AMable Open Call

Supporting SMEs in the uptake of Additive Manufacturing

Call for Proposals

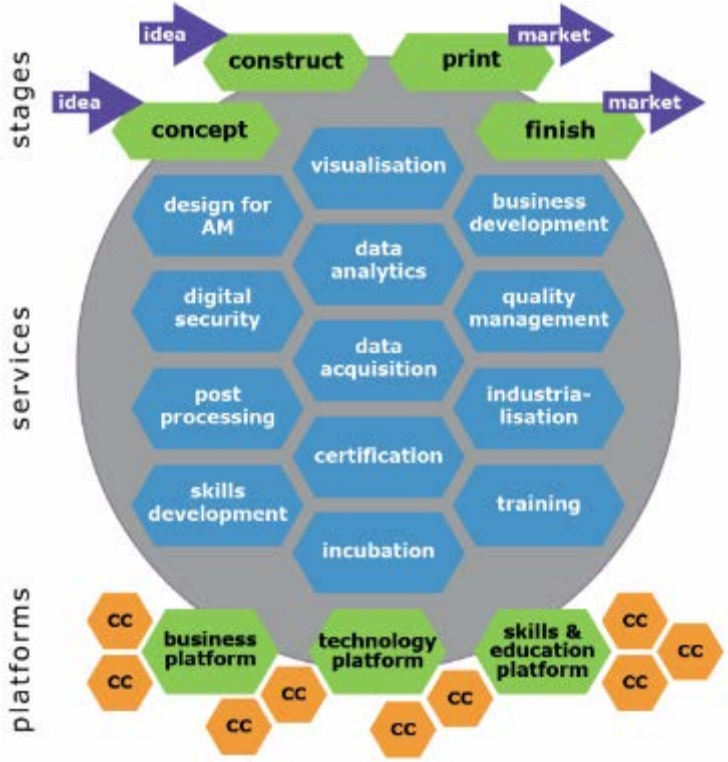
Upcoming Opportunities

06.06.2019

Digital additive manufacturing innovation hub for services from idea to market

(iv) Digital design for additive Manufacturing: Supporting the broad uptake of innovative additive manufacturing equipment and processes particularly focusing on the link between design tools and production, changes in business models, process chains and stakeholder relations.

AMable Services Arena



AMable

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AMable – Digital Additive Manufacturing Innovation Hub

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AMable – Digital Additive Manufacturing Innovation Hub

Project Objectives – Aims

- Create a community of securely and transparently connected Digital Innovation HUBs to provide a complete digital orchestra
- Evolute a set of complementary competence centers to source knowledge from regions to regions
- Develop a services arena with design brokerage, construction support and training to provide a fast track to production
- Provide business development support to enable early identification of high potential solutions
- Support the uptake of AM for functional parts in metals and plastics

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Core Consortium

Digital Design for Additive Competence Centres

Fraunhofer ILT
Fraunhofer ISST
aimen CENTRO TECNOLÓGICO
DANISH TECHNOLOGICAL INSTITUTE
FREDERICK RESEARCH CENTER
inspire
IK4 LORTEK Research Alliance
LMS Laboratory for Manufacturing Systems & Automation
mtc Manufacturing Technology Centre
POLITECNICO DI TORINO
sirris driving industry by technology
Scuola universitaria professionale della Svizzera italiana SUPSI
TNO innovation for life
TWI
VTT
Politechnika Wrocławska

Data Management

INDUSTRIAL DATA SPACE ASSOCIATION

Business Analysis and Consultancy Innovation

Keen Bull
strategy&
zabala innovation consulting

Training

EWF

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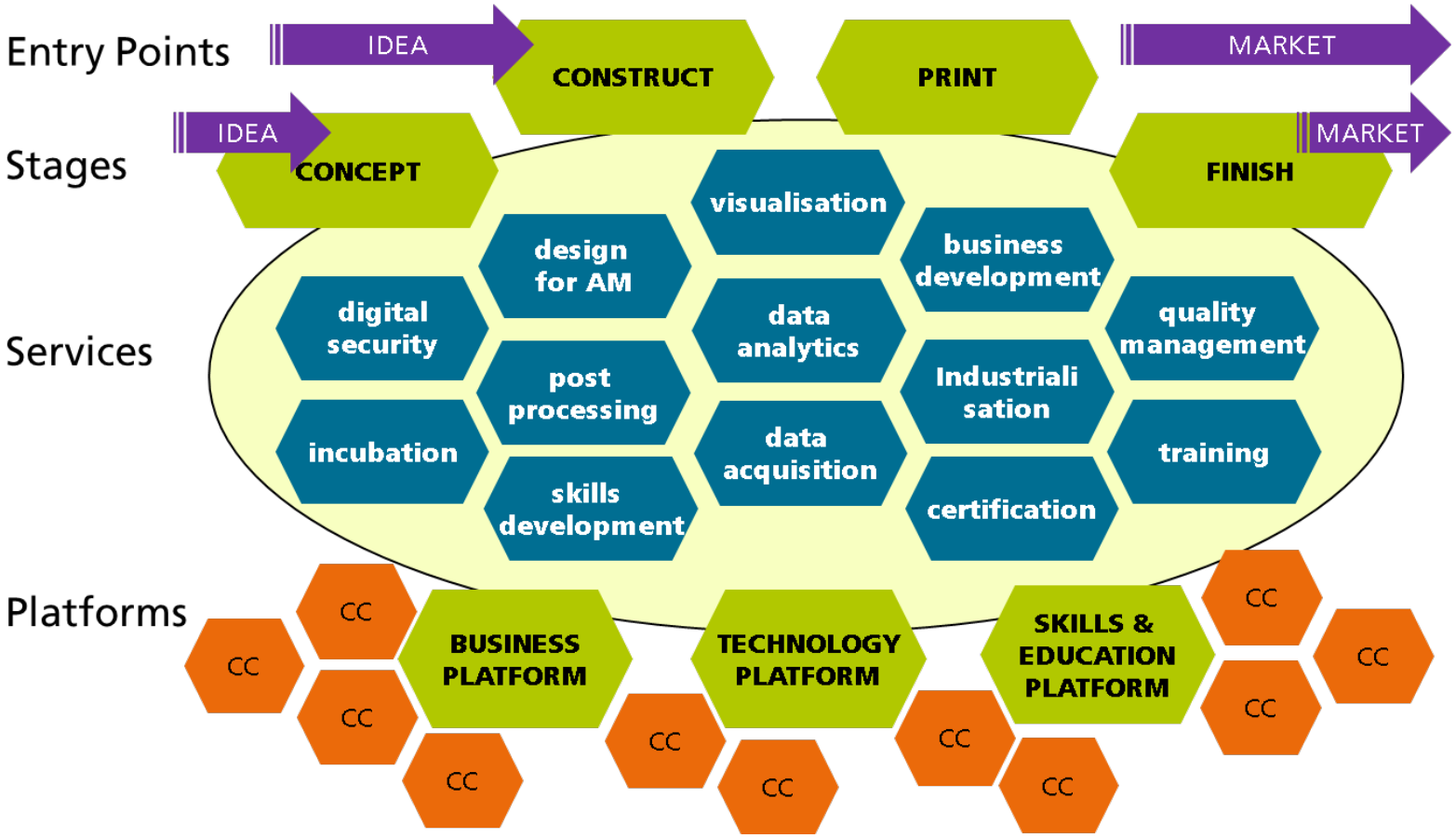
The Services Arena – from idea to market

Digital Services for SMEs and midcaps

- Three distinct platforms provide collated knowledge
- On demand access to individual service modules
- Entry from idea to suitable development stage
- Tutor directs the experiment partner through the services arena



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The Services Arena – Service 307 Visualisation / Immersive Design

ID 307

Service name

Visualization/Immersive design

Service description

Immersive design and connection with CAD packages will be developed to enable the user to experiment with variants, allowing quick and affordable pre-assessment of product design.

Service offering

The service focuses at providing the user with a realistic representation of the end result of the AM process through an immersive design environment. The ambition is to create a software module able to directly generate a realistic visualization of a certain part after being Additively Manufactured directly from a CAD file. The tool should be able to take into account surface texture/roughness based on the selected material, process/machine type and/or machine settings (such as layer thickness) and generate an appropriate texture to be mapped on the surface of the CAD model so that the user can have a realistic view on how the part will look right after production. The user should be able to modify selected production parameters as well as the CAD file, to understand how these affect the way the part looks.

In addition, coupling with the modelling & simulation stage would enable the visualization tool to use the distorted “as manufactured” 3D model instead of the user-provided CAD file, so that a “virtual prototype” will be available for the user to decide if his requirements are met or if any further redesign and/or optimization is required.

Service key benefits

- Ability to realistically visualize product
- Direct involvement of customers for feedback during the design phase
- Ability to fully grasp part surface roughness and/or finishing, as AM surfaces usually are not smooth
- Ability to fully comprehend distortion magnitude and effects without redesigning the part, as well as effects of a potential redesign to minimization of distortion
- Enabling product customization

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The Services Arena – Service 306 Design for AM

ID 306
Service name
Design for AM
Service description
This service will provide the knowledge to enable the creation of an AM-buildable product, while integrating incoming design data (customer scan or other input data) and creating the required instructions (file for build, post-processing, inspection instructions) to ensure the final product matches the design requirement. The design process may include a part consolidation exercise, structural optimisation, design concepts, customisation, reverse engineering or simply the redesign of a component for build-ability through AM processes.
Service offering
This service offers to provide working knowledge of how to design products for manufacture by AM in different applications (e.g. topology optimisation, tooling improvement, Part consolidation to improve lead times and Customer-led product design). Customers will be able to access design tools (hardware and software) and resources through this service, and the service will help them through their first AM design process. This will empower SMEs to do functional design, part consolidation and design based on customer input either through scan data or requirements capture.
Service key benefits
• Cost effective designs • De-risking the build • Accessing design guidelines/tools/resources

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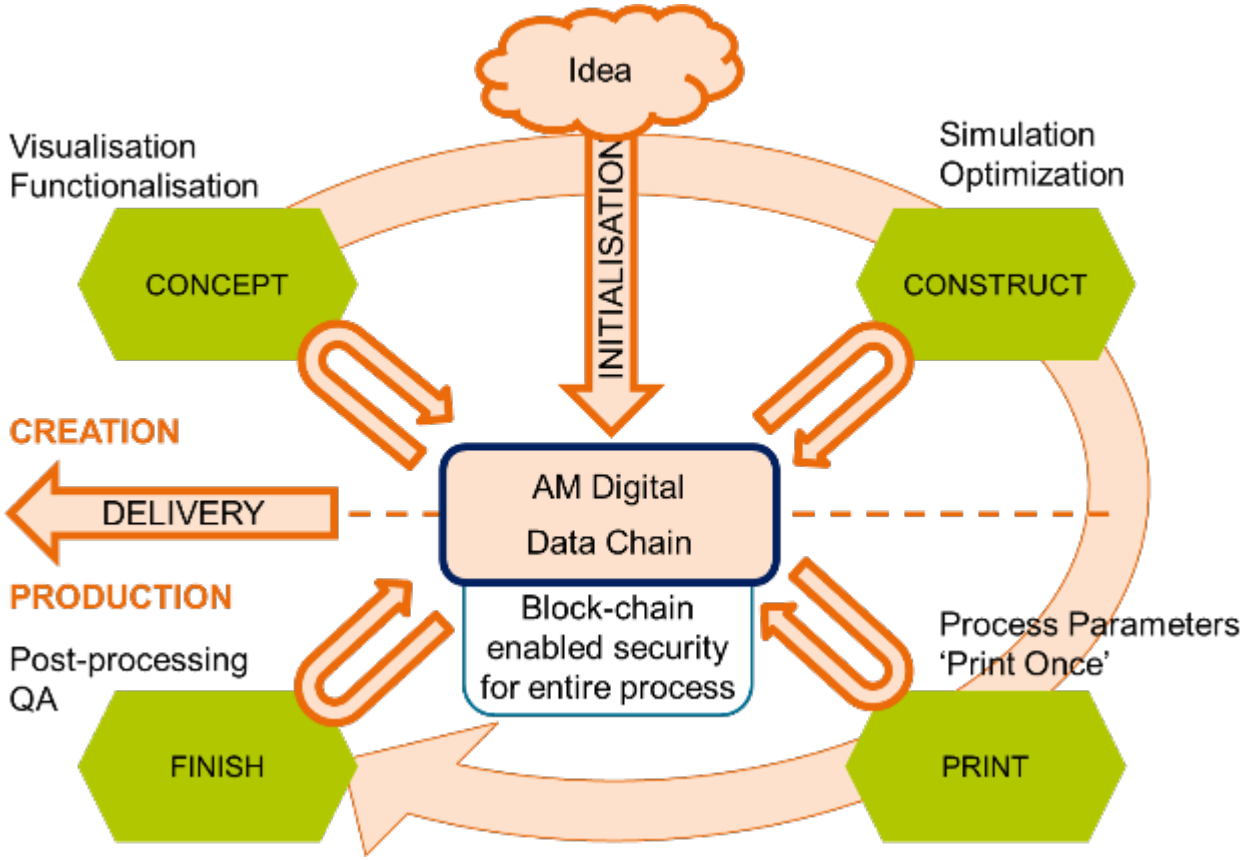
The digital data chain - Digital Infrastructure for AM related information

AM Data Evolution

- Data enrichment from stage to stage
- Data recording with Blockchain support for signed documentation
- Data viewport per stage and stakeholder
- Security requirements depending on application and actual stakeholders
- Continuous documentation and transparent access
- Respect for data ownership



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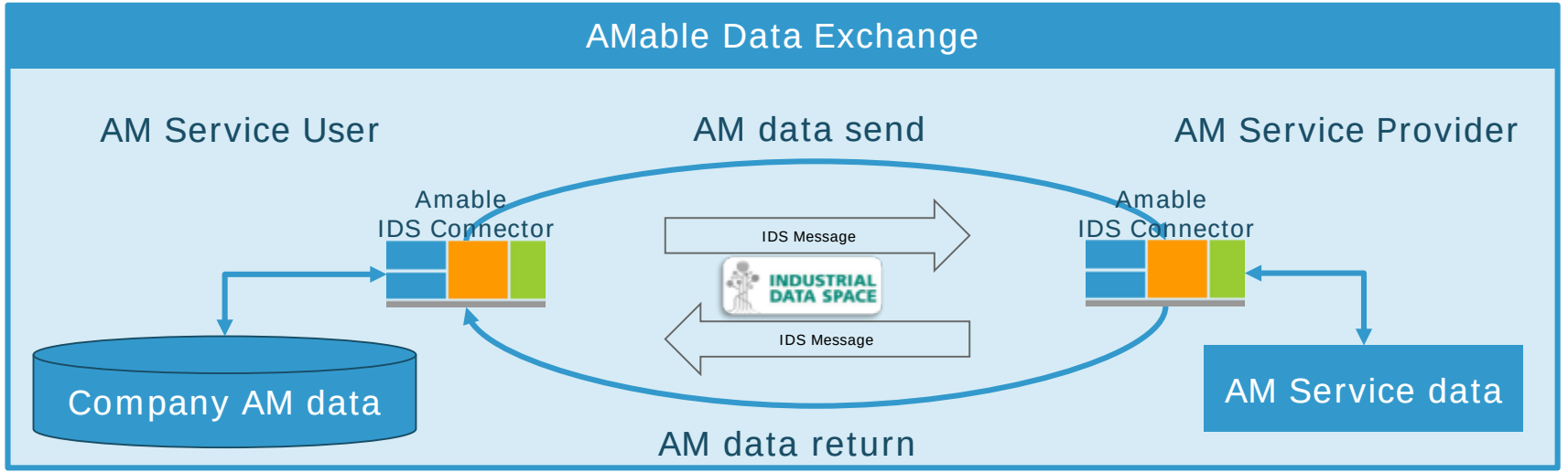
The digital data chain - Digital Infrastructure for AM related information

AMable IDS Connector – Trusted and documented data exchange

- Paradigm of the Industrial Dataspace ➔ Data remains with the data owner
- Transactions can be documented in AMable Blockchain
- AMable IDS Connector as a registered hardware device to connect between data owners and data users



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1 Project Aims and Objectives

2 Open Call Short Story

3 Functional Parts

4 Experiment Types, Partners and Roles

5 Evaluation and Implementation

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AMable Open Call OC2

Your Opportunity

1. Do you have an innovative idea for a functional product that needs AM to become alive?
You can tell & sell its story publicly but you cannot achieve the implementation yourself?

2. You can get support
from European Additive Manufacturing Competence Centers through services for design, testing, simulation, scale up, etc.

3. You can get funding
for your development activities if you are an SME or a mid-cap, eligible under Horizon2020 rules.

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AMable Open Call OC2

Your ToDo's

1. Write up your story
what is your idea; what is your AM starting point; how does the idea relate to the state of the art;

2. 

Present your business case
where will you sell; how will you produce; what will be your return of invest?

3. Describe your development plan
what are the risks; which success factors; define the AMable services you need; download and follow the guide for applicants; submit your proposal;

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AMable – Digital Additive Manufacturing Innovation Hub

Experiment – Functional Parts

AMable

Motorbike Fork as a sample use case for AMable

This use case of K-Tech, GRM and the MTC shows how AMable services can support all stakeholders in the uptake of additive manufacturing (AM). Parts that enhance performance in the use of the final product can profit from AM based manufacturing. See inside and learn how to approach the solution!

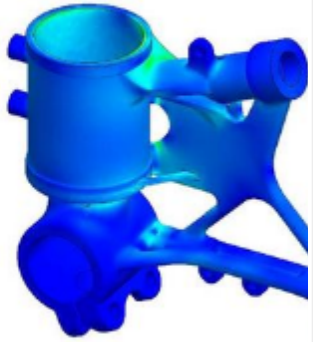
Optimised Motorbike Fork End

Challenge

Motorbike in action at the race course © MTC

Motorbikes challenge technology with drivers that strive for an agile and controllable performance on steering and handling - especially on the race track. One core component is the fork end which holds the front wheel and influences the suspension dynamics. The goal is to provide a part with high stiffness at low weight - a driver for additive with some challenges.

Solution



Mechanical model of the fork end which shows the result of a str

The team took on the challenge to create a new part wi reduced weight. To ensure that the design would withs mechanical analyses were performed on the optimised design was optimised and simulated towards its robust process in mind. These simulations enabled the team to additive manufacturing aware and objectives driven.

At that time, the partners reported:

- Working with GRM using TruFormtopology optimi iteration of designs to optimise the motorbike for
- Two motorbike forks were manufactured in Ti6Al4 (EBM)
- The MTC performed geometric evaluation via stru for shape conformance testing, and non-destructi for defect detection

Benefit

Image of the fork end as it comes from the machine. It shows the part and the support structures that a re needed to achieve a geometrically conformant part © MTC

Clearly, the driver of the motorbike was delighted by the performance of the new fork end. The main benefit however was twofold:

- a part that increased the sales value of the motorbike
- a technology demonstration that initiated new ideas where AM could benefit.

The part was 50g lighter at increased fracture thoughness with full quality assurance of the part's integrity. The process of developing a part that was ready for deployment entailed three main benefits for the customer

- Fast iteration and design change implementation throughout project
- Product and process knowledge captured for use in future GRM and K-Tech programmes
- Transferable capability and knowledge obtained as a result

Overall, the benefit of running through design, optimsation, print and post-process relied on services like topology optimisation, simulation, print and finish - services that AMable will offer to companies that have similar innovative ideas.

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Experiment – Functional Parts

AMable

Vinyl Disk Cartridge as a sample use case for AMable

This use case of DTI and ORTOFON shows how AMable services can support stakeholders in the uptake of additive manufacturing (AM). Printing of vinyl disk catriges is an innovative idea that brings individualisation and performance to a new level. Have a closer look at it!

Enhanced Cartrige

Challenge

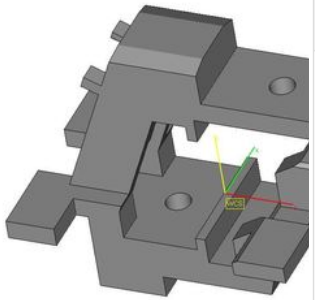
Lineup of Ortofon Cartriges © Ortofon

Vinyl record players provide high fidelity audio signals for music lovers all over the world. The phono cartridge still challenges engineers because of its key role in transferring the structure of the vinyl disc into electrical signals, which then are amplified to acoustic waves. The housing is one of the many important parts in a phono cartridge. In order to achieve best possible sound, the housing must be very stiff and at the same time damped to reduce unwanted vibrations.

To enhance these properties for the housing, DTI and Ortofon A/S defined the following challenges:

- Reduction of production time from 4-6 months to a few weeks
- Increase in freedom of design choices
- Achieve knowledge of the AM manufacturing process to take full advantage of

Solution

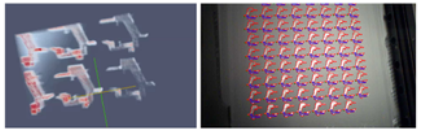


AM Construction of the new Ortofon Cartrige © DTI

DTI and Ortofon took these challenges to create a produc
this day is one of most advanced cartridges in the market.
transmission of the cartridge, the design was optimised ar
manner. AM was able to speed up this iterative process cr
faster development flow. The team implemented the follc

- The design of the cartridge was highly optimized to a dampening effect, which is not producable by traditi technologies
- CT scanning was applied to optimize the AM process production phase
- Coordinate Measurements was applied during the production phase to assess geometrical conformance
- The AM production chain was designed to meet a final production time of a few weeks

Benefit



Reconstruction of Ortofon Cartrige by 3D Vision © DTI

By optimising this part towards a production by AM technologies, DTI and Ortofon A/S have been able to produce a first high quality phone cartridge with a new level of audio performance. During this project, different solutions have been created and implemented to obtain a high level of quality across the complete production process. Following this initial experiment, six new cartridges (MC A90, SPU A90th, Xpression, MC Anna, MC A95 and SPU A95) have been developed, leading to rich portfolio of high quality products. We are launching the 100 years anniversary this year as well as two new pick-upper (MC Century and SPU Century)

Overall, the benefit of running through design, optimsation, print and post-process relied on services like visualisation, simulation, topology optimisation and quality assurance - services that AMable will offer to companies that have similar innovative ideas.

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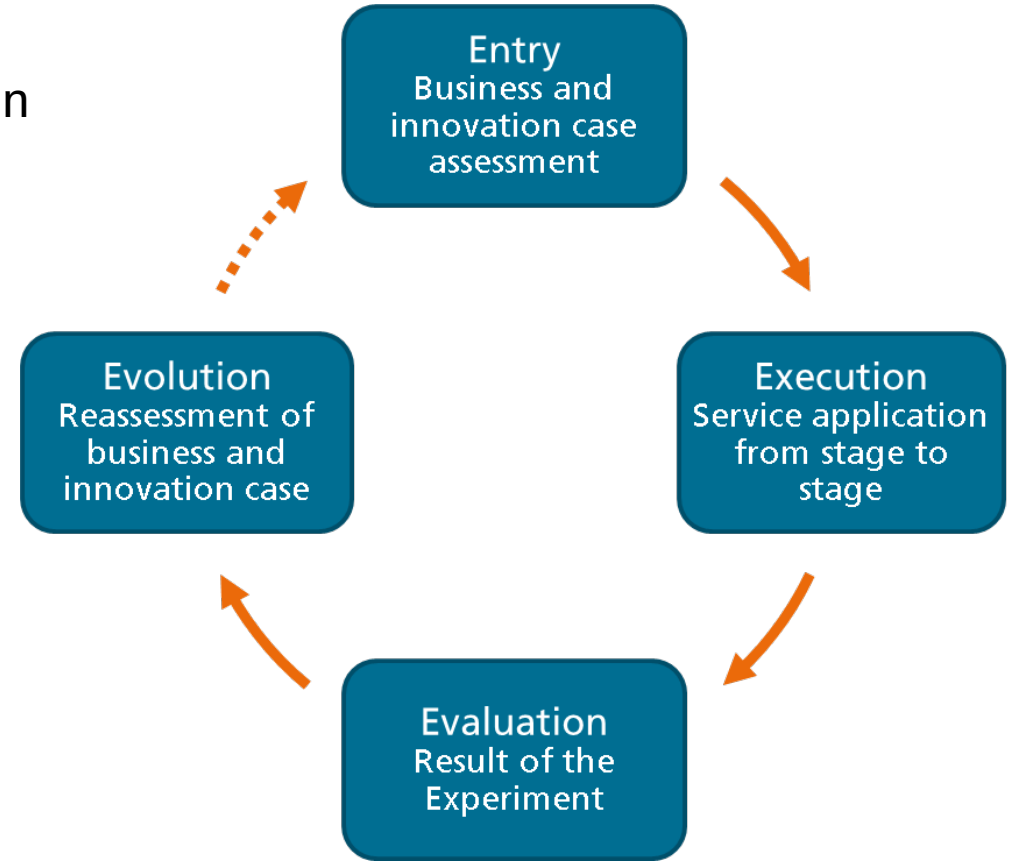
Experiment – Structure and Type

Experiment phases

- Four stages: entry, execution, evaluation, evolution

Experiments targeted at market needs

- Feasibility Study Experiments
  - Short term, low TRL, small budget
- Best Practice Experiments
  - Longer duration, higher TRL, more budget



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Experiments	3rd Party involved in experiment		Proposal length / pages	TRL	Number of services used per experiment	Duration / months	Cost* / Euro
	Supplier	User					
Feasibility Study Experiments (FS)	X		4	3-5	1-3	3-6	5k-25k
Best Practice Experiments (BP)	X	X	10	4-8	2-X	4-12	10k-60k

*Cost for the entire action of third parties including all eligible cost such as personnel, consumables and travel. Any form of subcontracting needs to be justified. Equipment (depreciation) will not be funded.

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Proposal Evaluation

- Evaluation Process
  - External experts (see call for evaluators)
  - Internal listing according to rules set out in the guide for applicants

- Proposal Evaluation Criteria

#	Name	Weight / Threshold
1	Impact of the experiment and the anticipated result	Weight 1 / Threshold 3/5
2	Excellence of the idea and approach	Weight 1 / Threshold 3/5
3	Quality and efficiency of the implementation	Weight 1 / Threshold 3/5

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AMable Open Call OC2
Information and Contact Points

- Feasibility Study Experiment
  - SME with an innovative AM product idea (supplier role)
- Best Practice Experiment
  - SME with an innovative AM product idea (supplier role)
  - SME / mid-cap as first user of the product (user role)
- Funding rate 70% of eligible cost
- Further Information
  - https://www.amable.eu/calls/
  - Twitter: @amable_eu

Industrial Partners

Research and Technology Partners

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