DANISH SOUND

INNOVATION PROJECT

SOUNDSENZE – BETTER DIGITAL MUSIC

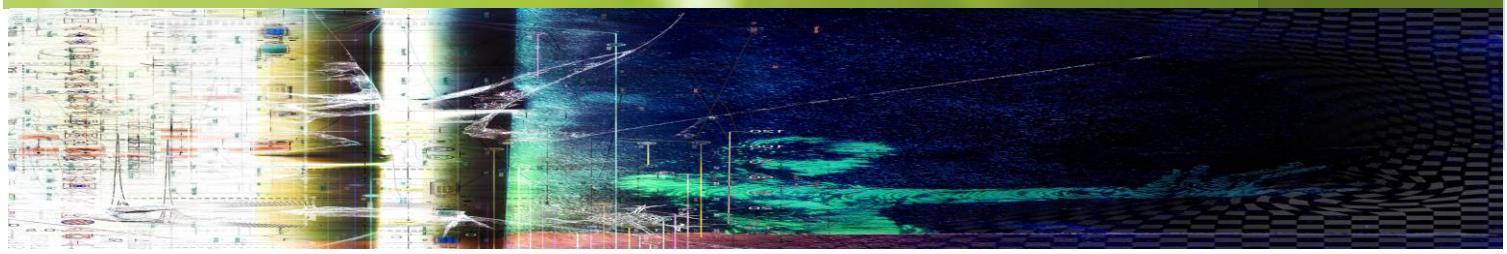
Aalborg University Copenhagen, CMI, Professor Knud Erik Skouby

Gramex, CEO John Robert Kristensen & VP Thomas Dyekjær

Danish Museum of Rock Music, VP Lena Bruun

Steinway Lyngdorf, Founder & Chairman Peter Lyngdorf

TC Electronics, Founder Kim Rishøj

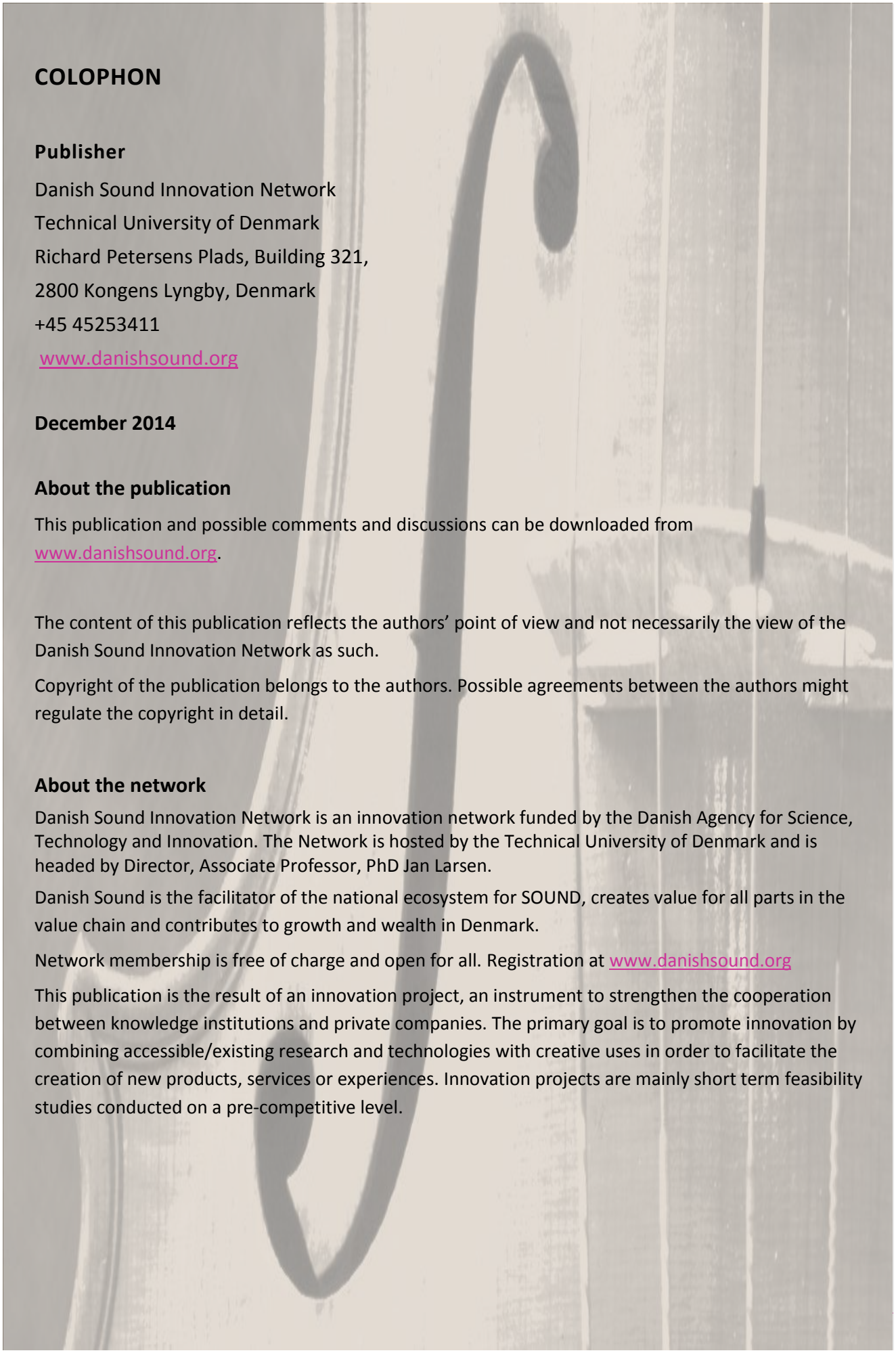


Abstract

The objective of the SoundSenze project has been to provide an overview of the techno-economic problem complex and the commercial potential for Danish sound Industry in creation of high quality sound in the digital environment. The project aims to be an end-to-end analysis ranging from the producing artist of the recording studio for audio equipment that delivers sound to the end user. The perspective of the project is to create a framework for cooperation between research and industry, which can produce a techno-economic solution to the 'Sound Challenge' leading up to the potential for a European standardization. The basic idea is evaluate and look for the digital technology potential in the field of sound.

The results of the SoundSenze project are that it has brought attention to the challenge by establishing workshops, establishing focus groups for young people to identify the significance of sound quality on the new media platforms. The project has brought a big awareness in the press resulting in over 10 national articles in leading newspapers and conducting a large Conference “Giv lyd, Danmark” that successfully ended with over 200 participants including politicians, experts and journalist. And finaly a very important spin-off of all these activities, has been support to the creation of The Sound House (‘Lydens Hus’), the world’s first development environment ever, bringing together artists, creative and high-tech entrepreneurs within the audio industry under one roof with a focus on growth and business development.

Gramex | DANMARKS ROCKMUSEUM | tcgroup | STEINWAY LYNGDORF | AALBORG UNIVERSITY DENMARK



COLOPHON

Publisher

Danish Sound Innovation Network
Technical University of Denmark
Richard Petersens Plads, Building 321,
2800 Kongens Lyngby, Denmark
+45 45253411
www.danishsound.org

December 2014

About the publication

This publication and possible comments and discussions can be downloaded from www.danishsound.org.

About the network

Danish Sound Innovation Network is an innovation network funded by the Danish Agency for Science, Technology and Innovation. The Network is hosted by the Technical University of Denmark and is headed by Director, Associate Professor, PhD Jan Larsen.

Danish Sound is the facilitator of the national ecosystem for SOUND, creates value for all parts in the value chain and contributes to growth and wealth in Denmark.

Network membership is free of charge and open for all. Registration at www.danishsound.org

This publication is the result of an innovation project, an instrument to strengthen the cooperation between knowledge institutions and private companies. The primary goal is to promote innovation by combining accessible/existing research and technologies with creative uses in order to facilitate the creation of new products, services or experiences. Innovation projects are mainly short term feasibility studies conducted on a pre-competitive level.

PREFACE

This publication is the result of an innovation project entitled SoundSenze – Better Digital Music. The project is financed by the Danish Sound Innovation Network through a grant from the Danish Agency for Science, Technology and Innovation. The project is completed in the period 1. August 2013 until 1. September 2014 and managed by Aalborg University Copenhagen, Center for Communication, Media and Information technologies (CMI), project manager Professor Knud Erik Skouby. Additional project participants are: Gramex, The Danish Rockmuseum, Steinway Lyngdorf, TC Electronics. Also Strategic advisor Carsten Corneliussen , as well as Stefania Serafin, Professor AAU; Allan Hammershøj CTO, Media@hand; Niels Farver, NiMorph has been involved in the project.

INTRODUCTION

BACKGROUND

Digitization and telecommunications allow music to be enjoyed nearly everywhere at any time. The technology of music consumption has changed drastically from phonographs, record machines, cassette and CD players—each with their own formats for recorded music. Today recorded music is largely consumed via a computer or mobile phone where recordings are obtained via the internet, through a streaming/download service, or from an app store.

In the process, however, music has become commoditized—differently from the music industry's traditional business models – in the sense that the music in itself is less important than the product as a commodity. This has in reality led to a situation where the tradeoff for having music everywhere is that sound quality has been compromised without this being necessary consequence of the technology used. On the contrary; today's digital technology can much cheaper than before deliver high quality. The compromised quality is the combined result of 'path dependency' and changed patterns in music consumption, cf. below. The mobile phone is today a dominating listening device and music is just one of many applications for a mobile phone, and there is not focus on provision of music in high or the same quality and fidelity as users experienced in the past.

It is increasingly realized by actors in the music complex including artists, device producers/ suppliers, rightsholders and streaming services that there is a quality challenge. The challenge is to highlight to users the importance and pleasure of enjoying music in 'authentic quality' and the opportunity is to build business models, products, and services that monetize this value proposition.

The SoundSenze project has brought together a variety of Actors including Gramex, Dali, Steinway Lyngdorf, TC Electronics, the Danish Rock Museum, and academics and entrepreneurs in an attempt to reinvent the music industry for Denmark.

OBJECTIVE

Digital technology has the potential to produce sound in unprecedented quality delivered to the end user in many devices, constellations at lower cost than traditional analog technology.

The potential is, however, challenged from three sides:

1) 'The sound consumption' is dominated by mobile devices intended for developing engaging and uncomplicated entertainment / listening

2) This leads to the production of highly compressed audio products with extremely compromised sound quality. In general, the sound quality is now worse than that achieved in 1960-65 with vinyl records and FM radio.

3) This leads to the creation of new 'Music Marketing' YouTube, Google, Facebook, etc.., Delivering low quality sound to the mobile devices and create a new (lower) standard for end-user audio experience. This means that high-quality music for playback on the 'High End' hardware products disappear.

The objective of the SoundSenze project has been to provide an overview of the techno-economic problem complex and the commercial potential for Danish industry for a (re) creation of high quality sound in the digital environment. The project aims to be an end-to-end analysis ranging from the producing artist of the recording studio for audio equipment that delivers sound to the end user.

The perspective of the project is to create a framework for cooperation between research and industry, which can produce a techno-economic solution to the 'Sound Challenge' leading up to the standardization and certification as a European / international solution.

The basic idea is that digital technology great potential in the field of sound would be delivered as effective opportunity to choose quality in the market and this interpretation must be made with Danish industry in a leading position.

The research base is that the existing commercial formats and the resulting quality of sound is determined by streaming services and suppliers as Spotify, iTunes, YouTube, etc.., And these formats cannot easily be changed or influenced. Based on this starting point the idea of the project is to identify a system of algorithms that detect sound at the highest quality and allow for unpacking at different quality levels. This procedure include the development of verification and reference software that "recognition" that the basic master audio file meets the requirements for a high quality audio experience. A suite of algorithms can be subsequently activated for unpacking at different quality levels.

It has been found that several promising solutions exist. The codec called OPUS was standardised by IETF and is developed using the best technology from open source Skype codec SILK and open source CELP. The development of the codec used MUSHRA tests for optimising parameters to be best for both music and speech at the same time. Furthermore the codec is optimised for low latency streaming, making it extremely suitable for real time streaming of live content like from a live concert with very short delay or for a two way conversation. Very few devices has hardware support but software codecs exists for most platforms - even the mobile. As a parallel work on extending the original AAC is carried out by MPEG with Fraunhofer as the most prominent developers. This new codec is called USAC and uses some of the same principles from Opus, but it is a non-free codec.

IMPACT/EFFECT

The results of the SoundSenze project are that it has brought attention to the challenge by;

- Establishing workshops to identify problem areas for further action
- Establishing focus groups for young people to identify the significance of sound quality on the new media platforms and acting as a preface for a report.

- Creating a preliminary communication platform on the website www.soundsenze.com, where it is possible to experience a sound-demo developed within the SoundSenze project and where it is possible to learn about the loudness challenge at large.

- Conducting a large Conference "Giv lyd, Danmark" that successfully ended with over 200 participants including politicians, experts and journalist.

- The activities in the project have brought a big awareness in the press resulting in over 10 articles in the leading newspapers in Denmark.

- Project applications with the aim to continue the project has been sent to
    - The Danish Agency for Culture
    - The Obel Foundation
    - The Augustinus foundation

- A spin-off of all these activities, has been support to the creation of The Sound House ('Lydens Hus'), the world's first development environment ever, bringing together artists, creative and high-tech entrepreneurs within the audio industry under one roof with a focus on growth and business development.

- Preliminary investigations of existing codings/ algorithms pointing to existing open source and proprietary solutions

Establishing of a web site following the debate and presenting an online tester of compression level for a given melody

METHODS AND RESULTS

METHOD

EXPERIMENTS

See Demo at www.soundsenze.dk developed by Niels Farver

RESULTS

Look at Impact – Effects

CONCLUSION

CMI

CMI has gained insight on the technical compression area leading, e.g. to a bachelor project; collaboration is established between the student start-up platform, Danish AppLab and 'Lydens Hus' establishing a trajectory from student ideas to start ups; the insight gained through SoundSenze is being used for project ideas within the multidisciplinary core-area of SoundSenze.

Gramex

The Danish music industry has in the past decade experienced a large decline in the sales of CD and as a result of this also a significant decline in the music industry's revenue. The new Streaming services and their business models have not been able to compensate for these developments. This means that a new focus on business development is more relevant than ever. The SoundSenze project has been an important part in the creation of a new agenda and movement in the industry with its focus on better digital music. The focus on better digital music has meant that both Spotify and WIMP has launched new digital streaming services with larger bandwidth which enables the user to experience a better quality of sound. Furthermore the Souindsenze project has meant that Gramex together with Vaeksthus Copenhagen, Danish Sound and Vaeksthus Sealand has been able to open the world first Vaksthus called The Sound House solely focused on innovation activities within the sound and music industry

The Danish Rock Museum

Sound is both an art form, heritage and music, and advances in technology have influence on how music consumer meetings and listening to music: from the radio, record player, reel tape recorder for making music on the Walkman, the personal CD player and the 20 million tracks we currently have on our phone. This historic development is central for the Danish Rock Museum to focus on, and it is therefore natural for the museum to attend a project having sound experience as focus - whether it is through headphones, smart phones, live concert or the upcoming rock museum. The SoundSenze project has been of great benefit for the museum so far regarding development of museum exhibitions and sound experiences when opening in 2015. Additionally, the project research activities as well as network have contributed to the museum research results and partnerships.

REFERENCES

APPENDIX

1. Links www.soundsenze.dk