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Technology Jams to bring new meaning to Human-Computer Interactions

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ABSTRACT
In this paper we introduce Technology Jams as a platform for exploring how novel technologies, when introduced in a specific context, can open up possibilities for radical innovations that change the relationships between people and products or services.

The concept of Technology Jams is based on elements from design thinking and so-called Jams. The platform that Technology Jams create, aims to support cooperation as well as exchange of knowledge and ideas between people from different backgrounds. Through rapid prototyping and user involvement in evaluation, these ideas can be tested and explored. This way, Technology Jams provide a more hands-on approach for sparking radical innovation of products and/or services within the field of Human-Computer Interaction.

We provide a detailed description of the setup of Technology Jams and present the content and outcomes of a pilot Technology Jam. Based on these results, complemented with other questions and challenges, we sketch possible ways for further development of the concept of Technology Jams.

Author Keywords
design thinking; design driven innovation; radical innovation

ACM Classification Keywords
H.5.2 Information Interfaces and Presentation (e.g. HCI): Theory/Method, User-centered design

INTRODUCTION
The user-centred design approach in HCI [14] has been criticised for only driving incremental (not radical) innovations in technology [15]. Even though it is considered the role of the designer within the (user-centred) design process to be aware of future possibilities of technologies and suggest these for the users that are involved [4], radical innovation often does not follow from a user-centred design approach [13]. Besides, methods that are part of the user-centred approach (see e.g. [12]) focus on the interaction between humans and machines and tend to pay limited attention to the way in which this interaction, and the context in which it takes place, may influence each other. However, frameworks exist within HCI, such as Activity Theory (e.g. [5]) or situated action, (e.g. [9] or [16]) that do include this backdrop to human-machine interactions. Yet, the theoretical nature of these frameworks give them more value as analytical frameworks than as hands-on tools to support radical changes in the relationship between people and products or services.

Design thinking, on the other hand, has a user-centred approach similar to the one used within HCI, but differs in the sense that it works with a problem statement that allows to establish a realistic set of goals, while leaving room to interpret, explore and discover [2]. This could help to imagine solutions that address the problem(s) that users are facing while not entirely building on what the user says s/he wants to have. That way, design thinking can help to solve problems that people are facing in novel ways, which might not originate from existing products, interactions and/or systems. Besides, the use of multidisciplinary teams in design thinking, consisting of T-shaped professionals [2] also means that not just the designer in the process is tasked with suggesting and introducing of new possibilities in terms of technologies.

In turn, this might lead to a combination of the introduction of new technologies (technology push) in a way that also innovates the meaning that people give to products as well as their relationship with them. Such a combination of innovation on two frontiers is what Verganti [17], in his description of design-driven innovation, calls technology epiphanies (p. 61). The development of such technology epiphanies and the process of design-driven innovation as such, however, require substantial investments in time and
One aim with Technology Jams is to speed up this process.

**TECHNOLOGY JAMS**

We maintain the idea, in what we call Technology Jams, that design-driven innovation combines the input from various interpreters with the aim of creating technology epiphanies. We use elements from design thinking and Jams to explore how novel technologies, when introduced in a specific context, can open up possibilities for applications that change the relationships between people and products.

Technology Jams provide a platform where interpreters from different backgrounds meet, to cooperate in a way that can be compared to a jam session in music during which you "bounce your ideas [for songs] off other people, and play around with what comes back. Together, you build something which none of you could have built alone." Yet, in the Technology Jams, the instruments are the knowledge, skills and tools that participants bring to the jam and the ideas are about products or services instead of songs.

In order to achieve a similar speed for bouncing ideas of other participants as in musical jams, we use the concept of rapid prototyping. Besides speeding up iteration cycles, (rapid) prototypes help to discover potential problems early on in the process and makes it possible for all those involved in a Technology Jam to share a common focus. The rough nature and everyday ingredients used for rapid prototyping might also lower the threshold of participation for those uncommon to or not confident with visualising ideas. This stands in stark contrast to e.g. Innovation Jams, where ideas are mainly shared and built upon in a textual medium.

**SETUP OF A TECHNOLOGY JAM**

A Technology Jam starts with an introduction of the technology and its possibilities, after which the participants of the jam are divided into groups of 3-5 people to develop ideas for possible applications of the technology within the given target context. Ideally, this part of the jam also includes visiting a context in order to gather inspiration for applications.

After this ideation phase, the groups present their ideas to each other. Then, idea selection takes place, where all participants use stickers to indicate their preferences. New groups are then formed based on who wishes to work with which idea(s).

Tangible rapid prototypes are made for the selected ideas using everyday materials. These prototypes are then used to evaluate the product or service idea with potential users, in the actual context of use, gathering their feedback for continued development.

In summary, Technology Jams thus contain the following elements:

**Elements from design thinking**

Similar to design thinking, Technology Jams are human-centred and multi-disciplinary. Balancing feasibility, viability and desirability are elements that occur in both.

**Elements from Jams**

Technology Jams share with (regular) Jams the user-centeredness, rapid prototyping, as well as being in the actual context to gather inspiration and test prototypes.

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**PILOT TECHNOLOGY JAM**

To evaluate the setup of Technology Jams we held a pilot jam with five researchers (four men, one woman) from the Human-Centered Systems division at the department of Computer and Information Science at Linköping University. This four-hour pilot explored possible applications for a technology called *dynamic QR codes* (DQR) within an urban context. This DQR technology was developed by a Swedish research institute. The pilot jam consisted of an introduction to the DQR technology and its possibilities, introduction of the target context, ideation for applications, idea selection and prototyping of three possible applications of the DQR technology: an outdoor, card-based game, a tourist discount service and a new packaging for medical products that focuses on improving the privacy of the patient.

This pilot jam provided valuable input for improvement of the concept of Technology Jams. It showed that a four-hour timespan for a Technology Jam is short, given the goal and
content. Firstly, because it takes time to understand the possibilities, limitations and unique added value of a specific technology, required for the expected level of ideation and idea selection. Secondly, and related to this, the ideation phase took longer than expected. This meant that there was only time left for making and presenting the prototypes. Testing and evaluating them with potential users was, however, not possible. On the other hand, after those four hours, participants were more familiar with the technical possibilities and limitations.

FURTHER DEVELOPMENT OF TECHNOLOGY JAMS

Our next step is to improve the format of the Technology Jam based on these findings. In order to create more room in the schedule of the jam, we plan to have two four-hour sessions instead of one. The first session will introduce the technology and determine its unique added value in relation to comparable technologies. The second session will be about developing, prototyping and evaluating ideas and prototypes for applications of the technology. Participants can use the time between the sessions individually for incubation and formulation of possibilities. Besides, we will further evaluate the effect of the multidisciplinary nature of the Technology Jam by including people from more diverse backgrounds than those in the pilot jam in future Technology Jams. This improved setup for the Technology Jam will be a first step towards optimising this platform for steering radical innovation. However, given the fact that Technology Jams are still in their infancy, a number of challenges and questions remain.

One of the main questions is whether Technology Jams can lead to radical innovation or even technology epiphanies despite their short timespan. Related to this is the question of how to prevent that such sessions remain in the domain of technology push and do not reach the level of technology epiphanies. Another challenge is to make the Technology Jam interesting for all participants. This includes taking into account frictions that might occur between designers and technology developers [11] as well as possible reservations that participants might have towards design [3]. Besides, there is the question of what extent of rigor and structure should be added to the originally open and playful character of jams. Should the Technology Jams, for instance, be given a theoretical underpinning in the form of design theories such as C-K theory (see e.g. [6])? Finally it can be interesting to look at how the results of Technology Jams can be developed and detailed further. For instance by doing as suggested by Norman and Verganti [15]: to apply user-centred design methodology after the initial version of the radically new product or service, in order to further optimise the specific innovation.

It is our intention to take on these and other questions and challenges related to Technology Jams while we iteratively improve this concept.

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REFERENCES


