D5.2
SME + Artist Collaboration toolkit 1.0 version 4.0

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Marco Duarte
INOVA+, Innovation Services SA
Rua Dr. Afonso Cordeiro, 567
4450-309 Matosinhos, Portugal

marco.duarte@inova.business
+351 229 397 130

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Main author	Reviewed by
Marco Duarte	Lija Groenewoud van Vliet
Accepted by Project Coordinator	**Accepted by Technical Coordinator**
Magnus Simons	Ali Muhammad

Contributing author(s)	Pages
Lija Groenewoud, Marta Coto, Nicolas Wierinck, Rodolfo Groenewoud, Tânia Moreira, Zeynep Birsel	38

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Abstract

The SME+Artist toolkit presents the Tools and guidelines with example use-cases from the collaborations performed under Better Factory framework. The experiments gathered three-member consortium from each, including 1 Artist, 1 Technology Supplier and 1 Manufacturing SME. This toolkit focuses on the collaboration between Artists and SMEs, describing the methodology applied and evaluating the collaborations by the mentors. The evaluation captures the whole progress of collaboration from the initial steps of setting the experiments plan and matchmaking until the delivery of results.

The learnings collected during the experiments will contribute to the continuous improvement of the methodology, to be applied on the forthcoming set of experiments within Better Factory, as well aiming to inspire other collaborations running outside the project.

Project Coordinator contact
Magnus Simons
VTT Technical Research Centre of Finland Ltd
Tekniikantie 21, P.O. Box 1000, Espoo, Finland
E-mail: magnus.simons@vtt.fi
Tel: +358 40 543 8586

Technical Coordinator contact
Ali Muhammad
European Dynamics SA
E-mail: ali.muhammad@eurodyn.com
Tel: +358 400 560 851

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HISTORY OF CHANGES

Date	Version	Author	Comments
27.09.2021	V1.0	INOVA	Structure of the document
31.03.2022	V1.1	INOVA	Methodology implemented on KTEs
31.08.2022	V1.2	INOVA	Overview to SME+Artist collaboration
03.10.2022	V2.0	INOVA	Artists self assessment
03.10.2022	V2.1	INOVA	SME individual evaluations on their collaboration with Artists
07.10.2022	V2.3	INOVA	Art Mentors' individual evaluation per KTE Artist
02.11.2022	V3.0	INOVA, WAAG, GLUON, IN4ART	Deliverable restructure
28.02.2023	V3.1	IN4ART, GLUON, WAAG	Additional inputs and review
20.03.2023	V4.0	INOVA	Final version

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EXECUTIVE SUMMARY

"The aim of art is to represent not the outward appearance of things, but their inward significance." Aristotle

This toolkit has been developed as a practical resource to support particularly artists and Manufacturing SMES in finding a common ground and language, identifying goals and objectives, offering guidance on how to set up, manage and interpret collaborative art-driven innovation project.

Expressing the wish to collaborate with artists is one thing, but actually building a successful cross disciplinary collaboration is something completely different. It takes good preparation, clear objectives, willing participants, and a suitable methodology to get off to a good start.

The present toolkit intends to complement the STARTS Collaboration Toolkit, by providing a specific focus on SME+Artist collaborations, having real cases of collaboration where the methodology was tested, and having additional information that we consider relevant for other similar initiatives and projects.

Through this toolkit you will find tools, process maps, links to reference videos, learning and case examples from the Kwnoledge Transfer Experiments that foster the collaboration between Manufacturing SMEs and Artists during 16 months.

This toolkit doesn't intend to be a detailed Guide on how to launch Open Calls for collaborations, but better a Guide on the methodology of collaboration.

This SMES+Artists Collaboration Toolkit representes the first version, released after the first set of collaborations (7 KTEs) that occured in Better Factory Project. The final tooklit will be delivered containid the global assessement , learning and overview of the SMES+Artist collaborations after all the 16 KTES will be completed (expected to be released in the final quarter of 2024)

INTRODUCTION: About the toolkit

This SME+Artist Collaboration Toolkit intends to be a practical resource to support collaborative processes between business companies (manufacturing, etc.) and Artists. It is developed by the team involved in the collaboration and mentoring of the *Knowledge Transfer Experiments* (KTEs) within the Innovation Action Better Factory, funded by Horizon 2020.

Better Factory's mission is to support manufacturing SMEs to grow their business, have optimal lean-agile production and a more diversified portfolio of products and services. A unique element In this project, is that next to providing financial resources, technologies, methodologies and expert mentoring to Manufacturing SMEs, the SME's have created a consortium with an Artist and technology supplier to work and co-create, under the so-called *Knowledge Transfer Experiments* (KTEs).

The Artists provided the manufacturing SMEs the possibility to co-create and develop new and personalized products. With the technology suppliers, they have the opportunity to test and implement technologies developed by BetterFactory consortium partners and become cyber-physical systems, transforming them into Lean-agile production facilities capable of manufacturing new and personalised products along with existing ones.

This toolkit presents the methodology and techniques designed and used within the Better Factory project to challenge, monitor and support the KTEs, providing a special focus on the Manufacturing SMEs and Artists collaboration. This SME+Artist Collaboration Toolkit would be relevant for companies who are thinking about the future of their business.

GOAL

Offer practical guidance to support SME+Artists collaborative processes.

TARGET

Primary target: SME and ARTISTS
Secondary target: Teams/collaborators, art intermediaries and researchers

Reference Methodology

The methodology used in Better Factory follows the methodologies presented in the *S+T+ARTS Collaboration Toolkit*[1]. The present toolkit intends to complement the STARTS Collaboration Toolkit, by providing a specific focus on SME+Artist collaborations, having real cases of collaboration where the methodology was tested, and having additional information that we consider relevant for other similar initiatives and projects. This SME+Artist Collaboration Toolkit is an intermediate version elaborated in the final phase of the first round of 7 KTEs, the collaborations between SMES+Artists+Tech Suppliers that occurred in the Better Factory project. These KTEs resulted from the 1st Open Call launched by the project and in the 2nd call 9 KTEs more will be funded to experiment together. After this 2nd round of KTEs a 2nd version of the SME+Artist Collaboration Toolkit will be created including an overview and analysis based in all 16 KTEs.

A booklet will be prepared by Better Factory with this information in the end of the project.

The SME+Artist Collaboration Toolkit is an extension to the Collaboration Toolkit which was published by S+T+ARTS in 2020. The Collaboration Toolkit was based on S+T+ARTS collaborative projects from its inception in 2016 until 2020. These programs, including VERTIGO, RE-FREAM and the first Regional STARTS Center program, had a strong focus on establishing networks of collaborations between art and science, mediated by technology and, occasionally, supported by industry.

It identified a number of overarching commonalities and categories of projects which had shown evidences of successful collaborations. In essence, the toolkit identified four different drivers of successful collaborations: collaborations driven by either science, technology, challenges or missions.

The challenge driven collaborative projects as well as the mission driven collaborative projects were taken as starting points for the development of collaborative projects between Artists and manufacturing SMEs in Better Factory (see Figure 1).

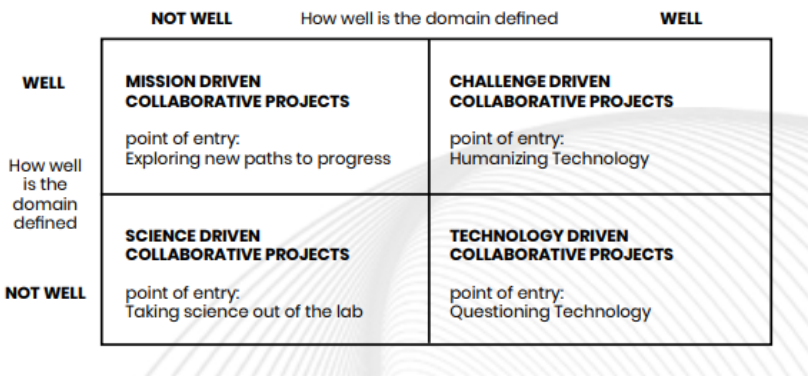

Figure 1 - Models for collaborative projects between scientists, technologists and Artists, retrieved from STARTS toolkit (2020, p. 15) , starts-toolkit-13july2020.pdf

In challenge driven collaborative projects, the aim is for Artists to come up with propositional solutions to well defined industrial or societal challenges. The intended outcome is to take what is already there (existing products, processes, resources, methods, technologies, etc) and explore its outer edges, resulting in prototypes, demonstrators and pilots for new use cases. In the 7 Knowledge Transfer Experiments (KTEs) collected as cases in this toolkit, the challenge driven approach was chosen as starting point for the Artistic response to the manufacturers industrial challenge.

In mission driven collaborative projects, the aim is for Artists to be able to respond to a higher level ambition set by the manufacturing SME. While the problem in relation to the mission is defined at the start of the collaboration, the Artist diffuses a wide variety of ideas over multiple domains to explore its possibilities. This way, the outcomes can have different forms, might even be less tangible than with challenge driven collaborative projects, but contribute to insights and directions relevant for strategic decision making at the organisational level.

[1] Groenewoud - van Vliet, R. W. *et al.* (2020). *S+T+ARTS Collaboration Toolkit*. Retrieved from: https://starts.eu/starts-libary/

Moreover, the Collaboration Toolkit from 2020 introduced three methodologies for collaborative project execution: Art Influenced Science / Art-Driven Technology / Art-Enabled Prototyping (see figure 2). From these methodologies, the Art-Enabled Prototyping method was used as the reference methodology in the 7 Artist-SME collaborative experiments part of Better Factory. Art-Enabled Prototyping refers to the process of: "putting the challenge at the heart of the creative process and experiments with different technologies, materials or constructs from different domains to develop a response."(Groenewoud -van Vliet et al., 2020).

Since the methodology as presented in the Collaboration Toolkit was basically a deduction of past projects, the methodology was further developed in Better Factory in round 1 of the experiments, and again, based on the learnings, in round 2 of the experiments.

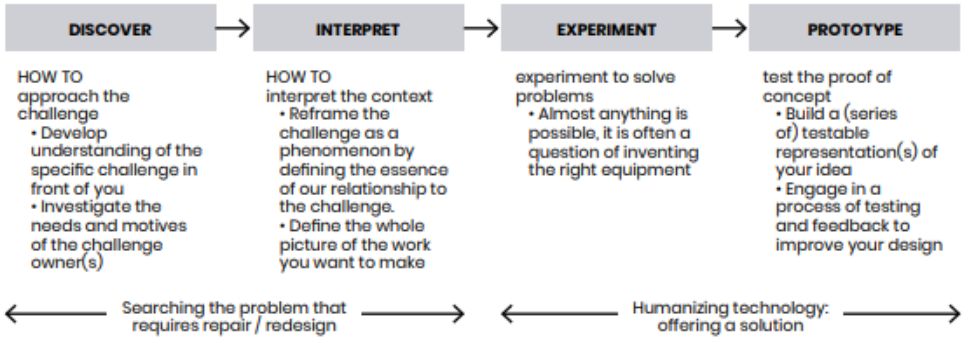

Figure 2 - Art-Enabled Prototyping methodology, retrieved from STARTS toolkit (2020, p. 28), starts-toolkit-13july2020.pdf

Toolkit structure

The document is structured in **the following** chapters:

Chapter 1: **Art-Driven collaborative method,** will include the explanation of the adjusted methodology developed, based on empirically evidence and implemented by the Better Factory in relation to Knowledge Transfer Experiments. It also explains how within this project experiments are defined.

Chapter 2: The KTE process and evaluation method, will include the explanation of KTE process during the 16 months, including the mentoring plan and the evaluation process.

Chapter 3: Reflections & Learnings, presents the results of the KTEs on the activities regarding SME+Artist collaboration in each of the 7 KTE from the 1st Open Call of Better Factory and the feedback collected from the Artists and from the SME on their collaboration. Additionally, a third analysis from the Art Mentors is included, presenting the overall evaluation of the SME+Artist collaboration and Artists' individual achievements. It will conclude with reflections and learning from the overall process, including some guidelines for improvement on this SME+Artist Collaboration Toolkit.

CHAPTER 1: ART-DRIVEN INNOVATION COLLABORATIVE METHOD

The Art-driven innovation collaborative method starts with exploration and ends with implementation within the walls of the involved SME. But before the collaboration can take off, time is needed to prepare the minds on this type of collaboration. It means explaining the value and benefits that can come out both for SMEs and Artists.

Why art-driven experimentations?

This toolkit, in this first version describes and discusses in detail 7 unique, sixteen-month collaborations between Artists and SME manufacturing companies. Across sectors, across countries. How were they formed, what happened and what came out. We believe that, by describing in detail what we did over the course of nearly 4 years of experimenting and exploring, we can share useful insights for those interested in, or themselves participating in, collaborative projects combining art and manufacturing with the intent to realize innovation.

Yet, before we can go into the how's and what's, we shall start with the why's. Why would one try to realize collaborative innovation projects between these two, seemingly different, types of actors in the world?

The first reason to look at Artists and Artistic experimentation as a way to stimulate innovation in manufacturing is **to be able to see past rules**.

Industrial companies, engineers, technologists, scientists, designer; they all operate within the boundaries of written or unwritten rules on how research, development, idea generation, experimenting and prototyping should be done. Proven methods of operandi expected stages of development or best practice led narratives, ways of working are to a large extent predictable. Not with Artists. There are as many ways to experiment as there are Artists who are experimenting. Following an often messy and non-linear process of idea generation, research, idea selection and execution, Artists are masters in seeing past rules of the game and finding their own way to work on a topic. The best Artists for innovation are those who combine a messy creative process with great working discipline and collaborative skills.

In this toolkit we will see evidence of this distinguishing skill in several of the experiments, including but not limited to: Tomas Libertiny x ZOVOS-EKO and Gareth Neal x ODC3D and Jesse Howard x BCF

The second reason to look at Artists and Artistic experimentation as a way to stimulate innovation in manufacturing is **to be able to look at longer-term consequences and ripple effects.**

The past decades can be defined as decades in which, due to different forces, the time horizons of markets as well as governments, have shrunk. Companies have become used to focusing on the next reporting period, and governments have become used to concentrating on the next election. It has shaped the way in which value coming from innovation has been defined – the short-term, incremental approach. Longer-term consequences and ripple effects are often non-existent in decision-making. Business experimentation, therefore, is concentrated mostly on the here and now, raising questions like: how can we validate our assumptions on the present needs? On a same note, to understand today, looking back has become an important factor for making innovation decisions. A discipline mastered by scientific experimentation, where testing hypotheses based on past events is way of working. In comparison, Artistic experimentation is neither about the past nor the present, it is a way to look at the future: through Artistic experimentation futures can be thought of, envisioned, and built.

"Artistic experimentation is different in that it is about the future. It raises questions about the choices we can make, and the possibilities we can create… It supports radical, system-changing perspectives and ideas, needed for responsible and sustainable futures. In comparison, scientific experimentation is essentially about looking back and testing a hypothesis. It raises questions like: 'what can be learned from what has already happened?' Business experimentation is mostly about the here and now, raising questions like: 'how can we validate assumptions for a product, for e.g to achieve a product-market fit?' (Groenewoud-van Vliet, 2022)"[2]

Many manufacturing SMEs in Europe are family-owned companies, with a tradition to look beyond next quarterly results and embrace a horizon as long as a full generation. Their purpose is not to respond to market changes instantly, but to maintain a steady innovative course, steering the company towards the next apprentice.

[2] Definition of Third source of Experiment by In4Art, retrieved from PESETABS (2022, p.3).

In this toolkit we will see evidence of family-owned business showing particular interest in innovation development in collaboration with Artists because of their instinct to look at longer-term possibilities and consequences. This is the case in experiments such as: Nicola Ellis x Ritherdon Co. and Frederik de Wilde x Capanna Prosciutti

The third reason to look at Artists and Artistic experimentation as a way to stimulate innovation in manufacturing is **to be able to deal with uncertainty.**

Experimenting with many diverse, and sometimes seemingly absurd, ideas is crucial to realize innovation in environments characterized by uncertainty. In times of geopolitical tension, ecological boundaries, and economical fluctuations, uncertainty is increasing for all manufacturing SMEs in Europe. As a result of this, experimenting and exploring new opportunities for product or market development is ever more under pressure while, at the same time, known strategies and propositions are at the risk of becoming obsolete. In this environment, circulating energetic ideas and testing many possibilities rapidly is a rewarding method to realize innovation.

In this toolkit we will see evidence of manufacturing SMEs benefiting from this third distinguishing skill of Artists in innovation experimentation in several of the experiments, including but not limited to: Isaac Monté x Europack Bulgaria and Jesse Howard x Fiction Factory

In conclusion, below figure shows the three reasons:

1) **to be able to see past rules, conditions and boundaries**

2) **to be able to look at longer-term consequences and ripple effects**

3) **to be able to deal with uncertainty.**

Figure 3 - 3 Reasons for art-driven experimentation

1.1 Preparing the Minds

Having this said, the SME+ Artist collaborations involve a **mediating effort and planning** to initiate and set up. Most of this process requires networking, soft skills and can be aided by simple process tracking tools.

The critical step in the process relates to how to prepare the minds, what to expect, how to prepare for fruitful interactions and initial dialogue to **establish a common ground**. This common ground is essential to understand the different needs, ambitions, and visions. In finding this commonality, and understanding the identity and perspectives, the collaboration works towards acting as a team. To achieve this, the mentors play a crucial role.

In this toolkit, we focus on creating a guide on the methodology of collaboration. It doesn't intend to be a detailed Guide on how to launch Open Calls for collaborations. We start at the stage when the potential candidates for the collaborations are identified, both the Artist and the SME have shown their interest through applying to the Call for Artists resp. Call for Expression of Interest on the side. Hence, we knew that both were interested to join forces for an Art-Driven Innovation Collaboration. However, the weren't a team yet and needed to be introduced to each other. The next step, was to make the right match.

In Better Factory we prepared the minds as follow:

1 Describing the gains of working together to SMEs and to Artists: , a.o. exlpaingin the value and reasons behind art-driven experiments.
2 Explaining what to expect from each other and making the intents explicit
3 Setting a common language between SMEs and Artists, explaining the added value of the mentors.

The matchmaking moment is the one where the collaboration teams start to be created and it is included in the first Stage of how to experiment with Artists: the Scoping. In this stage we set a common ground on what the Experiments and the collaborations are.

The overall methodology would consist in 3 stages:

1 **Scoping** the experiment: the onboarding, involvement and finding the igniting question (see 1.2)
2 **Running** the experiment: the art-driven experimentation iteration cycle (see 1.3)
3 **Analysing** the outcomes: the art driven innovation spill overs (see 1.4)

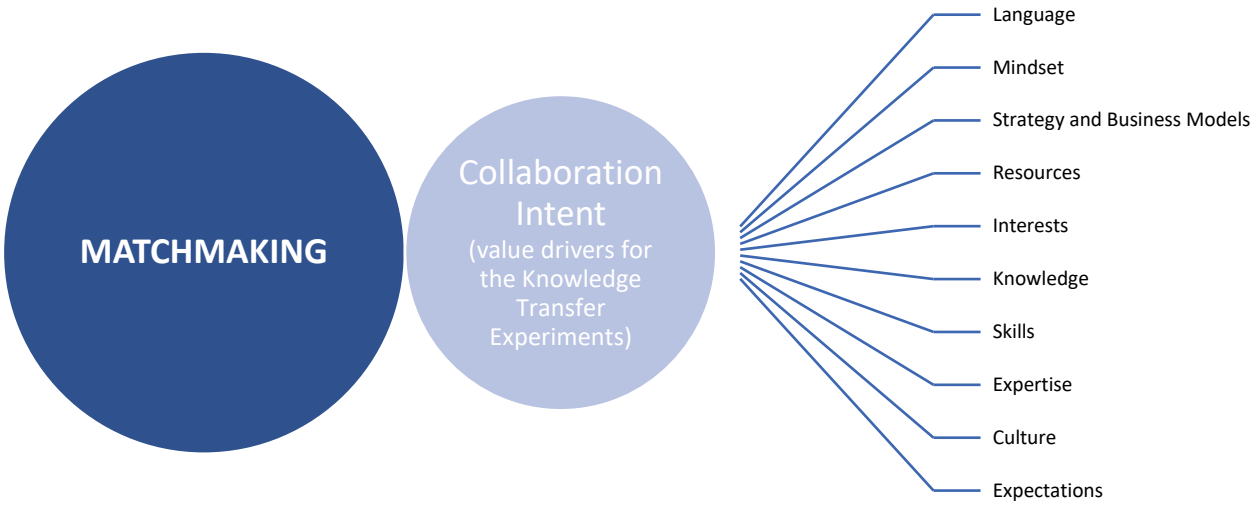

Figure 4 - Preparing the minds process

1.2 Matchmaking

The Matchmaking is part of the **Scoping the experiment** stage. Successful SME+Artist collaborations are based on building a fitting infrastructure for the experiment.

The supporting team, the mentors assigned to the project form Better Factory, support the formatting of the future collaboration team by asking the SME what they want to achieve and the Artist what they are looking for. After having this information, together with the working experience and capabilities of the Artist the matchmaking process can start, “finding the right lid for the pan”, meaning the most suitable success match.

Building this fitting infrastructure should consist of process and culture:

Process	scale of the experiment	- is the ambition high yet realistic?
	speed	- how long and intense will it run?
	Team involved	- ecosystem around the experiment
	Support	- access to finance, assets, knowledge
	standards	- quality criteria
Culture	shared values	- Artist and SME share values on how to work

	competences/skills	- Artist brings in right competences to explore the igniting question successfully (meaning leading to a conclusive outcome)

In Better Factory, the process side of the infrastructure is created by the consortium, the culture side of the infrastructure is the result of matchmaking.

On the first matchmaking phase of Better Factory, we received interest from 123 SMEs and 114 Artists. The matching was moderated and designed by BF mentors (Art, Tech and Industry/Cluster mentors). The mentors had one-on-one meetings and suggested joint meetings to introduce the potential team members to each other. In the end, 32 matches where made, meaning that they worked on a joint proposal for a art-driven innovation collaborative project – the KTE. A total of 38 proposals were submitted, 23 coming from the matchmaking process.

1.3 Collaborative Project Iteration Cycle

As said in the above, after the Scoping we arrive to the next stage: **Running** the experiment, that happens trough the implementation of the the art-driven experimentation iteration cycle.
The Art-enabled prototyping methodology puts the challenge at the heart of the creative process. To do so, it identified four steps, which are by no means a linear process: 1. Discover; 2. Interpret; 3. Experiment; 4 Prototype.

The KTE project development is about 3 entities from different worlds coming together to share ideas, knowledge and skills in the pursuit of art-driven technological innovation. To adjust it to the Better Factory KTEs, these 4 steps from art-enabled prototyping where adapted, into 1. Ideate; 2. Prepare; 3. Build; 4. Learn.

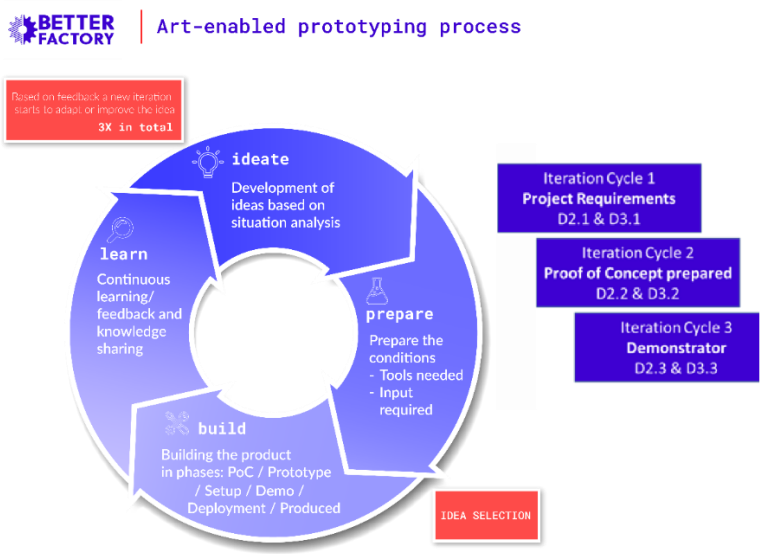

Figure 5. Better Factory Collaborative Project Iteration Cycle, based on the Art-enabled prototyping process

It is called the collaborative iteration cycle, because the 4 steps will be conducted three times throughout the collaboration project. In each cycle, there is a slightly different attention point within the defined steps. Each step is also the guidance for the mentors and the team to talk about the progress and identify challenges in the collaboration.

Iteration cycle 1: Project Requirements

Start: M2
End: M5

Phase 1:	Ideate	M2	Development of ideas based on situation analysis
Phase 2:	Prepare	M3	Prepare the conditions: tools needed / inputs required

Phase 3:	Build	M4	Building the solution in phases: Architecture / Experiments
Phase 4:	Learn	M5	Continuous learning, feedback and knowledge sharing

Iteration cycle 2: Proof of Concept prepared

Start: M6
End: M9

Phase 1:	Ideate	M6	Adaptation / Selection of ideas based on Cycle 1
Phase 2:	Prepare	M7	Prepare the conditions for PoC / Prototype testing
Phase 3:	Build	M8	Building the solution in phases: Proof of Concept / Demo
Phase 4:	Learn	M9	Continuous learning, feedback and knowledge sharing

Iteration cycle 3: Demonstrator realised

Start: M10
End: M13

Phase 1:	Ideate	M10	Adaptation / Selection of ideas based on Cycle 2
Phase 2:	Prepare	M11	Prepare the conditions for implementation / deployment
Phase 3:	Build	M12	Building the solution in phases: Setup / Run / Produced
Phase 4:	Learn	M13	Continuous learning, feedback and knowledge sharing

1.4 Art-driven innovation spill-overs methodology

Art-driven innovation methodology, developed by In4Art, was created in order to analyse and diffuse the outcomes of art-driven experiments. It is based on the notion that art-driven experiments are a rich source of surprising ideas for responsible innovation. The methodology works best when an experimental project ends. To understand the reach of these experiments and translate them into potential impactful responsible innovation spillovers, it is useful to search for diffusion into eight different directions: policy, ecology, society, economy, technology, art, business, and science. To support this, the PESETABS diffusion model can be used as a tool to make the path to create value explicit.

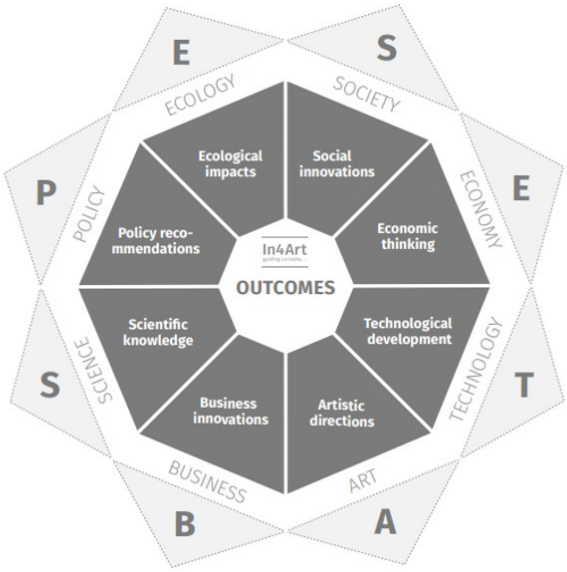

Figure 5 - PESETABS Diffusion (In4Art, 2022)

Art-driven innovation spill-over analysis will help to successfully:

- Understand how Artistic experimentation can create value;
- Strategize for diffusion of knowledge, ideas and propositions;
- Find and pursue surprising, creative ideas.

The Art-Driven innovation methodology was not yet applied to the KTE outcomes, but it will be to all outcomes once the 2nd round of the KTEs is concluded.

CHAPTER 2 KTE MENTORING PROCESS

In this chapter the importance of mentorship is linked to the Knowledge Transfer Experiments process used in Better Factory. The Mentoring plan adopted during the experiments guided this process and through evaluation, learning insights on the method could be achieved.

2.1 Importance of Mentorship

One way to evaluate the effectiveness of the mentorship is to measure the progress and achievements of the Artists and SMEs in terms of the specific skills and knowledge they gained through the mentorship. This can be done through assessments, surveys, or interviews with the Artist, SMEs and technology providers.

Figure 6 - Benefits from mentorship based on the evaluations (INOVA, 2023)

Another aspect to evaluate is the impact of the mentorship on the SMEs and technology providers. This can be measured by assessing the success of the collaboration in terms of the solutions developed and implemented, as well as the impact of the solutions on the SMEs' competitiveness and efficiency.

Additionally, it is important to evaluate the effectiveness of the mentorship in fostering a culture of collaboration and innovation. This can be done by assessing the level of communication and cooperation between the Artist, SMEs and technology providers, as well as the level of experimentation and idea sharing that took place during the mentorship.

It is also important to evaluate the impact of the mentorship on the Artist's career, such as the opportunities they have had to showcase their work, the recognition they have received, and the collaborations they have had with other SMEs and technology providers.

Finally, it is important to gather feedback from the Artist, SMEs, and technology providers to understand their perceptions of the mentorship and to identify areas for improvement.

> Evaluating the effectiveness of mentoring is both and art and science. It is art because a significant portion of what a mentor brings are a combination of experience, creativity, constructive communication and care. These are difficult to quantify. The science should be able to break it down to different types of mentoring activities/ interventions/ methods and tools in relation to project deliverables and KPIs.
>
> Evaluation of mentoring process and mentorship (related but two different things) should be designed as a simple tool and not demand too much from the collaborators in terms of input. It is better to expand evaluation throughout the lifecycle of the project, also allowing for reflection and group learning.

Nevertheless the mentoring process is not static so that means that there are constant challenges that should be considered and that could influence the process such as:

- Alignment between multiple interests and translation into business strategies

- Maintaining an equal distance to partners (in case there is a single mentor for both Artist and industry partner) otherwise alignment between mentors

- Where mentorship ends or should end. This is an unresolved discussion. Many of the projects produce results which can uptake, but cycle is designed to end at prototyping. Future work can look into how mentorship can contribute into the ideal outcome of 'market' or 'social/ societal' impact phase.

2.2 KTE knowledge transfer process

The SME+Artist collaboration in Better Factory Project is made through the **Knowledge Transfer Experiments (KTEs) (**click here to know more about KTEs in Better Factory**).** This process was defined based on lessons learned in **DIH²**, **L4MS** and in **S+T+ARTS Residencies**.

Managing a mentorship within the context of Industry 4.0 with collaborations between manufacturing SMEs, technology providers, and Artists involves several steps, that can be resumed below:

1. Establish clear objectives: The mentorship should be aligned with the overall goals of the project and should aim to achieve specific outcomes for the Artist, SMEs and technology providers.
2. Identify the right mentors: The mentorship should be led by experienced professionals with a background in both art and industry 4.0, who can provide guidance and support to the Artist, SMEs and technology providers.
3. Match the Artist with the right SME and technology provider: The Artist should be matched with SMEs and technology providers that have complementary skills and interests. This will help to ensure that the collaboration is productive and that the Artist can learn from the SMEs and technology providers.
4. Create a collaborative environment: A culture of collaboration and open communication should be fostered between the Artist, SMEs and technology providers to encourage experimentation and idea sharing.
5. Monitor and evaluate progress: Regularly check-ins and evaluations should be conducted to monitor the progress of the mentorship and make adjustments as needed.
6. Provide opportunities for the KTEs to showcase their output: Opportunities should be provided to showcase their collaborative output and share their learnings and experiences with others in the industry.

Overall, managing an art mentorship within Industry 4.0 requires a balance of creativity and structure, flexibility and planning, and a strong focus on collaboration and open communication. Translated to the KTE, this resulted in in 3 stages:

Stage 1 – Knowledge co-creation: In this first stage a Technical Mentor, Business Mentor and Art Mentor from the consortium will be assigned. Together with KTEs, they defined **Individual Mentoring Plans** for each one of the experiments selected. These Individual Mentoring Plans will establish the KPIs and Deliverables that will be considered when evaluating the experiments' performance.
Stage 2 – Knowledge transfer: During this stage the KTEs receive an invaluable reinforcement through the mentoring services (see 2.3 Mentoring team) to implement and testing of multiple ideas, iteratively to reach the optimum solution (see 1.3 Collaborative project iteration cycle).
Stage 3 – Knowledge Scale-up: In this stage the Business Mentors are responsible to support the Manufacturing SMEs to get the investment needed to transform their production and business and to support the Artists from KTEs in commercialisation of new product concepts and IPR generated during the KTEs.

2.3 Mentoring Team

Mentoring is a valuable component as an enabler, the mentor is responsible to provide guidance and show the right direction, gives help, challenges the team and advises.

In projects involving art-driven experiments, which is considered a relative new form of collaboration, the mentorship aspect of the collaboration is crucial for the Artist's output and development, as well as for the SMEs and technology providers to gain new skills and knowledge. It is also an opportunity for the Artist to gain insight into the industry and the challenges it faces, and to apply their Artistic perspective to solve those challenges. Figure 6 presents the key capabilities delivered by mentoring activities[3].

Figure 6 – Mentoring capabilities, (digitalchangemakers 2023)

In Better Factory, the whole KTE process was supported by a mentor team. The *KTE mentors* – aimed to facilitate the collaboration and support the process with necessary services and technologies:

- **Technical mentors** guide the technical implementation of the KTEs, provide expertise for resolving technical issues and ensure that the solution is beyond the current state-of-the-art. Whenever needed, they will allocate additional researchers from Better Factory competence centers to the KTEs to fill technological gaps.

- **Art mentors** provide crucial support in guiding Artists to develop creative solutions that provide real value in addressing the challenges, but also challenging the Artistic and conceptual development. The art mentors are responsible to implement a continuous mentoring support to Artists, setting a close communication with Artists to follow the progress and providing insights to support the achievements of Artists individual goals and be aligned with the SMEs challenges and overall Better Factory requirements and expectations.

- **Business mentors** support in developing a business plan for the further exploitation of the KTEs results beyond the KTEs to ensure their long-term sustainability. The business support will focus on ensuring the differentiation and value proposition of the KTEs' achievements.

In Better Factory KTEs, mentors had different levels of involvement concerning the needs. A minimum of weekly contact was established, but it was needs depending resulting in certain periods of intense daily basis involvement and in others, bi-weekly. Each project at different stages has different needs for mentoring. In order to develop more systematic/ model and effort efficient approaches, the KTE experiments kept flexibility to not make the process restrictive and look into what capabilities and interventions-activities are most useful under what conditions/ stages.

As an indication, the modelling approach below reflects the levels of involvement during the experiments. It shows that the start and end are more heavily supported by the mentors, with setting the stage and supporting the first iteration cycle and in the end with the analysis of the outcome.

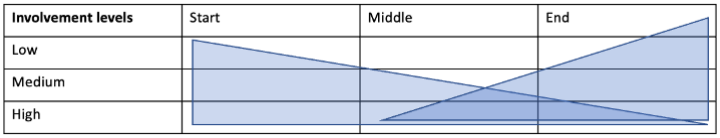

Figure 7 – Mentoring involvement Levels (WAAG 2023)

[3] DigitalChangeMakers - what is Collaboration & Collaborative Mentoring
https://www.digitalchangemakers.eu/m2/2-1/

2.4 Evaluation Process

On Better Factory a series of Evaluations were made throughout the monitoring process, namely:

1. Artists Evaluation

Better Factory performed a survey to the Artists to assess individual evaluations of their work after they succeeded in the mid-term review. For this, a SWOT analysis was conducted, in which:

- **Strengths** and **Weaknesses** are related with internal subjects – Individual evaluation of the Artists regarding their activities performed in the KTEs, where Strengths stands for the positive outcomes/learnings that Artists gained in the experiments, and Weaknesses are the non-positive aspects which affected Artists' performance not caused by external factors.
- **Opportunities** and **Threats** are related with external subjects – Individual evaluation of the Artists regarding Better Factory Mentoring Activities and other External activities which impact positively Artists' work – Opportunities; or that caused a negative impact on Artists' work/performance - Threats.

As much as possible, Better Factory aimed to address the self-learnings that Artists got within the experiments, as well the collaborations made during the first months of the experiment with respective partners in the KTE (both SME and Tech Supplier) as well respective Mentors, in order to better evaluate the experiments and learn/improve the Better Factory methodology based on this feedback received.

This resulted in the following enrichments:

> The possibility of experiment through 3 iteration cycles proved to be valuable to the Artists

> The closer and contact interaction between SMEs+Tec+Artists proved to be a motivational boost

> The self-assessment proved to be an important reflection process, but should not only be done in the end but also in the middle of the experiment.

For more info on this, see Annex 1.

2. SMEs evaluation

Based on the definition of the SMEs challenges to improve their productivity, the Artists have developed their action plans. The plans in each KTE needed to be continuously monitored to ensure the prototypes developed will match the expectations and requirements initially proposed. In order to align those, fruitful collaborations require to create a relationship and close communication to enable knowledge transfer in a smooth way.

The Artists being able to meet at the SME Factory became an important moment to strengthen the relationship between members, as well as get a clearer perception of the daily productivity and organisational environment.

The work performed by Artists have been validated during the KTE evaluation periods (evaluation meeting that occurred periodically during the experiment). These checkpoints allowed to adjust priorities and approaches for the final prototype version to be more easily accepted.

This resulted in the following insight:

> include a physical kick-off early in the collaboration

For more info on this, see Annex 2.

3. Joint Evaluation meeting

The prototypes developed in each KTE were continuously monitored by the Better Factory mentors. The close communication and continuous assessment provided by the mentors – aiming to achieve the right balance on setting realistic goals while pushing limits on innovation – resulted in an important process of the methodology.

All deliverables were structured with a specific template to draw the lines of the expected outcomes. The format of deliverables to report varied throughout the KTE. To better describe the actions and results achieved, the deliverables submission included a presentation of results in the presence of all KTE members and mentors. The presence of these actors during evaluation became very important to validate the prototype for its continuous improvement, alignment with SME needs and ambitions, and drive the business scale-up.

4. Mentor evaluation

The Art Mentors constitutes a key role during the experiments regarding SME+Artist toolkit. The experience of Manufacturing SMEs in working in close collaboration with Artists is not common. To minimize the gaps in terms of how an Artist can better fit into a new product/service concept for a manufacturing SME, Art Mentors established the necessary link between the creative work offer with the boundaries of the SME needs within Better Factory. The Art Mentors, with a strong background of working with technology and within manufacturing sector, support the Artists to create real valuable solutions by co-thinking and prototype ideas. The Art Mentors pushed Artists limits to create added value of their prototypes, taking objective evaluations of Artist's levels of performance and ambitions. The Art Mentors were continuously updating on the Artists prototypes to avoid critical changes on the evaluation periods.

As most beneficial mentoring activities, the following has been identified: the Artist Mentor became the person which the Artist could brainstorm to support the development ideas and approach methods, and not be lonely during the product roadmap. Being an external fresh eye became beneficial provided Artists with mental space to clear out some tangled issues and questions, giving the possibility to refocus on the larger picture and clarify alternatives, possibilities thinking through pros and cons and implications of options. Dedicated sessions between Artist and Art Mentor became important for both on creating a relationship to exchange knowledge and knowhow for the Art Mentor to better guide the Artist on this journey, receiving the necessary guidance and support to meet the promising expectable results set at the proposal stage.

CHAPTER 3 REFLECTIONS AND LEARNINGS

Based on the insights of the first round of KTE's, and for the purpose of improvement, an analysis of the SME+Artist collaboration have been made, focusing on performance, motivation, availability and engagement with other members during the experiments. This resulted in different suggestions for improvement and insights for this toolkit.

Like referred, the involvement of the mentor during the experiment is crucial for supporting and following the collaboration, enabling the mentor to observe, analyse and give feedback during the whole process.

3.1 Selection criteria used to match SME with Artist

The matchmaking was made collectively with a group of Artist Mentors, SME Mentors and Tech Mentors (all members from Better Factory partners). Each with their specialty and background could suggest the best matches between Artist – SME – Tech Supplier. The end match reflects on this. The matchmaking process was an intense part of the applicants during the Open Call. This process required a continuous communication from Better Factory – including generic information about the project and candidature, complemented in a further step with dedicated support from the Art Mentors to support the definition of Artist scope of work in line with Better Factory requirements and to address the individual SME challenges – in which some Artists faced more challenges than others during this process. It is important to highlight that the Artist puts a significant effort in the matchmaking as they have in a way proposed a challenge that need to fit the needs of the SME. The preparation of communication actions by Better Factory team facilitated Artists to understand about the whole process, however some Artists required some efforts to find suitable matches between the SME applicants as some of them started to be matched with others and the communication flow is sometimes an difficult process when it starts to involve multiple persons and technical discussions.

3.2 Challenge- and Mission-driven projects preparation and development

In the overall, the SMEs were not clear on how to incorporate the Artists work under their individual challenges. Most of them have never worked before with Artists and, as consequence, were not aware of their mind-set, capabilities, focuses or even methodologies to implement such activities. The Art Mentors acted took here a very important role to merge both interests (SME+Artists) and to reach interesting perspectives from the projects which were being designed, as well, the expectations set by Better Factory at the very beginning. To simplify this process from the beginning, SMEs were invited by Better Factory to develop their own challenge from an early step, with the objective of the project in mind to facilitate Artists (as well Technology Suppliers) and respective Mentors on finding potential matches which higher rate of success.

Challenge-driven project: The understanding of the SMEs' needs required extra efforts from every member involved. Even if not totally clear at the beginning from both SME and Artist, in the overall KTEs, they evolved in a very positive way and resulted in a fully collaboration between the 3 parties. Time was a serious constraint, as in a few weeks, the members had to understand each other ways of work, evaluating and balancing interests to find suitable and ambitious scope of work for the Artists collaborations. The development of such projects by the Artists, besides being in line with the respective SME business model and strategy, had a strong focus on implementing sustainable and productive methods.

Mission-driven project: The mission-driven project was based on a more conceptual idea of the Artist. As this project development was not following specific requirements of Better Factory and the respective SME for being more experimental, Artists ended-up having more flexibility and freedom to develop own ideas – together with Artist Mentors – resulting on interesting perspectives from start. The Artist were pushing the limits under the research topic applied within the Artist work to bring innovative products and new possibilities for the SMEs.

3.3 Interaction with the Artist

Communication: Artists and Art Mentors kept a very regular communication, talking or exchanging messages on a – at least – bi-weekly basis. During the preparation of deliverables and milestones, the interaction became more intense. This close contact from the beginning of the KTE activities demonstrated to be important, not only to clarify the Artist's scope of work and methodology for the prototype development, but also to strengthen the relationships between Art Mentors and Artists, as well Artists and SMEs since this last became more clear and conscious of the Artist role and capabilities to develop the prototypes which could be extremely valuable and unique within the operations at the factory level.

Impact observed by the SME from the Artist efforts: In the overall, the Artists demonstrated the right fit to the challenge proposed, offering real and measurable benefits to the SMEs, opening new solutions for their operations and position in the market. Some Artists felt resistance from the SMEs on changing/adapting their own production line and habits – visible at the most traditional manufacturing SMEs.

Potential barriers and unmet expectations: In the overall, the expectations have been greatly achieved by the Artists. They have developed interesting results, achieving the acceptance and recognition from the SMEs. Setting the projects at the first stage was the common barrier faced by the Artists, even though faced with a great commitment and enthusiasm. Once passed that barrier, all KTEs achieved quite quickly mutual understanding of SME+Artist collaboration. The Artists outcomes are merging their outputs with SMEs' operation or machinery, ending up will clearer results for the SMEs – lowering barriers on accepting innovative approaches on factory operations.

3.4 Artist alignment with specific SME needs and mission

Artist alignment with the SME needs: The Artists were able to engage and involve other staff members from the SME, rather than only the main contact. In order to understand better the working environment, specific needs and position to the market, the Artists interacted with the factory operators and visited the factory to have a real experiment of the daily work, observe directly the SME's operations and get a better feeling on the respective SME image. The Artists demonstrated flexibility and innovation to offer customised and unique prototypes, based on their diverse and technological experience.

Artist alignment with the SME mission: The way the Artists dive into the SMEs reality, they went deep on research and expriments to build meaningful and solutions for SMEs. Artists knowhow enabled them to work and improve their ideas to implement on their prototypes for future possible business models.

3.5 Lessons learned.

These first KTEs evidenced that the collaborative effort can provide a valuable experience both in terms of outcome and process. However, this is a learning process, as for the next steps – for the second round of KTEs – we will be introducing some adjustments to our methodology with the aim to improve and simplify the overall monitor of activities.

1. Reduce the distance feeling between the Artist and the SME. The physical distance was felt particularly during the beginning of the process of collaboration for the members to know each other better, taking a deeper understanding of the challenges as well cultural aspects.
2. Create additional incentive for the SME (showing business models for example) at an earlier stage to help guarantee stronger involvement.
3. Engage the Technology Supplier within SME+Artist collaboration in the project at an earlier stage.
4. Keep documentation track on key issues and decisions made; It was not an easy process to manage the complexity of the experiments with the number of persons and diversity of knowledge present in each KTE (KTE members plus Better Factory mentors and technology providers), considering that it needed to be implemented different channels/level of communication (Better Factory consortium only, Better Factory and KTE members, as well some parallel discussions over more specific technical topics with Art and/or Technology Supplier issues).

5. Promote the interaction of the Artists to discuss together experiences and ideas on an informal setting could beneficiate mutually, as external views from other persons – with a similar or distinctive background – can offer interesting discussions and promising ideas.
6. Be clearer on explaining the challenge/ mission terminology and structure, simplifying the topics of experimentation, keeping the focus on on problem/challenge and expected outcome / solution
7. Set clearer expectations for the mission-driven to avoid using extra resources (e.g., cost, time), providing better support and 'protection' to the Artist.
8. Integrate closer mentorship to the SMEs, through the clustes and regular check-in of the mentor.
9. Equally balance the level of participation and responsibility from Artist and Technology Supplier on collaborations, setting the Artist as a key role and not just a missing piece of the whole puzzle.
10. Intensify the effort on how to make the KTEs products and outcomes visible through systematic and strategic dissemination, benefiting from individual valuable networks which KTE members, mentors and consortium bring.

Conclusion

This deliverable shows the direction in which we want to develop the SME+Artist Collaboration Toolkit. The final toolkit – available by the end of the project with ending the second round of KTEs – will be based on the learnings and insights form all 16 KTE's that are executed in the Better Factory project. The document will be designed as a reference work for others to use, hence, the final formatting will be adjusted to this in close collaboration with the dissemination activities within the project.

Integrating Artists to Industry is a challenging process. It is an emergent and promising approach which needs sustained practice. It is important to focus on developing pragmatic and modular methods and tools on project level but also think more systematically and build an ecosystem for mutual learning and exchange of practices. Understanding success factors requires vision, trust and patience. Often adoption of traditional and transactional (purely commercial) success metrics are misleading and not conducive to enabling impactful art-driven innovation outcomes.

Based on the activities performed in SME+Artist collaboration of the first Open Call of Better Factory, we were able to test and implement the methodology to co-design ideas, support and mentor the Artist during the KTE.

The start of the collaboration is the highest learning curve for all parties involved. The Art Mentor revealed to be more than the sum of all the activities pre-defined in their respective role, assuming an important voice and behavior to facilitate the communication and natural flow of activities.

A major conclusion on the process and results of the collaboration with Artists and manufacturing SMEs within the framework of Better Factory is that it can lead to the development of innovative solutions and new perspectives for the manufacturer. An important starting point here is the challenge-driven project description at the beginning of the residency.

The collaboration between Artists and manufacturing SMEs can bring a unique combination of creativity, technical expertise, and industry knowledge, which can drive the development of advanced manufacturing solutions.

However, it is important to note that this type of collaboration can be challenging, as the different backgrounds (education, professional, culture) and ways of working of the parties involved may require a significant effort to align and communicate effectively. Therefore, it is essential to establish clear objectives and communication channels, and to foster a culture of collaboration and experimentation, enabled by the mentors.

Annex 1: Artists Self-assessments

The SWOT analyses that the Artist do on their work in the end of the experiment is really valuable, not only for the ones that are guiding the process, the mentors, but also for the Artist themselves and for the SMEs. With these own evaluation the self-process and the overall process can be improved.

The first round of the KTEs showed that this self-assessment proved to be important tool, but can even be more valuable if it is done not only in the end but in the middle of the experiment.

Strengths [*Based on its own work, Artists benefited from…*]	**Weaknesses** [*Based on its own work, Artists struggled with…*]
Focus – Setting a clear framing of needs of SME and production possibilities there, finding for a solution that fits the environment of the company; Using own Critical Thinking and experience to create a positive impact in the factory ecosystem. Knowledge – Taking the opportunity to deepen own understanding of specific processes, tools, and technologies (which would be difficult without the structure of the KTE); Learning to keep track of design process, receiving continuous feedback on it from the SME, the Tech Supplier as well from Better Factory consortium – more specifically from Art Mentors. Ability to predict various outcomes in the experiment; Possibility to expand own portfolios. Experimentation – Openness to explore both practical solutions and to apply topic/technologies more freely, while applying experimentation on sustainable debate. Communication – Experimenting with and learning new ways to tell complex technical stories in an engaging way. The interaction with the KTE members increases motivation and the overall experience. Artists' presentation skills and proactivity in communication during the KTE meetings were improved. Ambition – Artist practice expanded considerably in terms of what an Artist can achieve as an individual, a collaborator and a 'welcomed outsider' in an environment outside of the art context. This is extremely valuable for future challenges.	Complexity – From the technical aspects needed for the KTEs, the Artists worked to have different prototypes. Clearly communicating (internally and externally) to cover different technical aspects was sometimes led to confusion. Hesitation – Some reluctance to make physical prototypes of initial ideas at the beginning of the KTE. Prioritise – it was at times difficult to define which aspect of the process was best to emphasize to both meet the needs of the SME and the relate to own Artist practices. Moreover, The Artists needed to deal with the speed or slowness of a collaborative project. Communication – Faced some difficulties with discussing technical terms with other KTE team members, as well manage expectations of the outcomes to them. The working distance on some periods was also a barrier for the interaction with other members.
Opportunities [*Based on external factors, Artists benefited from…*]	**Threats** [*Based on external factors, Artists struggled from…*]
Mentorship – Clear and motivating feedback sessions about Artist outcomes and facilitating collaboration within KTE. The mentorship on business-related topics, such as IPR and business development were also evidenced. Feel part of the SME – Welcoming atmosphere of the SME made experimentation accessible. Collaboration with Technology Supplier – throughout the process, but especially by spending time working in their offices, the Technology Supplier team members were supportive and open with sharing their knowledge and experience.	Isolation from other KTEs – for motivation, but also expanding networks, it could have been interesting to have more exchange between Artists of other KTEs. Moreover, working toward a collective format (publication, exhibition) could give a defined format for Artistic outcomes (especially mission-driven) outside the confines of the SME's needs. Lack of Feedback – feedback on general goals could be provided more often. Complexity – ensuring compliance with Better Factory technical requirements and administrative issues (bureaucracy) of the project. Design of business activities less familiar to Artists – such activities, from an Artist opinion, could had been evaluated together with them to turn into a more creative task.

Table 1 - Overview of feedback from Artist self- evaluation on KTES

Annex 2: SMEs' Evaluation of Artists

To support the **SME+Artist Collaboration Toolkit**, Better Factory collected feedback from each SME (the 7 KTEs selected from the Better Factory First Open Call) an evaluation on the collaboration made with the respective Artist on the following categories:

(i) selection criteria used in the very early stage of the KTE in the matchmaking,
(ii) the prototyping ideas development process for both challenge- and mission-driven projects,
(iii) the development of the interaction with the Artist,
(iv) allignment with individual needs and mission of the SME,
(v) Lessons learned on the overall experiment

For these evaluation checks, it is described below the evaluation collected from each SME representative was analysed together, considering specificities of each experiement, while aiming to conclude to a general overview and guidelines for the SME+Artist Collaboration Toolkit.

(i) **Selection criteria used to match SME with Artist**.

Most SMEs were interested to know which were the Artists' previous experience and skills before agreeing to partner within Better Factory experiments. The Artists know how and awareness regarding the respective fields in which the SMEs operate, as well the capacity of Artists (available on their curricula) to transform handmade/manual processes into semi- or fully-digital processes capture the SMEs attention. Moreover, the Artists proactiveness during the matchmaking phase was evidenced by the SMEs as a benefit and an advantageous point for selection, demonstrating their interest and willingness to establish collaboration.

(ii) **Challenge- and Mission-driven projects preparation and development**.

Challenge-driven project: In the overall, Artists set a close collaboration with the SME, and secondly with the Technology Suppliers. The development of innovative and eco-friendly products will allow to step-up from the competition, while co-developing business-oriented solutions with Artists to reach production cost, time and waste usage reductions. Artist acting as resilient and team player across its own network and/or with SME staff demonstrated to be an important mindset for the SMEs.

Mission-driven project: The experiments have shown that Artists are, in general, going further on SMEs mission and goals. New automated processes were set and designed with an umbrella of environmental awareness, seeking for multiple market applications from the SMEs' production chain. Important to notice is the general behaviour set (independently) by the SMEs was to give a total freedom – not setting any barriers – for Artist to explore for the creation of new products and interaction with staff members of the factory.

(iii) **Interaction with Artists**.

Communication: In overall, the KTEs have set internal regular meetings from the beginning of the experiments. Despite some barriers caused by covid-19 on travelling, the KTE have managed to meet in person, where it enable to build relationships between members. Artist is an equal part of the team. In average, the KTEs meet every 2 weeks, keeping a close communication between all three members, and not excluding any KTE member from the group meetings. The SMEs have declared that communication intensity increased during the periods of implementing and testing stages.

Dissemination Activities Plan: The KTEs have worked together with the planning and setting of dissemination activities. The SMEs have been involving their marketing and sales teams in this regard, either to prepare promotional material (e.g., pitches, videos), as well to identify / contact key stakeholders of their value chain to promote the KTE results on exhibitions, benefiting from the usage of solutions which have been tested in real scenarios.

Manage to collaborate in-person and remotely: The KTEs have set an internal procedure for communication, setting a communication channel for remote communication. The remote work is the new normal, where the members did not face any constraint on holding the great majority of the meetings via online calls (apart from one KTE in which the Artist works on site, at the SME premises). The meetings in-person were mainly used to know each other better and to perform installations, programming and testing activities at the respective factory.

Engagement level with the SME staff set by Artists: Artists have been involved really well within the respective SMEs. Artists, besides SME representatives, have been involved regularly in average with 2-3 members of the SME to discuss and manage the more technical operations. Since some of the activities by the Artists involved high-level discussions over technical topics and key decisions, the SMEs involved engineers, system owners, sales and marketing, directors and other members to facilitate the engagement of the Artists with the SME staff and operations at the factory in each KTE.

Impact observed by the SME from the Artist efforts: Even though most of the SMEs were not familiarized with Artists work and without a clear idea what it could add into a collaborative experiment at the start of the KTEs, their work is being constantly praised by the SMEs. The diversity and refreshing common perspective by Artists are turning promising new products and media awareness into real benefits. Creative thinking in problem solving and innovation is becoming more important and valuable to companies. The Artists offer mind-change and passion for the subjects, which makes the daily work more enjoyable.

Potential barriers and unmet expectations: The expectations from the SMEs were generally on how to learn and develop new approaches, while creating a connection between the product and modern art. It has been identified in some KTEs, even in minority, the technical complexity used by some Artists and the usage of different methods – not the most common in industry – became barriers for the SMEs to fully understand the Artists' innovative concepts.

(iv) **Artist alignment with specific SME needs and mission**.

Artist alignment with the SME needs: Artists are well aligned with SMEs needs since creative thinking together with technical background solve problems which at first seem very difficult in a short time or even impossible. Artists are acting in the experiments as one more element of the SMEs, fitting into company's vision to fully understand and be aligned with SME's objectives. Artists were able to deliver unique solutions, improve effectiveness in operations, capture interest from target groups. Artists which can provide the right fit to collaborate with SMEs (and with Technology Suppliers) can achieve very interesting results and disruptive solutions in industry.

Artist alignment with the SME mission: Artists are in line with SMEs' missions, creating tools, delivering new products, offer new aesthetic perceptions, embed production process to reflect the product's uniqueness and market fit.

(v) **Lessons Learned from the collaboration with Artists**.

This part looked at the lessons learnt in the collaboration - including technical and non-technical issues – and look for potential future collaboration with Artists.

Main challenges faced within the collaboration: The main challenges that SMEs faced when collaborating with the Artist was the **step out of comfort zone**, the need to think out of the box, experiencing new approaches on something on the most familiar activities, fitting Artists work in SME operations, co-create something authentic and original while at the same time being inspired by the existing portfolio or following quality parameters of SME processes.

Main Risks/barriers faced within the collaboration: Communication can be a barrier, when the level of technical knowledge and perceptions can differ drastically. In the case where the Artist needed to work around operations, the management of plant modifications can become a barrier in operations. Finally,

another barrier identified was finding a proper balance between giving freedom to Artist to develop concepts while assessing those as feasible solutions that would still match with organisation's philosophy.

Mentors role: The continuous mentorship proved to be useful for SMEs to understand the different stages and they explained the activities and how to approach the work funnel in Better Factory. The Art Mentors facilitate on brainstorming for the project concepts, speaking the same language and with a common mind-set to fit into Better Factory goals and SMEs expectations at the same time

Inputs for Methodology improvement: Few improvements regarding the Artist Methodology of work within Better factory have been identified: setting stronger time management within the experiment as when working with new and exciting features the focus can disperse and ending up using more time compared with what was originally planned (mentors need to keep track on the time spent on each iteration cycle); the collaboration with an Artist can be jeopardized if vision and goals are not mutually agreed since the beginning; and the physical participation of the Artist in the SMEs production premises should be estimated to be more frequent to facilitate interaction and operations.

Artist unique values: The Artist can provide a different perspective, fresh and outside the box thinking on SME's daily work, which for being very practical for the SME, it can be easy to follow under the same routine and miss business opportunities. Moreover, defining different contents, language and points of view can be challenging for the SMEs but the value in the end is visible. The Artists can be the missing piece to provide a unique cooperation, bringing new ideas and concepts from people with very specific expertise and creative thinking to implement solutions which would not be in SME plans.

Future collaboration with Artists: Some KTEs are very impressed with the Artist's work and results that are already seeking for collaborations to work in the same team again. By the end of second stage of the KTE, The SME can realize how well an Artist can collaborate with them in projects, mainly on developing new product concepts or to overcome production/commercial barriers. Artists with a genuine interest in manufacturing/engineering and how factories work, from SME's point of view, will represent a great added value in a development team.

Opportunities for improvements

1) Some SMEs identified a language barrier, as some SMEs are not familiar with some terms used in Better Factory. Either some terms can be too technical (specific technology field) or business-oriented (project management terms) can become a barrier.
2) The evaluation should consider that the Artist's work can be constrained by the fact when a product is very regulated.
3) SMEs would like to see implemented a simple process to support the matchmaking when starting an experiment. The search and analysis of possibilities should be clearer and easier.

Annex 3 - Results achieved by the KTEs

In this section, we provide an overview of the results achieved by the KTE's and add a description of the 16 use cases on which this SME+Artist Collaboration Toolkit is based.

For each case, the following description will be given.

- **Title**:
- **Members**:
  - *SME*:
  - *Artist*:
  - *Technology Supplier*:
- **Mentors**:
  - *Art mentor*
  - *Business mentor (incl cluster)*:
  - *Technological mentor*:
- **SME challenge**:
- **Impacts**:
- **Challenge-driven project**:
- **Mission-driven project**:
- **Achieved outcome:**
- **Artistic Impact:**
- **Collaboration insights and unique values:**

More detailed information on the KTEs Success Stories can be found in the D5.5 Success Stories, that describes and analyses all the 7 KTEs focus on the KPIs achievements, including a final video. This D5.5 will be soon available on Better Factory website (https://betterfactory.eu/

Annex 4 - Artist evaluation from Art Mentors

(i) Lessons Learned from the collaboration.

Main Challenges addressed by Artists: Some level of resistance to engage the SME into Artists' work; Manage external constraints due to late delivery of resources to perform the work; Finding the right balance between the development of the two projects (challenge- and mission-driven); development of different products from opposite criteria which turned into a more challenging process; Need to focus on business plan in the SME+Artist collaboration; Using and introducing innovative technologies in a very conservative industry; Exploring technology limits and adoption higher-tech solutions by the SME; Expanding own portfolios through different companies.

Artist Impact and Value per KTE	**Artist's Impact by the eyes of Art Mentors**	**Unique values identified by Art Mentors**
BCN Artist Jesse Howard	It is visible a strong and positive impact on the SME. Both parties are very collaborative, and the SME greatly benefitted from the ideas and work of the Artist.	Strong focus on reimagining everyday objects in response to new forms of digital fabrication. As well, the Artist knowledge of digital software was highly useful for the development of the projects.
FOLD Artist Isaac Monté	The impact can be seen as a great success, as all challenges were surpassed.	The high-level of creativity of the Artist in this specific case.
ODC 3D Artist Gareth Neal	The value is mostly derived from learnings in the process of planning and designing a mass line and a crafts line as part of the same manufacturing structure.	Use of collective thinking on the concept and challenge development to build the necessary skills for collaboration, as for self-reflection.
DSBSF Artist Sara Alvarez	Artist's project demonstrated the potential to generate impact on the employees of the SME. It definitely opened up the SME to the discovery of new ways of working and alternative use of technologies.	Able to master several digital software components.
MiniRoboFab Artist Nicola Ellis	Strong impact on the SME coming from the collaboration with the Artist in terms of redesign the flow of the production, working with waste material and create a new line of products.	Development of a very close collaboration with the SME, benefiting with a core position to start and execute her project.
SMARTHam Artist Frederik de Wilde	The SME could benefit a lot from the conceptual ideas of the Artist as some will probably be implemented in the future. The benefit comes from the great collaboration between the 3 KTE members.	Cross-fertilization – Multi-disciplinary collaboration since the beginning of the process brings much further into the development of ideas and products.
RWC Artist Tomáš Libertiny	The SME is pushed to its limits in a way they were so eager to buy new machines. It's still a difficult process to change the production line and habits, but the Artist inputs are contributing to that and opening for new business opportunities.	The understanding of creative process leading to new and innovative products.

Table 2– Artists Impacts over SMEs and Unique Value

Annex 5 – KTEs overview

BCN

- **Title**: Reducing wood waste from CNC production by anticipating wasted sheet-material before production
- **Members**:
  - *SME*: Fiction Factory (NL)
  - *Artist*: Jesse Howard (US/NL)
  - *Technology Supplier*: IAAC (ES)
- **Mentors**: INOVA+, HBD, WAAG, HOLONIX
- **SME challenge**: deploy and integrate a technological solution for waste reduction and production pre-planning and simulation based, developing a series of customisable products that will adapt in shape and design to the waste material available.
- **Impacts**: automated wood waste recycling
- **Artist challenge-driven**: aimed at conceiving, prototyping and testing a product portfolio addition or adaptation with the goal of adding the result to the SME portfolio. Primary goal is to reduce the amount of waste produced during CNC production…monitor the percentage of used plate material before CNC production, comparing the average leftover in the current workflow.
- **Artist mission-driven**: allow the Artist to conceive a speculative future scenario for Fiction Factory is line with its mission. This project nature is explored through form (how the principle of making use of pre-identified leftover material can lead to new ways of generation shape and form) and production (how new typologies of "programmed objects" can challenge the specific roles of designers and producers must take-on when attempting to produce sustainability).

FOLD

- **Title**: Modular Cobot for production of Stone Paper Innovative Products
- **Members**:
  - *SME*: Europack (BU)
  - *Artist*: Isaac Monté (BE/NL)
  - *Technology Supplier*: Ovisio Robotics (RO)
- **Mentors**: INOVA+, HBD, GLUON, HOLONIX
- **SME challenge**: convert diverse packaging solutions to Stone paper and to enter new markets by producing various types of products out of Stone Paper.
- **Impacts**: resource optimization of materials, water, energy and CO_2.
- **Artist challenge-driven**: highlight the importance of scales & reframe the value of plastic waste through: Create a new, updated design for the small scales introducing elements to highlight the value of DELMAC's scales and Use recycled plastic so as to prove that it can be a valuable material to make robust, accurate scales.
- **Artist mission-driven:** Reappreciate the care put in the scales by taking care of the workers by (i) making sure they comply with breaks, (ii) enabling healthy habits like frequent movement or stretching, (iii) providing mindful breaks to regain self-awareness.

ODC 3D

- **Title**: Optimisation of Digital Craftmanship in 3D printing through improved resource efficiency and operation efficiency
- **Members**:
  - *SME*: The New Raw (GR/NL)
  - *Artist*: Gareth Neal (UK)
  - *Technology Supplier*: Artific Intelligence (FI)
- **Mentors**: INOVA+, HBD, WAAG, HOLONIX
- **SME challenge**: demonstrate how craftsmanship and artificial intelligence can work together to improve energy efficiency, and optimise the fabrication of products made with large scale 3D printing and recycled plastic.
- **Impacts**: New products made from recycled plastic to be marketed and retailed at the top end of international design.
- **Artist challenge-driven**: The challenge-driven project takes mis-prints and glitches currently occurring in the printing process as a starting point, and looks to explore how they can be utilized to create exciting and desirable product samples for specification by designers within the design and architectural industry. This approach has the potential to reduce the volume of printing waste, saving on both materials, cost and time and will build upon the developments of the Artific AI.
- **Artist mission-driven**: Through a series of technical interventions proposed by the Artist, the KTE hopes to develop a printing technique that mirrors hand and tool movements used within traditional craft techniques such as weaving and crochet. The result of our Mission-driven project is to produce a working prototype that can be developed into a final piece and presented to the art market through Gareth Neal's previously established international gallery network and collectors' market.

DSBSF

- **Title**: Reducing wood waste from CNC production by anticipating wasted sheet-material before production
- **Members**:
  - *SME*: Delmac Scales (GR)
  - *Artist*: Sara Alvarez (ES/NL)
  - *Technology Supplier*: NO Solutions (SE)
- **Mentors**: INOVA+, HBD, WAAG, HOLONIX
- **SME challenge**: Collaborate with the local community for the collection and reuse of local plastic waste by incorporating it in the production of the scales, and Replace the purchase of some components by in-house production, using 3D printing in the production facilities.
- **Impacts**: Sustainable and optmised production through an immersive remote customer support.
- **Artist challenge-driven**: Highlight the importance of scales & reframe the value of plastic waste through: Create a new, updated design for the small scales introducing elements to highlight the value of DELMAC's scales and Use recycled plastic so as to prove that it can be a valuable material to make robust, accurate scales.
- **Artist mission-driven**: Reappreciate the care put in the scales by taking care of the workers by (i) making sure they comply with breaks, (ii) enabling healthy habits like frequent movement or stretching, (iii) providing mindful breaks to regain self-awareness.

MiniRoboFab

- **Title**: Exploring Product Customisation and Robotic Fabrication in a Small Factory
- **Members**:
  - *SME*: Ritherdon (UK)
  - *Artist*: Nicola Ellis (UK)
  - *Technology Supplier*: Digiotouch (EE)
- **Mentors**: INOVA+, HBD, WAAG, HOLONIX
- **SME challenge**: create a sheet-metal welding robot, testing the limits of human-robot working within a small, sheet-metalworking factory.
- **Impacts**: offering customizable designs for its products which, using the automated processes developed, will also allow 'Lot Size One' manufacture of these products, and boost factory's productive capacity.
- **Artist challenge-driven**: Focused on Waste powder usage reduction and recycling through: (i) Experiment with different ways to apply powder coating to steel, (ii) Discover new possibilities for powder combinations and new visual and surface qualities, (iii) experiment with waste powder as paint finish and combining it with fresh powder to change visual and physical/texture characteristics; (iv) use the powder coating facility as a temporary studio.
- **Artist mission-driven**: Generate and share knowledge about how the welding robot and associated technologies can be used in Ritherdon factory.

SMARTHam

- **Title**: Supervised Manufacturing And Real-Time Trace-ability in Ham Production
- **Members**:
  - *SME*: Capanna Alberto (IT)
  - *Artist*: Frederik de Wilde (BE)
  - *Technology Supplier*: Sirmium (SE)
- **Mentors**: INOVA+, HBD, GLUON, HOLONIX
- **SME challenge**: improve the effectiveness and profitability of ham production through potential implementation of product customization strategy
- **Impacts**: Product differentiation will embrace: a) new consumer cluster (special packaging for school students); b) new consumption opportunities (special packaging for aperitifs); c) new sales channel (special packaging for vending machines).
- **Artist challenge-driven**: Through the measurement of food eating related taste sensations and emotions, and translate/reproduce them in an interactive audiovisual and real-time way: (i) instances (3d animation with interactive sound) from the MISSION output are translated to WEBxr in order to create a digital augmented layer for a Capanna product i.e. ham. This will lead to product gamification to reach new consumer markets; and (ii) Create NFT's from the instances.
- **Artist mission-driven**: Create and build a novel interactive real-time food/taste to EEG audiovisual immersive experience in Unreal Engine 5 and MetaSounds (a new high-performance sound programming system that provides sound designers complete control over Digital Signal Processing in UE5).

RWC

- **Title**: Robotic Welding Cell
- **Members**:
  - *SME*: ZOVOS-EKO (SK)
  - *Artist*: Tomáš Libertiny (SL/NL)
  - *Technology Supplier*: Rossum Integration (SL)
- **Mentors**: INOVA+, HBD, GLUON, HOLONIX
- **SME challenge**: Improvement on Welded Metal doors' design from manual towards semi-/fully-automated (collaborative) robotic welding fabrication with a new aesthetics based on sustainability.
- **Impacts**: increase operation safety and high efficiency on production of repeated welds of passenger doors.
- **Artist challenge-driven**: The Artist will focus precisely on the first type of these doors. The specific challenge will be to adapt the new design into the new production method. The new production method will be done in two steps: manufactured of smaller parts manually and joining them all into the complete door system by the robotic welding station.
- **Artist mission-driven**: The Artist will aim to explore the potential of using the expertise of the SME's of fabrication of heavy-duty equipment. New product ideas are therefore very suitable for the use in the public space such gates, doors but also playgrounds, public exercise equipment for outdoor cross-fit trainings as well as public furniture. The use of metal and its exposure to abuse of both human and natural forces is part of Zovos-Eko accumulated experience over the years. With the use of more complex 3D welding technology and additive weld deposition the repertoire of design in the public space could be enhanced as for the most part it is still fabricated with traditional fabrication methods.

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