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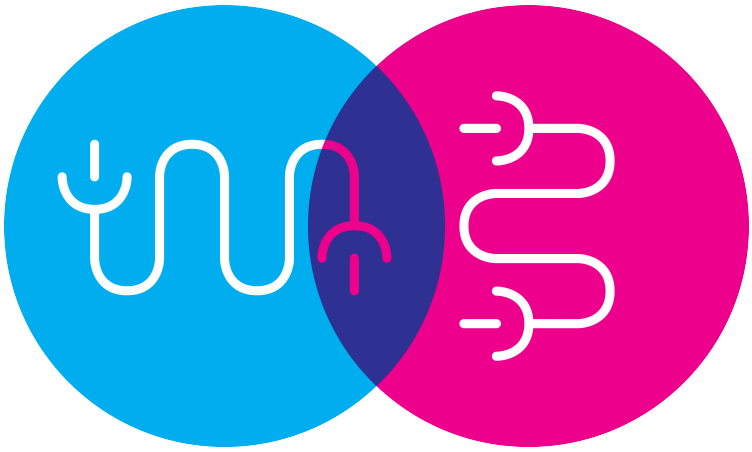

Project Acronym:	**#MusicBricks**
Project Full Title:	**Musical Building Blocks for Digital Makers and Content Creators**
Grant Agreement:	**N°644871**
Project Duration:	**18 months (Jan. 2015 - Dec. 2016)**

D2.2 Exploitation Plan

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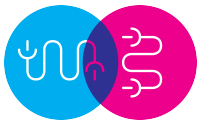

The #MusicBricks project consortium is composed of:

SO	Sigma Orionis	France
STROMATOLITE	Stromatolite Ltd	United Kingdom
IRCAM	Institut de Recherche et de Coordination Acoustique Musique	France
UPF	Universitat Pompeu Fabra	Spain
Fraunhofer	Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung E.V	Germany
TU WIEN	Technische Universitaet Wien	Austria

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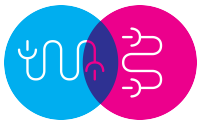

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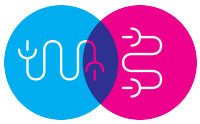

Executive summary

The present document is a deliverable of the #MusicBricks project, funded by the European Commission's Directorate-General for Communications Networks, Content & Technology (DG CONNECT), under its Horizon 2020 research and innovation programme.

The document presents the exploitation plan for the first half of the project. Exploitation is here presented for each individual partner, as well as at the consortium as a whole. Exploitation is key not just for the consortium, but also – and foremost – for the projects which are being supported in the Creative, Industry and Market Testbeds. Business models and plans concerning the creative projects supported are developed in the third testbed and will be reported in WP7 deliverables.

So far, the suite of tools made available by partners during the creative testbed events has been well received and utilised, providing the individual authors with valuable feedback and ideas for further development and exploitation. 11 innovative projects based on the bricks are currently incubated and will be further channelled to the market. The #MusicBricks process is extremely valuable also in terms of best practices, knowledge exchange and models distilled by the consortium members, suitable to be repurposed in future projects, studies and ventures.

Three new 'bricks' joined recently the project suite, proving the interest by external stakeholders in joining the #MusicBricks ecosystem, and showing the potential for exploitation of the project outside the boundaries of the H2020 framework and in the industry.

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Introduction

The #MusicBricks exploitation plan deals with setting up the environment for making possible the presentation on the market of the 11 innovative ideas supported in the framework of the project, as well as further exploiting the project tools and acquired knowledge. This first exploitation plan is drafted at M9, and will be updated at the end of the project (M18), to detail how each project partner and the consortium as a whole intend to make use of technology results and take advantage of their activities in the project. This report outlines the #MusicBricks consortium current exploitation status and future plans to further benefit from the partners participation in the project. *Exploitation* as presented here includes the increase of partners' expertise, knowledge acquisition, network enhancement, commercial opportunities, as well as scientific/ technological advances. WP7 deliverables will include the structure of a business model towards the commercialisation of the innovative ideas incubated by #MusicBricks, as well as related barriers. This 'exploitation long tail' and the success of these projects complete thus the plan outlined in the present document.

The Exploitation Plan is two-folded, as it presents exploitation for each individual partner and at the whole consortium level. For each partner are hereby reported the expectations prior to the #MusicBricks launch; the current exploitation of the project; and the future plans for exploitation. For what concerns the consortium, the document outlines factors such as the integration of external bricks and the distillation of best practices that require the cooperation of the whole group of partners.

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1. Exploitable elements

The exploitation of the technology bricks provided by the project in commercial products is the one of the major aims of #MusicBricks, and informs the process leading from WP5 to WP7. The exploitation of the suite by third parties is completed by the benefits that each partner and the consortium as a whole will be able to draw from their participation in this Innovation Action.

The following three categories of elements are considered as exploitable:

1. New knowledge

- Feedback on the tools;
- Network enhancement;
- Methodologies tested and validated in the incubation process;
- Lessons learnt replicable in future European funded projects and suitable for advising the European Commission.

2. Improved technologies

- The complete #MusicBricks toolkit;
- Individual APIs;
- TUIs (hardware, branded and packaged for sale);
- GUIs.

3. New products

- Airstrument;
- Dolphin;
- Eear;
- Enboard;
- FindingSomEthing BondingSoUnding;
- High Note;
- Hue-Wee Jam Session;
- Interactive Cube;
- Interactive Remix Dance Floor;
- Manuphonia;
- Sound in Translation.

The elements cited above feed each partner expertise (technological, legal, industrial) and competitiveness, contributing thus to their strategic positioning in the music industry, in the H2020 framework and beyond.

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1.1 Feedback on the tools

Technology partners attending the Creative Testbed events (Music Tech Fest Scandi; Music Hack Day Barcelona; Music Tech Fest Central; Waves Festival) not only played a proactive role introducing the tools they developed to the participants of the hackathons hosted by each event, but they also remained at the disposal of the creatives for any questions and elucidations. The interactions with the participants and the novel way they employed the tools proved extremely valuable for the #MusicBricks providers, giving them inputs for improving the tools (in some cases directly on site) and to think of possible integration with other tools and programming languages.

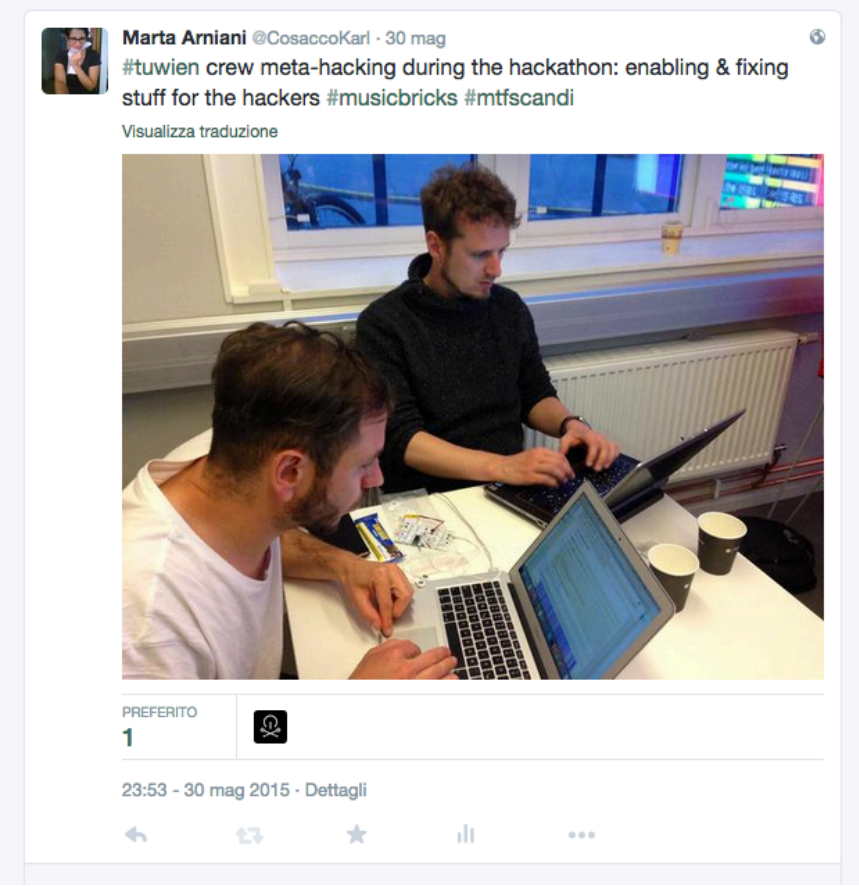

Fig. 1: Partners working onsite accordingly to the feedback received at the Music Tech Fest Scandi Creative Testbed

1.2 Network enhancement

The creative testbeds saw the participation of important industry players, such as Soundcloud, Philips and Warner Music, and the project has been communicated to industry stakeholders at key events such as SXSW in Austin, Texas (17 March 2015); TEDx Umeå (23 April 2015); Re:publica Berlin (5-7 May 2015); and Open Innovation 2.0 in Espoo, Finland (8-10 June 2015) (see D2.1 for the full list). Not only #MusicBricks, but also the partners clearly benefit from such exposure.

1.3 Methodologies tested and validated in the incubation process

The residency placement system employed in #MusicBricks is the evolution of the one pioneered in the FET-ART Coordination and Support Action (2013-2014, coordinated by Sigma Orionis and including Stromatolite as key consortium member). In the #MusicBricks framework it allows the mentoring of the teams selected during the creative testbed events (remote or F2F, on a case by case basis). This methodology facilitates interdisciplinary,

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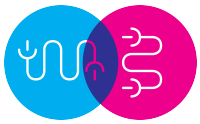

productive and fast collaborations, and is being adopted as a requirement by the European Commission in the Industrial Leadership Pillar of the H2020 Work Programme for 2016 and 2017. More precisely, the STARTS (Science, Technology and the Arts) call for Coordination and Support Actions, identifies ICT & Art residencies as one out of the three core activities to be coordinated by applicants.

The methodology is clearly of interest to the industry as well, as it demonstrates the possibility of fast progresses from simple ideas developed in a 24-hour hackathon, and testifies how routes to market can be focused on shorter ideation/development cycles, alongside with a constant feedback loop. In a moment that sees the crisis of classic music industry big players sources of revenue, as well as the global success of SMEs such as Spotify, it is not surprising that #MusicBricks attracts for instance the interest of Josh Saunders, Head of Technical and Creative (Digital) at Warner Music UK, who is following closely one of the incubated projects (Interactive Cube).

Finally, the increasing pace of change concerns all phases of product development, and a lifecycle of a few months is already reality for a variety of technological products. #MusicBricks proposes a solution to cope with fast-changing markets that can be applied beyond the music sector including proactive users in the exploitation of technology, producing thus a creative fruitful collision of different expertise and uses, opening new avenues that the technology provider alone would not have considered.

1.4 Solutions replicable in future European funded projects

Besides the residency methodology cited above, some administrative items required a strong collective effort, and the way the consortium tackled these challenges can open the way for an easier implication of new actors in European funded frameworks. These items are namely:

- Handling the Intellectual Property in the Consortium Agreement
- Elaborating a residency contract valid across Europe

The above contracts were given special attention and focus because the partners considered them extremely important for securing the successful exploitation of the project (see Section 3).

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2. Partners' Individual Exploitation Plans

The exploitation plans reported in this section consist in each partner answers to the following *Exploitation questionnaire*:

Q 1: Expectations / Motivation. What is the main reason why you organisation got involved in the #MusicBricks initiative? What did your organisation expect to achieve in joining the #MB consortium? (Increase of your expertise, knowledge acquisition, network enhancement, commercial opportunities, scientific/ technological advances, etc.)

Q 2. Current exploitation. How the participation to #MusicBricks is currently being used/ exploited by your organisation, and in which measure is it influencing your strategy and activities? (Feedback, knowledge acquisition, network enhancement, scientific/ technological advances, etc.)

Q 3. Future exploitation. How does your organization plan to exploit #MusicBricks outcomes after the project?

2.1 Sigma Orionis

2.1.1 Initial expectations and motivation to join to consortium

Sigma Orionis is specialised in bringing research to innovation and markets, and has a long-standing expertise (31 years) in European funded projects. The company considers #MusicBricks a strategic project to be part of as it is pioneering new routes to market for technology research. The project ambition resonates with Sigma Orionis' Creative and Civic Innovation Unit (CCI) one, which experiments creative and interdisciplinary models for bridging technology research to innovation and to civic society. Empowering citizens through collective intelligence and unleashing the power of European creative excellence are its two major areas of action.

If a collaboration with the Innovation Coordinator and contacts with the other partners were already established, the project provides Sigma Orionis the opportunity to strengthen its links with the top European research centres for music technology, and to lay the foundation of future collaborations.

By coordinating the #MusicBricks project Sigma Orionis expects not only to add a relevant experience to its portfolio, but also to enhance its network in the music industry and to consolidate methodologies and processes it has contributed to launch.

2.1.2 Current exploitation of #MusicBricks

As any pioneer project, #MusicBricks presented so far challenges that had to be solved at the coordinator's level (e.g. framing IP rights in the consortium agreement) and provided Sigma Orionis with use cases and solutions suitable to be exploited in further projects. The company is at present collecting and analysing best practices and methods (this same report is partly a distillation of this knowledge), and plans to utilise them outside the boundaries of the CCI Unit and of the #MusicBricks project.

Presenting the project in external events, as well as taking part to the project testbeds, enhanced the company visibility and positioning, thus enlarging its network.

2.1.3 Plans for the exploitation after the grant end

Sigma Orionis involvement in the #MusicBricks project will increase the overall potential of the company as far as its four core services are concerned: technology and market research, promotion and exploitation of research projects, organisation of cooperation and business events, support to the involvement in EU-funded programmes.

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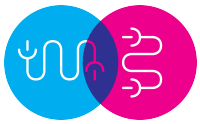

Sigma Orionis plans to further collaborate with the consortium members and to exploit the knowledge acquired thanks to #MusicBricks in future projects and publications and in the CCI Unit development strategy.

2.2 Stromatolite

2.2.1 Initial expectations and motivation to join to consortium

Stromatolite believes that building a wider ecosystem around the creative industry of music technology brings more awareness to this sector and more demands for its goods and services, which in turn benefits all stakeholders involved. Proof of this has been seen in the successful #MusicBricks campaign, which highlighted the benefits of the #MusicBricks music technology ecosystem, and prompted external industry stakeholders to invest their tools into the project, thus adding more value to the toolkit. Partnerships forged through such collaborations and alliances are expected to bring long-term benefits to all stakeholders involved.

2.2.2 Current exploitation of #MusicBricks

As a toolkit which stimulates the seeding of creative ideas and the generation of new markets and business models, #MusicBricks forms a valuable part of the Music Tech Fest ecosystem, which has built a community of highly engaged contributors across multiple geographies, across industry and academia, across age groups and across multiple disciplines from the finest arts to the most advanced technologies. At its core, Music Tech Fest is a festival of ideas, a melting pot for the ideas and creativity of all of these contributors. As such it functions best with the minimal level of formality and structure, eschewing the agenda driven format of a traditional conference, and importantly striving to avoid prohibitive fees and costs to contributors to ensure that it is open to all, and maximally beneficial to its community.

For third party stakeholders in the music technology landscape, seeding ideas with #MusicBricks at the Music Tech Fest Creative Testbeds may represent either pure blue sky R&D - simply watching for ideas or applications that may fit their requirements - or more directed R&D where their requirements, technology, applications, data, etc. are seeded into the community. This interest has been harnessed in the form of match funding and equipment in kind, by major brands in both the music and technology landscapes (e.g. Soundcloud, Philips, Ableton, Warner Music, etc. - see the full list in the footer of http://www.musictechfest.net/). As Music Tech Fest has grown in scale and profile there is a strong argument that the interest of these and other new stakeholders in the music tech value chain can be harnessed in a more meaningful fashion.

In conjunction with Music Tech Fest and Par Equity, Stromatolite is establishing a Music Tech Fund, which is set to engage a large number and variety of commercial industry players e.g.: music services, record companies, music publishers, performing rights organisations, music tech companies, music device and equipment manufacturers, mobile carriers, music and sound production and post-production, sound engineering, creative marketing, mobile apps, gaming, live events, etc. (as noted in the “MIReS Roadmap”, the FP7 CSA from which the festival evolved). In terms of novel business models, an interesting reference point are those corporates involved in the Project Music accelerator investment programme in Nashville http://www.ec.co/projectmusic/ (e.g. Digital Entertainment Ventures, Google, Creative Artists Agency, Universal Music, Red Light Management and Galante Entertainment).

2.2.3 Plans for the exploitation after the grant end

#MusicBricks has demonstrated that the project’s Open Innovation approach has successfully enabled rapidly evolving layers of innovation, supported by the creative seeding of ideas and strong marketing and business direction and support:

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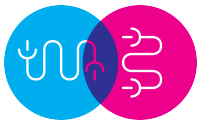

1) Creating a **#MusicBricks Components Toolkit** for the sector of music technology (at first derived from academic research results, but now with the addition of industry tools) which can be shipped and combined with another sector's toolkit for experimentation (demonstrated very successfully during our last Creative Testbed).

2) **#MusicBricks Product Prototypes** have been developed from seed ideas using the #MusicBricks toolkit following the principle of Open Innovation (a range of 11 to date - from data-enhanced product and hardware to SaaS).

3) **#MusicBricks Product as a Platform** - some of the above #MusicBricks product prototypes allow applications to be built on top. E.g. the #MusicBricks project Dolphin (gesture-driven spacial audio headphones) and Enboard (motion-driven music playlisting skateboard) are both potential platforms enabling gaming developers to build applications for these products.

4) **#MusicBricks Creative Content** can be built for the above by engaging platform content creators (e.g. creative developers, media content and product makers)

By establishing a Music Tech Fund, Stromatolite anticipates all of the above layers of product, service and content innovation will have the opportunity to benefit from an Industry Fund and Accelerator Programme, with potential for seed investment, direction and mentorship, with formalised and professional processes for investment negotiation and documentation, due diligence, post-deal monitoring, company support and exit.

2.3 TU Wien

2.3.1 Initial expectations and motivation to join to consortium

TU Wien was successfully involved in European research networks already in FP5, 6 and 7, e.g. in the Digital Library initiative DELOS, the MUSCLE project on multimedia understanding and the CHORUS+ multimedia benchmarking initiative. The consortium of #MusicBricks is particularly interesting, as it comprises top European institutions in Audio and Music Analysis: UPF Barcelona, IRCAM Paris, Fraunhofer Germany and companies Stromatolite in UK and Sigma Orionis in France. While there existed loose collaborations with nearly all of them prior to the project, joining this initiative will certainly strengthen partnerships among these institutions and lay the foundation for future collaborations. These collaborations might include academic publications, integration of software, research partnerships and exchanges as well as overall a positive visibility in the research community and beyond. Moreover, the provision of software tools as outcome of prior research as a common pool of "bricks" to a larger audience of creators, SMEs and industry will certainly have a positive effect, both on improving the tools towards industrial applications and on the integration level. Communication-wise this will also have a large effect on our institution. On top of that, a major benefit is to get in touch with industry players in this sector, such as Soundcloud or Philips, which also may be potential future partners.

2.3.2 Current exploitation of #MusicBricks

In the first phase of #MusicBricks, the main benefit of the project is to gather a lot of feedback from the creators (hackers) who are working with the #MusicBricks tools. Already after the first 2 events organized by #MusicBricks, there was a reasonably large number of feedback from applying the music analysis tools in both live performance, experimental but also industrial settings which turned out to be really valuable to improve the tools towards this respect both in terms of stability and various additional features that were not primarily addressed by the research earlier. Additional feedback is gathered from the partners within #MusicBricks, where an exchange of ideas and feedback takes place, which also benefits the tools themselves. The entire consortium learns from the manifold applications of the tools devised in the "hacker events" co-organized by #MusicBricks and the manifold use cases therein.
In particular the combination of various tools as shown by different creators makes this initiative very interesting and the partners in the project can learn from applying each others tools jointly and aim for making integration more

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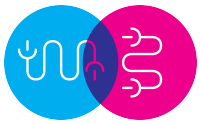

simple. This includes knowledge exchange and exchange of competencies which were not in the focus of each institution prior to this project: As the "Institute of Software Technology's Information & Software Engineering Group" of TU Wien, we are not primarily focused on physical and tangible devices and have learned a lot about the use of (e.g. gesture) sensors in real-time environments together with software. Also, the collaboration with other partners with similar research areas makes a lot of sense to mutually strengthen the research outcome and aspects of stability and integration. TU Wien and UPF-MTG established 2 research visits in the course of the #MusicBricks project; another one with IRCAM is being discussed.

2.3.3 Plans for the exploitation after the grant end

The feedback gathered during the project about the tools will certainly stimulate future research, which can already incorporate use-cases, requirements and issues of "real-world" scenarios early on. Knowing the tools from #MusicBricks very well will also largely benefit university teaching as several of these tools can be employed in both lectures and teaching assignments. This in turn will again gather valuable feedback for all of the tools. The tools themselves can be integrated and used in larger systems in future research projects.
Far more than that, #MusicBricks implicitly initiates a large network of people across many disciplines, with backgrounds as researchers, creators, artists, entrepreneurs, etc. This network provokes exchange of ideas far beyond the traditionally technology-centred aspects that a technical university usually focuses on and therefore opens up inter-disciplinary research aspects that were not considered before. Potential partnerships with companies that were involved with #MusicBricks are an additional benefit for future exploitation.

2.4 IRCAM

2.4.1 Initial expectations and motivation to join to consortium

#MusicBricks represents for us the opportunity to reach a broader community interested in our gestural and tangible interfaces developments. While we are used to deal with artists, academic communities (such as the audio technology and computer human interactions communities), specialised industries, #MusicBricks bring us the possibility to reach towards larger communities of "Makers" who are playing an increasing role for innovation in Europe. It is then particularly interesting to evaluate the readiness of our tools in this context, since this type of technology is evolving very fast. This implies gauging our technology and improving it in order to facilitate the take up by potential industrial partners and start-ups.

2.4.2 Current exploitation of #MusicBricks

The participation in #MusicBricks allowed us to clearly confirm the large demand in wireless motion sensing technologies. In particular, #MusicBricks gave us the opportunity to improve and duplicate our current hardware, called R-IoT, which opens new opportunity for both research, artistic endeavours and transmission through hackathons and workshops. #MusicBricks gave the momentum needed to duplicate our tools and disseminate our movement interaction approach. Importantly, #MusicBricks also allows us to improve the interface of our gesture analysis software (API), to be used in different platforms (embedded microcontrollers, desktop and mobiles).

2.4.3 Plans for the exploitation after the grant end

The #MusicBricks outcome is twofold. First, the project gives us the opportunity to broadly disseminate a number of basic tools to a large community of researchers, designers, makers and artists interested in non-commercial applications. This will be continued after the project. Second, it gives us the opportunity to further seek new industrial partners (startups and other industries) interested in licensing IRCAM technologies.

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2.5 UPF

2.5.1 Initial expectations and motivation to join to consortium

The Music Technology Group is internationally recognised for its track record in TechTransfer (regular collaborations with companies, licensing of technologies, establishment of 3 spin-off companies) as well as for investing important efforts in producing impact at socio-economic level, in form of concerts through the Phonos project, organising workshops in schools to foster interest in sound and sound technologies and the Music Hack Day in Barcelona amongst others.
The reason why we yearly organise the Music Hack Day is because it represents not only the perfect environment for us to get feedback about our technologies directly from end users but also a way to discover new use cases and understanding the needs that our technologies must fulfil in order to proof to be useful for the creative community. This valuable information directly feeds our development roadmap in order to optimise our technological assets, making them more appealing for the market and thus more likely to be transferred.
It is then natural for us to be interested in participating to #MusicBricks, which promotes a number of values that are really aligned with our current strategy. In addition, thanks to this project we can host creators and help them incubating their projects empowered by our technologies and thus helping them taking the most of our technologies (and developing better use case integrating our technologies). Moreover, it constitutes a good showroom of our technologies not only for hackers and the makers community but also a great number of stakeholders at European level. At last, it also helps us spreading our academic network at European level and strengthening our links with the #MusicBricks partners IRCAM, TUWien, Fraunhofer, and of course Stromatolite and Sigma Orionis acting as innovation catalysts.

2.5.2 Current exploitation of #MusicBricks

As introduced above, #MusicBricks helps us to better understand the real market needs and thus the knowledge we are gaining through the hackathons and incubations are feeding into our development roadmap.
In conclusion, we can figure out and try strategies to enable additional pathways for sophisticated technologies to get to market in a way that is coherent to us as a research centre. It is also interesting to see how other European research centres are dealing with innovation processes and TechTransfer.

2.5.3 Plans for the exploitation after the grant end

The 'Bricks' that we have provided to #MusicBricks (Essentia and Freesound.org) are technologies released under open source licenses and thus it is crucial for us to engage developers and find ways to make their communities sustainable. We have other ongoing (private and publicly funded) projects that are allowing the pure technological development of those technologies, while projects like #MusicBricks and initiatives like the Music Hack Day helps us to maximise their exposure to potential clients and users, gaining more knowledge about how to improve them and making them more useful for the developers.

2.6 FRAUNHOFER

2.6.1 Initial expectations and motivation to join to consortium

Even if we´re doing applied research and the brand name Fraunhofer is well established worldwide, we do need more feedback from the market and especially from the creative people for our developed tools and our ideas. Taking some very useful tools from our portfolio which are offering basic functionality and bringing them to the creative environment will hopefully prove to be valuable and informative. Even if an idea receives negative feedback when taken to market, this is very valuable information for us. Usually an institute presents papers at conferences to a lot of like-minded people with the same high-level background, though that often lacks real substantial feedback. On the

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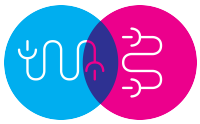

other hand, software created for commercial applications and offered to IT services of potential customers may not return helpful evaluations.

Joining the #MusicBricks consortium means for us: presenting a set of tools to people with a very creative mindset without any specified previous knowledge, so that they will be able to use our technology with a flick of a finger. With the creative thinking "outside the box" and the experience of the creator's activity with our tools, we hope to improve not only the quality of our software but also the commercial potential when it comes to new licensing or product opportunities, beside additional contacts and a broader network to a great new community of creative people.

2.6.2 Current exploitation of #MusicBricks

In the discussion with our existing licence partners #MusicBricks is often part of our discussion in a developing cooperation, as well if we talk to partnering organisations like Audiolabs in Erlangen or other specified institutes. One can say, that everybody is very interested in this kind of incubation and the possible outcome. On the other hand potential partners, who are interested in products and projects based on the used topics, are also very interested to see how #MusicBricks is bringing together new ideas and a new way of incubation with the help of leading research institutes, partners like AxelSpringer SE, Native Instruments and others. The evolving connections in this project play an active role in our public relations and we are getting back benefits which we are finding have positive marketing effects for our licensing business and applied research.

2.6.3 Plans for the exploitation after the grant end

At the moment we are working together with our #MusicBricks partners to estimate the efforts and the possible success of the ideas which are already incubated. Some of the candidates for the next stage have chosen our tools and merged their ideas into new products. We are also gathering feedback that will lead to a more easy access to our SDKs and therefore we are planning not only new documentation but also some interactive or video tutorial, which will also help us in our communications with existing or new licensing partners. In the way we are communicating with all the stakeholders of these incubated teams and their approaches, we are checking the potential outcome for a partnership or to take an idea to a new level. While some members of our team were involved in the various testbeds, they have decided to organise academic hack events which will use all tools from #MusicBricks together with a department from the Fraunhofer IIS (MP3 inventors), the Audiolabs Erlangen and the Technical University Ilmenau. Our goal would be, to involve more people to think about new and innovative products based on research, because this is a very important repository for new ways of exploiting scientific work. Our favourite scenario is, to bring together one of the incubated teams using our tools with an existing or potential partner, to generate a real product or project as a direct outcome of #MusicBricks. That is why we are already mentoring the incubated teams and are planning to intensify our efforts fort the consulting tasks in WP7.

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3. Co-operative exploitation plan(s) of the #MusicBricks consortium

3.1 Enriching the tools suite

The 8 tools offered at the beginning of the project were joined in the past two months by 3 new bricks: SyncJams, POF and SonarFlow, the latter with its associated set of technologies. The tools suite comprises now 11 open APIs, GUIs and TUIs that allow creative technologists to create powerful new music projects, services, performance ideas and products. The the toolkit expansion is not only an indicator of how valuable the tools suite is, but also of the importance of federating different players and building a culture of exchange and cooperation. The new bricks and the advantages for their creators to join the suite are presented hereafter.

3.1.1 Spectralmind

Spectralmind was a startup-company co-founded 2008 by four music enthusiasts and semantic audio analysis experts in Vienna, Austria: Thomas Lidy, Ewald Peiszer, Johann Waldherr and Wolfgang Jochum. They created industry-grade audio analysis software based on prior research at Vienna University of Technology. Based on this audio analysis core, they built music search and recommendation products for professionals and music discovery apps for consumers on the Web and using iOS and Android smartphones.

The company ramped down in 2013 and closed in 2015 as it did not achieve its internationalisation goals. Throughout more than 5 years, a team of 12 engineers, researchers, UI-specialists and product & business development built an asset of a full software stack from fast industry-level audio analysis to fully-fledged interfaces for music search and recommendation.

The Spectralmind board decided to provide this software as #MusicBricks tools as there is a high potential of other people using part of this large software stack in various other projects. The software is very modular and can easily be used as building blocks for other, even bigger software projects around music and media search and recommendation. The entire software stack has been published on https://github.com/spectralmind under the MIT license, which not only provides the code open source, but also enables usage in commercial projects.

The Spectralmind board explicitly wished for the software to live on and evolve and be potentially used in other innovative projects, be it free as open source or also commercially. Publishing it as part of #MusicBricks brings the stack into a community of hackers, creative people and SMEs - the ones that benefit the most of such a software package. In turn, Spectralmind benefits from the visibility in donating their entire software to the public community, which might be beneficial to its owners acting as advisors for these building blocks. Thomas Lidy, former CEO of Spectralmind, is available to advise people throughout the #MusicBricks incubation program and also Ewald Peiszer, former CTO of Spectralmind, joined #MusicBricks for #MTFCentral in Ljubljana to advise people on how to use the software.

3.1.2 Ninjatune

The SyncJam and POF projects are led by **Matt Black** - industry pioneer, DJ, VJ, Ninja Tune label manager, one half of sampling legends **Coldcut** and godfather to the Music Tech Fest.
After 300,000 downloads of their iOS app, Coldcut and NinjaTune have recently launched their NinjaJamm Android app, which allows users to cut, glitch, mash and mix to make their own music, featuring loops and samples by the likes of Amon Tobin, Bonobo and Roots Manuva. As part of his continued effort to enable mass use of creative music tools, Matt Black teamed up with established developers Chris McCormick and Antoine Rousseau, to develop Open Source applications SyncJams and POF.

SyncJams is an open source standard to allow wireless inter music app sync and communication of key/scale between players in a 'mobile orchestra', defined by Chris McCormick as: "Zero-configuration network-synchronised metronome

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and state dictionary for music application". Currently Pure Data and Python are supported and it is available on Github.
POF = Pd + OpenFrameworks : openFrameworks externals for Pure Data, providing openGL mutlithreaded rendering and advanced multitouch events management. It can be found on Github and makes making PD music apps much easier including cross platform. It also feeds the Mobile Orchestra through SyncJams.

"Really happy to be joining the awesome #MusicBricks project. The whole concept of making tools freely available, providing space for makers and hackers and then supporting what's made with them is just brilliant. This is a new cooperative Win strategy. Looking forward to see what comes out of our #MusicBricks offerings. Onwards!" **— Matt Black, Coldcut / Ninja Tune**

3.2 Collaborating with key industry actors

Besides individual partners network enhancement, the suite as a whole has proved to be a valuable asset to be exploited with industry players. The creative ways the Philips Hue controllable lighting system was enhanced with the help of the suite at the Music Tech Fest Central testbed, adds a layer to the above-explained cooperative strategy. A big potential suited to be examined relies thus not only in adding new bricks, but also in exploring novel ways to bridge the tools and transversal applications with other technologies and frameworks.

3.3 Distilling methodologies and case studies for supporting innovation in H2020 (and beyond)

3.3.1 Regulating external innovation parties within the consortium agreement

The elaboration of the #MusicBricks Consortium Agreement proved extremely challenging as the DESCA template does not provide a clear guidance about cases where Intellectual Property regulation is not just an internal consortium matter but can affect directly the implementation of the action: in the #MusicBricks case the project is based on the principle of letting third parties developing new product ideas based on the technologies developed by the consortium. In order to succeed in this Innovation Action, the consortium needs to secure two types of results. The first set is the result of the WP3&4 (APIs, GUIs and TUIs) generated by the partners in the project. The second set is results generated by Third Party stakeholders following WP5-WP7.

In order to ensure delivery of the second set, consortium members needed to agree in advance on a strategy of deployment and commercialisation of the results of WP3&4. The Innovation Coordinator suggested the introduction of the distinction between:

- Background IP (existing results of partner research, ready for deployment via APIs, GUIs and TUIs)
- Research Foreground IP (results of WP3 and WP4, and any subsequent iterations / fixes following user feedback)
- Innovation Foreground IP (results of WP5, WP6 and WP7)

The following user case scenarios illustrates the Innovation Foreground IP:

Research Results User Case Scenario 1
"Creative Developer X uses an Arduino to build a physical interface which queries a number of APIs to access music data and drive Product Z. This set may be provided by e.g. Spotify API, MusicBrainz, Freesound.org and the newly available API from WP3.
a) All of the API stakeholders are happy for the developer to use these APIs during the course of experimentation and prototyping.
b) All of the API stakeholders require a commercial licence agreement upon commercialisation (proof of commercial transactions, or commercial agreements guaranteeing such transactions) of the stated product.

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c) All of the API stakeholders agree that the creative developer owns the IP of the product idea, any originally conceived and designed (e.g. 3-D printed) controller elements, or any innovation in the combination of software and hardware which can be proven to add efficiency to determined workflows on a case-per-case basis.
d) IP components which drive the said invention are individually owned by 1) Arduino 2) Spotify 3) MusicBrainz 4) Freesound.org 5) API resulting from WP3 (subject to consortium Research Foreground IP agreement) and those components listed under attribution, e.g. Open Source / GNU GPL / CERN OHL / OPL."

Research Results User Case Scenario 2
"Creative Developer X works closely with PhD Student Y to develop Product Z. PhD Student Y is familiar with the API (or GUI or TUI) Research Background and Foreground. Creative Developer X has industry experience and knowledge of market deployment methods. Following an idea by Creative Developer X of a particular market deployment, PhD Student Y suggests a tweaking of the original Research Results to enable best exploitation. The resulting Product is SaaS which evolves the original Research Results and amplifies the API capabilities.
a) Innovation Results are jointly owned by Creative Developer X and the Research Partner whose PhD student has contributed to the invention.
b) A commercial licence agreement is required upon commercialisation (proof of commercial transactions, or commercial agreements guaranteeing such transactions) of the stated product."

Research Results User Case Scenario 3
"Creative Developer X attends to a Music Hack Day and develops a Hack Y based on MusicBrainz and Essentia, both available under open licenses. The derivative work (Hack Y) is later on released in GitHub under an open license compatible with the Essentia and MB licenses' for the benefit of all the community. In this case, as long as the creator meets the obligations behind the type of licenses of the Research Results involved in the creation of the Innovation Result, no transfer of ownership nor commercial license of the Research Results is needed for exploiting the derivative work. Moreover, the Innovation Result would be then available for other creators that are interested in further developing it, thus maximising the related impact."

A new Section dealing with Innovation Results was thus added to the CA, as well as sub clauses in the Section dealing with Access Rights. Further definitions have been added as well: for the avoidance of doubt the consortium is distinguishing between the Innovation Party (third party engaged in generating "Needed" Innovation Results) and any other third party engaged in facilitation, dissemination, or subcontracted to conduct research on behalf of individual partners.

Innovation Actions are a new territory for H2020 in legal terms, and the work done for #MusicBricks could be exemplary for future projects, especially in providing useful guidelines for dealing with Innovation Parties.

3.3.2 Disciplining the collaboration with external innovation parties

The collaboration with external Innovation Parties is disciplined by the Innovation Agreement, a contract that defines the duration of the incubation and the amount needed for its implementation, and determines the objectives and expected results of the process. The contract can be used as a model for future collaboration with external parties, bearing in mind that the legal framework changes from Country to Country and across institutions. Disciplining the collaboration with Innovation Parties can be a key asset in the near future for H2020, but at present this is a rather new territory.

3.3.3 Proving the efficacy of more agile development cycle and impact evaluation

The preparation of the #MusicBricks proposal led to a reflection on the pertinence of the TRL (Technology Readiness Level) in dynamic sectors such as the creative industries, as the model (conceived in the Eighties by NASA) covers high-risk and expensive technologies, aimed at few end users and obtaining user data only after the final deployment.

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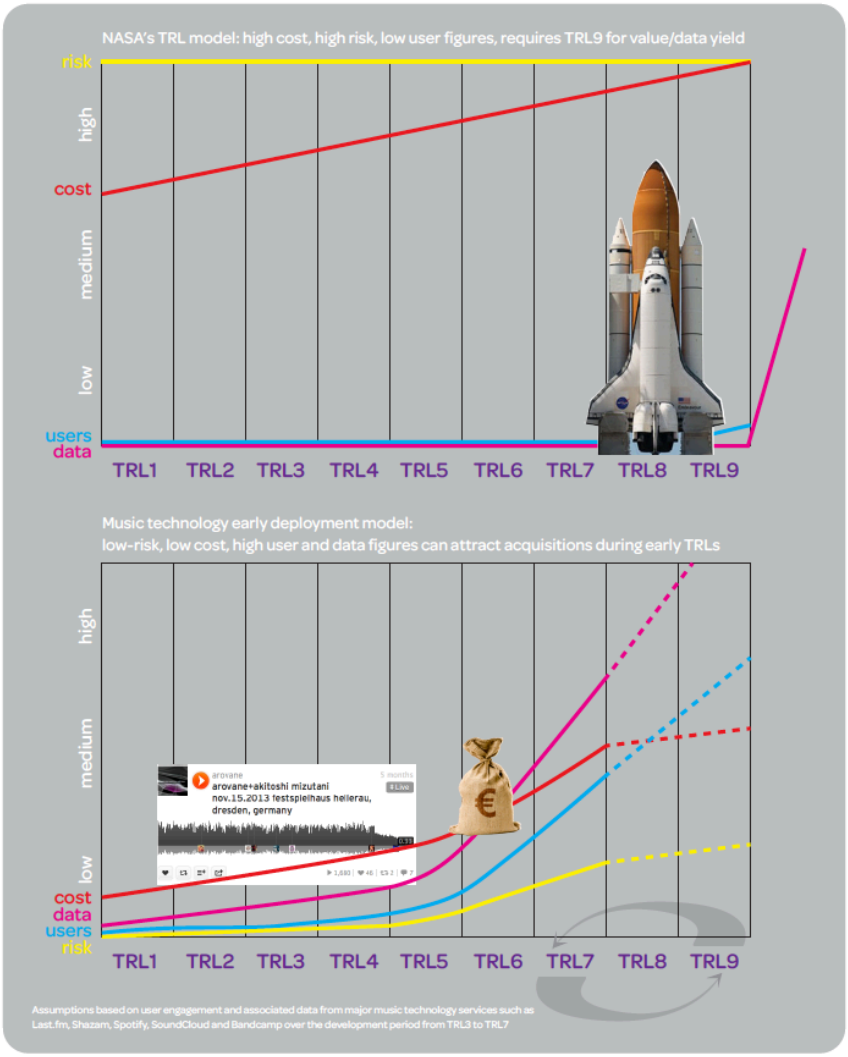
Creative applications in a competitive and fast-changing market can hardly be represented within the TRL model, as their development requires adequate business models and user engagement, and implies societal aspects.

These elements have been included in the proposal and further expanded by the Innovation Coordinator in the Connect Advisory Forum (CAF) context, where an alternative model, the MARLs (Market Adoption Readiness Levels), has been elaborated[1]. In addition to the technology readiness levels parameter, this model requires the assessment of three further value parameters: **users** (numbers of potential early adopters and values associated with feedback loops), **data** (potential quantity and value of data generated by the system and user interactions at each stage of the process) and the **level of risk** (assessment of benefits or adverse impacts of the technology on early adopters in various stages of the process). So far the incubation process proved the importance of such approach, and the documentation the consortium will be able to consolidate will constitute a ground-breaking work in the field.



[1] Connect Advisory Forum (2014): H2020 ICT R&D&I beyond 2015 http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?action=display&doc_id=7050.

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4. Conclusions

*"SMEs are champions of EU research programmes: they deliver **41%** of the high potential innovations generated in ICT-related EU-funded research and innovation projects, despite accounting for a mere **14%** of the total funding"*[2]. Led by two SMEs, #MusicBricks is already proving the importance of small actors in the European innovation panorama, both at consortium level and with the creative ideas supported by the project. One of the Key Impact Indicators for the Horizon 2020 programme as a whole is a percentage that concerns actors as those which are defined 'Innovation Parties' in the #MusicBricks framework: *50% of participating SMEs introducing innovations new to the company or the market (covering the period of the project plus three years)*[3]. Not only is #MusicBricks playing a role in making such indicators concrete, but it is providing valuable documentation of the process. If the benefits of being part of #MusicBricks can change from one organisation to another, surely at consortium level the tools suite enlargement, the collaboration with key industry players and the distillation of best practices and successful methodologies are the pillars of #MusicBricks exploitation.

[2] European Commission Joint research Centre (2015): Innovation Radar: Identifying Innovations and Innovators with High Potential in ICT FP7, CIP & H2020 Projects
http://publications.jrc.ec.europa.eu/repository/bitstream/JRC96339/jrc96339.pdf

[3] European Commission (2015): Horizon 2020 indicators. Assessing the results and impact of Horizon
http://ec.europa.eu/newsroom/horizon2020/document.cfm?doc_id=10927

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