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STARTS – Why Not Using the Arts for Better Stimulating Internet of Things Innovation

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“Artists should be incorporated as catalysts for new ways of thinking, not only about art, but about the world we live in, to change the way things are done, made and developed in the world.”

Camille Baker, FET-Art Project

Abstract

Ongoing digital transformation is profoundly changing industry, science and technology. Linking technology and artistic practice is today being considered a win-win exchange between European innovation policies and the art world, up to the point that it would be counterproductive to restrict artistic freedom and independence through the current linear and incrementally oriented patterns of invention and production. It is evident that the Internet of Things (IoT) is one of the biggest game changers for modern societies, whereby the IoT deployment is highly challenging when it comes to address all the industrial domains and the needs of the stakeholders and end-users. And here it is precisely where artists and artistic practices can team up with product and process innovators, because their stimulating ideas and out-of-the-box thinking contribute to a successful transfer into the era of a hyper-connected and potentially more sustainable society.

*The views expressed in this article are purely those of the authors and not, in any circumstances, be interpreted as stating an official position of the European Commission.

5.1 Introduction

Europe has historically focused its attention in engineering on research, development and standardisation. Today, an increasing number of high tech companies assert that, in addition to knowledge, creativity is central to companies' and society's ability to innovate. For innovation to happen and to be of value for society, the critical skills needed – in addition to scientific and technological skills – are skills such as inventiveness, and capacity to involve all members of a society in the process of innovation.

In this context, the ongoing digital transformation is profoundly changing industry, science and technology. It can be observed that digitisation is indeed uniting science and engineering with design and the arts, that the boundaries between art and engineering are removed, and creativity has become a crucial factor in engineering and innovation in general. Nowadays, the Arts are gaining prominence as catalysts for an efficient conversion of Scientific & Technical knowledge into novel products, services, and processes.

The European Commission has repeatedly pointed to digital transformation of industry, culture and society as a driver for an innovation-focused cross-sectorial exchange. For radical market driven innovation, industrial players are encouraged to think in a more holistic way in terms of services and of technologies. Linking technology and artistic practice is today being considered a win-win exchange between European innovation policies and the art world. Such links will help overcome current linear and incrementally oriented patterns of invention and production. Those synergies will only work if artistic freedom and independence are not restricted which is the main asset form which we can draw inspiration.

It is certain that the future will be different in the way we create, perceive, communicate and earn our living. Although it has been repeatedly said that the Internet of Things is one of the biggest game changers for modern societies, it is only slowly that actors in many fields, be it for example agriculture, urban life, health, transport and environment, explore concrete avenues on how to use the Internet of Things and redesign their way of operation. So far it has not been fully appreciated that pursuing Internet of Things deployment is not more of the same but that it challenges all of us to approach the future in novel ways. And here it is precisely where artists and artistic practices can team up with product and process innovators, because their stimulating ideas and out-of-the-box thinking will contribute to a successful transition into the era of a hyper-connected and potentially more sustainable society.

5.2 The STARTS Initiative

Europe has a rich artistic heritage and diverse art scene, but this asset is currently underused in promoting innovation and wellbeing in Europe. One particular angle of this deficit is the continued divide between artistic practices and technological knowhow. The resulting deficit is perceived as opposing modes of thinking of art and technology and is enacted in a still prevalent reluctance for arts and technology to collaborate on important challenges for our society.

This has serious consequences for the role of technology and art in innovation in Europe. A number of studies show that creativity is key for innovation and can be unlocked by collaboration between art and technology. An enhanced collaboration between art and technology for the Internet of Things would not only stimulate innovation and thereby enhance the competitiveness of Europe on a global scale; it would also help unleash creativity in our society and in European regions (see Figure 5.1).

However, until recently the acceptance of a transversal cooperation between scientists, technologists and artists was little and best practice cases on how to best stimulate this cooperation were rare and not widely known. For this reason, the European Commission contracted a study about “ICT

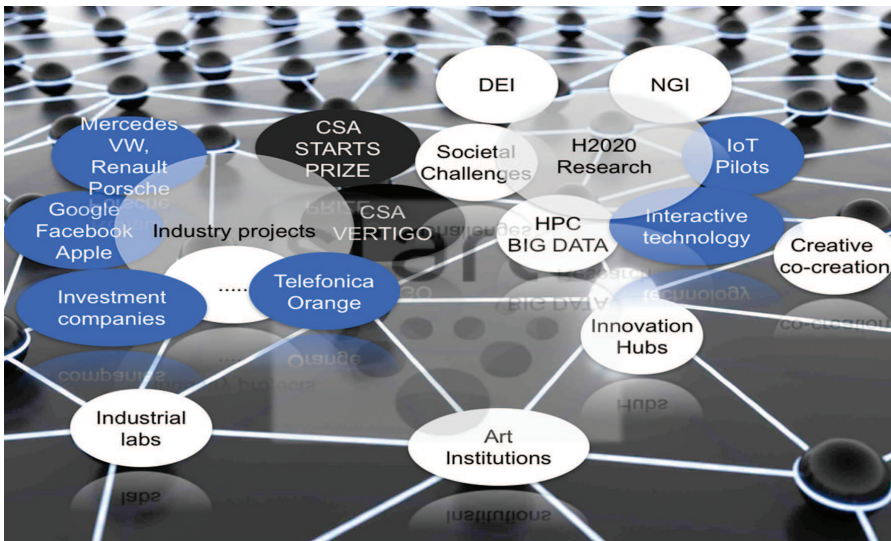


Figure 5.1 STARTS Ecosystem.

Art Connect – Activities linking ICT and Art” [1] in order to better target specific actions. Several barriers were identified: different working cultures between artists and innovators, different timescales, fear of artists to be instrumentalised, legal and contractual issues, non-explicit reference to the Arts in call for proposal texts, financing difficulties, missing openness on both sides, and lack of training and meta-competences.

As a consequence, the European Commission launched in 2016 the S+T+ARTS=STARTS [2] initiative – Innovation at the nexus of Science, Technology, and the Arts. Its objective is to provide seed funding for enhancing the interaction of H2020 projects with the art world and to promote inclusion of artists in innovation projects funded in H2020 and beyond. In a next step, the initiative should provide case studies – concrete projects where the Arts catalyse the novel application of technology in fields like Internet of Things, or in Social Media, where the influence of artists on novel uses and applications is strong.

5.2.1 STARTS Prize

The STARTS prize is awarded every year to projects at the cutting edge of creative and cultural engagement. In order to diversify the prize two categories are awarded:

- **Artistic Exploration**, where by appropriating technology in their artistic exploration artists help open new pathways for technology,
- **Innovative Collaboration**, where collaborations between artists and engineers are honoured that contribute to innovative product and services development in the context of industrial or societal innovation.

The STARTS prize is currently organised on behalf of the European Commission by Ars Electronica in collaboration with the Centre of Fine Arts in Brussels and Waag Society (see Figure 5.2).

Winners in 2016 were in the first category Iris van Herpen for the use of magnetic force fields as a design tool for clothes and shoes. For the second category the prize was awarded to Ottobock, a medical technology company, and the Berlin Weissenberg Art School for innovation in the design of prostheses (‘artificial skins and bones’). For 2017, the awards are attributed to the investigation into the constructive principle of the physical phenomena of jamming for construction, and to the exploration of the concept of ‘post-humanity music’.

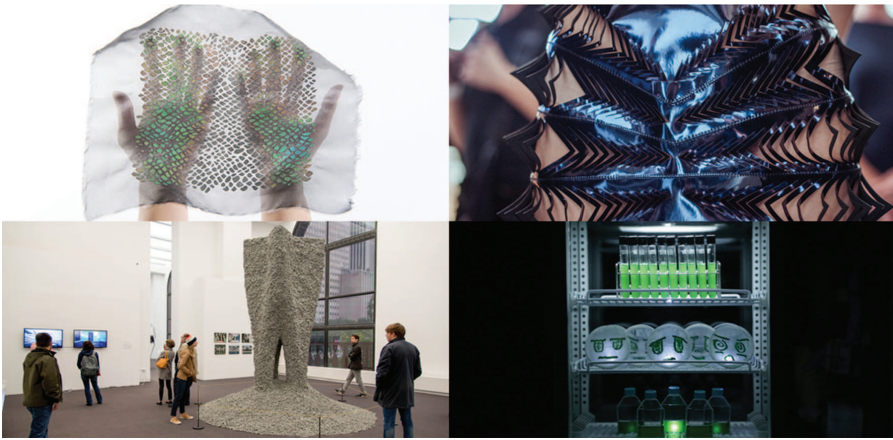


Figure 5.2 STARTS Prizes 2016 and 2017.

5.2.2 VERTIGO Coordination and Support Action

The VERTIGO project is supported by the H2020 Program of the European Commission, and its purpose is to support and coordinate synergies between the art world and the world of engineering and industry at the European level (see Figure 5.3).



Figure 5.3 VERTIGO artistic residencies.

VERTIGO will launch a program for STARTS residencies that will fund artists willing to work in technology environments for a duration of a couple of weeks. This will be done through several calls for proposals. Winners of STARTS residencies will be selected by an international jury. At least 45 residencies will aim at producing original artworks featuring innovative use-cases of the developed technologies in many areas including the Internet of Things.

A yearly public event in Paris provides the opportunity to exhibit the results of these collaborations. It will take place as part of the new Mutations/Creation platform initiated at Centre Pompidou, gathering exhibitions, performances and symposia, and dedicated to exposing and questioning the current challenges of contemporary arts in relation to their technological and scientific ecosystem.

5.2.3 Internet of Things European Large-Scale Pilots Programme

The Internet of Things European Large-Scale Pilots Programme includes innovation consortia that are collaborating to foster the deployment of solutions in Europe through integration of advanced Internet of Things technologies across the value chain, demonstration of multiple applications at scale and in a usage context, and as close as possible to operational conditions. At present the Programme addresses the fields of Smart Agriculture, Assisted Living, Wearables, Smart Cities and Autonomous Vehicles (see Figure 5.4).

The Pilots are accompanied by a dedicated supporting task as part of the project CREATE-IOT to develop a methodology for integrating Internet of Things and the arts, and to foster innovation in a heterogeneous Internet of Things ecosystem through the STARTS approach. The goal is to inject activities involving arts and artists that will lead to a more successful deployment of the Large-Scale Pilots results to the market.

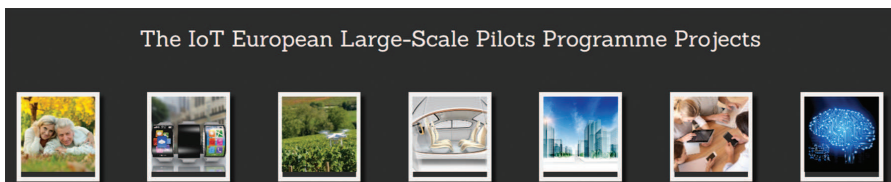


Figure 5.4 European Large-Scale Pilots Programme.

The activities include analysis of barriers to Internet of Things adoption and to follow-up user acceptance for improvement. They also intent to question the meaning and objectives of the pilots for a more sustainable implementation. Furthermore, the two Large-Scale Pilots for Wearables and Smart Cities are outfitted with a dedicated component on how to structurally integrate artists into the project realisation.

5.2.4 STARTS Lighthouse Pilots

The ultimate goal is to support art-driven innovation in European research and to create a STARTS ecosystem involving all stakeholders of 21st century innovation, industry, engineering, end-users, and in particular artists. To this end, the European Commission will finance lighthouse pilots addressing concrete industrial/societal problems, exploring new pathways and modes of thinking inspired by artistic practices, and developing art-inspired solutions in two chosen areas which can be situated around the Internet of Things (see Figure 5.5).

The lighthouse pilots will address in a first phase two areas:

- Digital objects and media for creation of smart environments for homes, mobility or urban spaces, putting art-driven design and development of

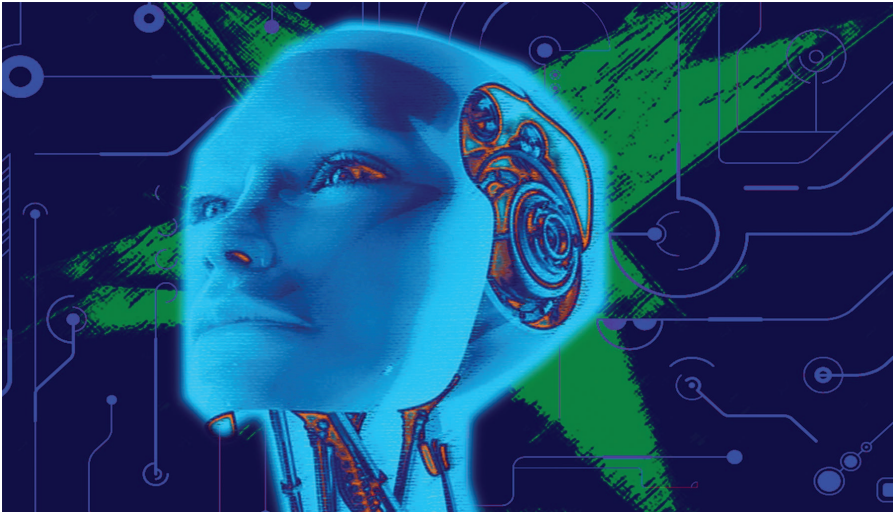


Figure 5.5 Future STARTS lighthouse pilots – catalysts of human-centred innovation [3].

services and products in the centre of radically different human-centred smart environments,

- Future of small scale production and co-creation value chains for reviving the urban social, ecological and economic spaces.

5.3 Internet of Things and the Arts

A successful implementation and non-technical deployment of the Internet of Things considers both technical and non-technical challenges. Although this appears trivial, the reality is dominated by a technology push, driven by efficiency justification and competition, and strategies for revenue increase. What is left behind, are pivotal reflections on the proper purpose and use of the Internet of Things, about sustainability (e.g. “less and differently than more of the same”), security and trust, about creativity where more and more ICT causes a suffocation of free thinking and human behaviour, not to forgot ethical questions about permanent data collection, implants, robots and artificial intelligence. If those questions are not properly addressed any implementation of the Internet of Things will miss its full potential.

Generally, the Arts can contribute on three levels towards better and sustainable evolution and innovation (see also Figure 5.6):

- **Catalysing function for innovation:** e.g. design of wearables, objects and smart buildings
- **Reinforcement of end-user and social engagement:** e.g. community-based development, digital empathy, green attitude
- **Critical attitude for pinpointing weaknesses of a system and its implementation:** e.g. critical documentary, creation of social media movements, system testing and hacking



Figure 5.6 Different levels of artistic collaboration of the Internet of Things [4–6].

Now where in the context of the Internet of Things the Arts could beneficially intervene? As possibilities are numerous, the following list can only be considered as a starting point and needs to be extended.

- **User experience and Interface design:** through the Internet of Things the future user experience is potentially twofold: technical devices and machines are disappearing, as e.g. environments become smart, but we also will deal with more of existing, augmented or new objects. In both cases, new and disruptive user experiences are to be designed where the artistic perspective could be highly beneficial.
- **Solution design:** here the objectives and functions are decisive for successful Internet of Things application take-up. A creative and critical artistic perspective could help for radical innovation, but also to get out of a technology-only driven approach.
- **System design:** in order to satisfy specified requirements, artists could help improving the process of defining architectures, modules, interfaces, and data bases from various angles, such as new creative perspectives, asking un-orthodox questions and making critical remarks e.g. concerning the extent of use of data.
- **Testing and Improvement:** testing is crucial for pushing the Internet of Things system towards adoption. Often on testing and subsequent improvements are neglected or even being considered as annoyance. In this context artists could e.g. take a mediating role both for a feedback process and supporting a common understanding.
- **Communication:** the importance of communication is often underestimated for a project success. But instead of wondering about professional support, artists could create/invent unconventional means and images for better communication.
- **Ethical/societal questions:** particularly for the Internet of Things and in light of a highly transversal deployment these interrogations play a crucial role. Artists can pinpoint and help to thematise them as they might be pushed back and repressed by the project team.

It should not be forgotten that the cooperation between artists and innovators is not happening per se, even as in theory positive results can be expected. Efforts need to be made on how those different working cultures can be brought together and synchronised. It is important to address the different timescales between engineers and artists, rapid remuneration, team-building, training and advancing through iterative steps and pilots.

5.4 Conclusion

The STARTS initiative supports the artistic practice contributing to innovation of information and communication technologies. It emerged out of the necessity to facilitate the cooperation between artists and innovators at the nexus of Science, Technology, and the Art. At present the catalytic aspect of artistic practices in innovation projects has been proven, although hesitations remain. The creation and extension of the STARTS Ecosystem for increasing awareness and the number of collaborations remains at the heart of the European Commission. The Internet of Things is potentially one of the most promising areas of cooperation, which at the same time due to its societal importance has a huge demand for artistic intervention and therefore presents a perfect match.

References

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