design to visualise final product before production

MODELLING, SIMULATION & HPC

Simulation of AM processes for "first-time-right" printing

DATA ANALYTICS

Capture and interpretation of AM build data to improve manufacturing lifecycle

DATA ACQUISITION

Measurement and consolidation of data throughout the AM process chain to help Quality Assurance (QA)

ROBOTICS

Access to LMD robot cells for manufacturing large parts

INDUSTRIALISATION

Upscaling of AM from a few prototypes to full-scale series production

QUALITY ASSURANCE AND CERTIFICATION

Assurance that AM products meet necessary QA and certification requirements

POST-PROCESSING

Guidance on post-processing of AM parts such as machining and mechanical testing

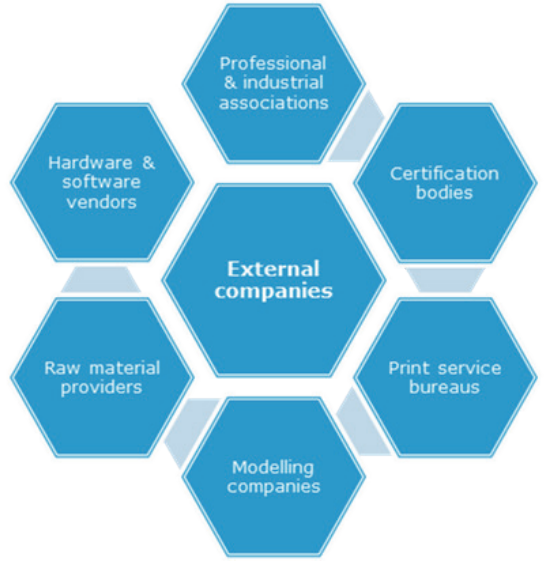
Materials for AM

Improve understanding of raw material requirements, processability and AM material properties

or questions about the functional definition of your part. Here, the increase of your knowledge and capability is the result of the service.
This service type is mostly delivered by the research and technology development partners.

The second type of service offerings is the solution service. This is where experts discuss the definition of the challenge in order to arrive at a sort of specification for the service outcome. If you define a functionality of a part together with the boundary conditions that the product needs to fulfil, the experts will sit down and present you the solution. Here, the solution is the service's result.
This service type is delivered predominantly by commercial parties such as companies and bureaus.

Having these direct links to stakeholders maximises the potential and reach of your business and product idea. This may be useful to SMEs pursuing certification of their process or product idea.



Things to follow

Ready to go ahead with your AM related challenge? Then use the following entry points:

AMable Cases

Scroll through our cases section on the web site to get an overview of the challenges that European SMEs are tackling with the help of AMable. Send us your questions about the ideas and we will bring you into contact with those people.

www.amable.eu/cases

AMable Services Arena

Enter the AMable Services Arena. Here you find all services that we offer. You have to make just three decisions:

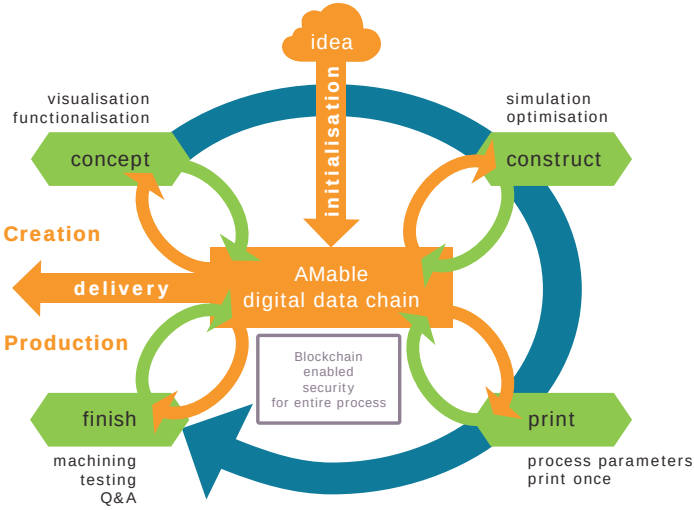
- Select the service mode: If you want to learn, use the “skill-up ” mode for the services, if you just want to get things done, request the “solution” mode.
- Select the entry stage: If you consider your idea to be mature, enter at the ‘construct’ stage. If you have a construction that is print ready, then enter at ‘print’ stage. If you are unsure, tell us what you have and we will help.
- Select the platform: Decide if your challenge is in the business or technology domain or if you need dedicated training in an AM related area.

www.amable.eu/services

AMable Digital Data Chain

Take a look at the AMable Digital Data Chain . If you are worried about data security that is associated with your digital production data from design to print file, from construction to quality assurance, then check out the availability of the AMable IDS Connectors and the AMable Blockchain.

We are developing a digital eco-system that provides continuous documentation and secure transfer of data. Once you rund a service, each registered AMable IDS Connector is able to transfer data between the contract partners. This ensures that you share data only with those that need the data.



If you want tamper-proof documentation of the existence of a file, then you can use your AMable IDS Connector in conjunction with our Blockchain. This Blockchain is hosted at multiple research centers as trusted entities. Once you run a file through the connector, you can choose to store its finger print (hash-key). You do not share your file with anyone, but you document that this specific file was there.

Take command of your data. Check the availability of your personal AMable IDS Connector.

www.amable.eu/data

AMable Calls

AMable currently has calls for product ideas to support the development and uptake of innovations. Check out the calls section if you are looking for support on specific challenges.

www.amable.eu/calls

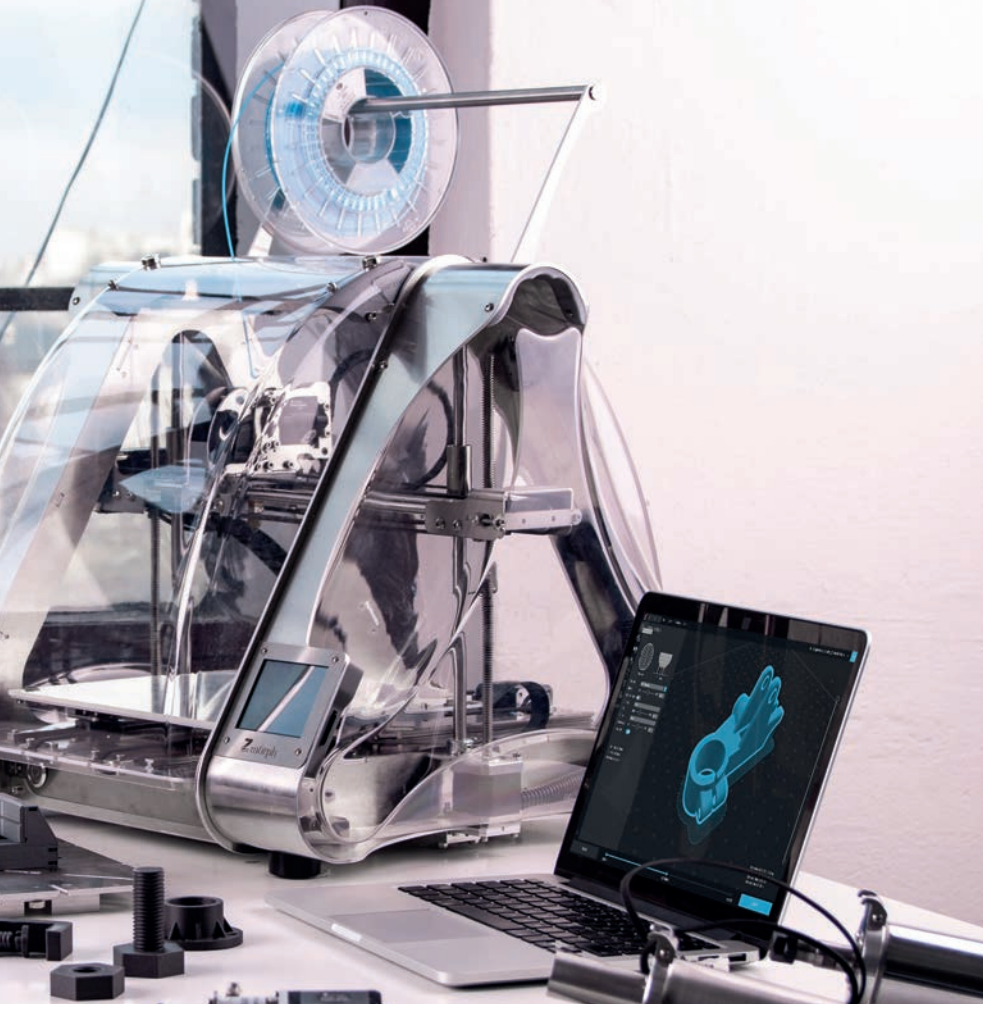
AMable Experience Labs

All the partners of AMable offer AMable Experience Labs on a regular basis across different sites in Europe. If you want to learn about AM in a seminar style event, where you even can bring your own idea and discuss this with experts and colleagues, then check out the event calendar in the labs section.

www.amable.eu/labs

Resume

AMable offers an environment where ideas can grow. You transfer your first sketch through the AMable Digital Data Chain to discuss it with experts. As you go, you easily document your results in the Blockchain. Numerous services at all stages of the product evolution are there to support you.



Use the entry point through the AMable Experience Labs to get you hands on. Our Business case assessments ensure a solid base for your investment. Industrialisation takes you where you aim for. All of that connected in one eco-system.

Talk to us. We support you.

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