

Interseum - From Physical to Virtual Showrooms

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Abstract. Following the successful proven concept of small and specialized exhibitions (so called showrooms) run by research institutions as windows to scientific innovation, the network BONITA (a project financed by the INTERREG IV B – Baltic Sea Region) combines the physical showrooms with virtual ones. While the basic idea of the physical showroom is to have an attractive exhibition area for demonstrating cutting edge-technologies in a tangible and accessible fashion and transmitting technological knowledge between science and people within a region, the main idea of the virtual showroom is to have centralized access to several exhibits located in spatially separated environments resulting in distributed knowledge and bridging the gap between the physical and virtual world of museums and showrooms and between the expert and the visitor. The presentation of what is today technically feasible is just one aspect of the showroom. It also creates a connection to what is imaginable, whereby the visionary aspects of the technology are communicated. The combination of tangible benefits and interdisciplinary visions for the future is an exceeding interesting one. Firstly it allows specific innovations to find their way to market more quickly, since they gain a higher profile and are in the public eye. On the other hand, long-term trends can also be created interactively and discussed within different target groups.

Keywords: museum, social interaction, technology transfer, science communication

1 Introduction

Science and the public - as stressed many times before - should be closely intertwined. But the reality is different and seems increasingly difficult. The causes are many. One is certainly the difficulty of translating scientific evidence in an understandable language [11] Another challenge is that science itself - much easier - does not seem to be in the living world of people. Nevertheless are many people fascinated and attracted by new developed technologies. Probably because they are continuously faced with technologically sophisticated decisions that have direct impacts on their lives. Often, their only opportunity to experience innovative technologies "live" is at exhibitions – which might explain why there is such a crush around some stands at for example the CeBIT fair. As also Susana Hornig Priest [7] concludes in her recent introduction essay on science's contemporary audiences, therefore the job of communicating technological science might be to help non-scientists feel they are not excluded as opposed to always included; that they can join in if they want, rather than that there is a necessity to spend their lives engaging.

Particularly small and specialized exhibitions (so called showrooms) run by research institutions are highly affected by this gap between experts and visitors. The limited availability to only one physical location and the lack of active involvement of the visitor are the main causes. Seifert [9] suggests that as technological issues become more complex they require "special cognitive effort from laypeople to be properly understood and debated". Emerging technologies might be too complicated for many – including policy- and other decision-makers – to understand without some infusion of relevant scientific or technical knowledge: A visitor may feel the need to gather knowledge about a certain exhibit in advance to have a more intense experience when seeing it

live. Also after seeing the exhibit, the visitor may become more interested and would like to know more details or even share his own opinion and knowledge about it with others. At the moment, this may only be achieved by expert forums on the internet. These are neither connected to the real objects, nor the exposing institutions, nor the researchers and experts working on those exhibits. Other sorts of knowledge and information – particularly about how science is conducted including the institutional arrangements of the scientific enterprise – will always condition or moderate people’s understanding and use of scientific information. Also, the efforts of negotiating one’s own “social identity” influence how members of the public view and respond to scientific knowledge [12]. On the one hand, the institution misses out on the transfer of their work to the general public and industry partners. In particular we consider use of demonstration pilots tailored to the needs of additional players. On the other hand, the researchers and experts miss out on the knowledge which could be gained from a broader network of involved stakeholders. The successful transfer of their scientific knowledge into practice is an important building block to come from a pilot to innovation and is an attempt made to overcome the expert/lay divide through this special form of science communication.

We present the BONITA (Baltic Organisation and Network of Innovation Transfer Associations) physical and virtual showroom concept and possible applications to the interested public where visitors could experience firsthand what is possible with information and communication technology and how this might translate into real world applications. The basic idea of the showroom is to have an attractive exhibition area for demonstrating technologies in a tangible and accessible fashion as well as a meeting point for workshops, seminars or lectures. They have to be flexible so that they can be used for different activities and purposes. Parallel to the physical showrooms, there are virtual showrooms to ensure the connectivity between a network of physical showrooms and to support the exchange of exhibits between the different showrooms. The main idea of the virtual showroom is to have centralized access to several exhibits located in different places meaning distributed knowledge and bridging the gap between the physical and virtual world of museums and showrooms and between the expert and the visitor. These exhibits could either be real exhibits like prototypes or intangible exhibits like software demos, videos and sketches. In order to make the virtual showroom even more attractive, there is a user interface supporting multi-touch technology by multi-touch tables and screens. This means presentations to be used in the showrooms are not done in the traditional way using power-point but rather a web-based application. This application contains a template to prepare presentations where videos, pictures, texts, software demos, etc. can be introduced in an easy way.

2 The showroom concept

2.1 The physical Showroom

The showrooms as permanent exhibitions allow the diversity of information and communication technology to be made accessible to a wider public. They present mobile solutions and technology which are reachable, touchable and testable. They will be an essential role in the value-added chain in the near future. Talking of applications like wearable computing, smart clothing, mobile sensory networks and other new mobile interactive concepts, the showrooms support technology transfer in both directions – as push and as pull of technologies. The motto of such an exhibition will be “Hands-on research”. On the one hand a university as public funded research organization is presenting technologies and potential applications in an attractive way. On the other hand it is an innovative form of communicating science with its outputs and acting persons. Results from current, application-oriented research projects and innovative products from the field are on show. By allowing the general public access to normally restricted content, the showroom enables a concrete dialog with various stakeholders regarding the potential take up of these technologies. In addition to technically interested laypeople, the target group might be anyone who can gain a genuine benefit from the technologies on show.

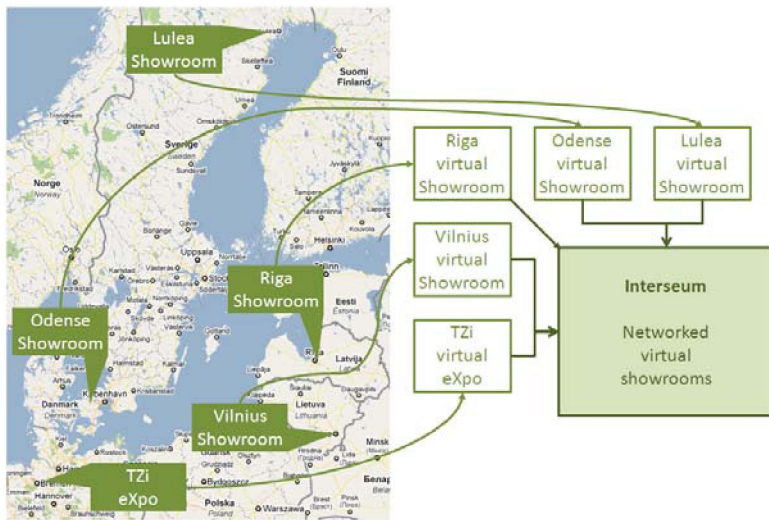


Fig. 1 – From real showrooms to a networked showrooms: Interseum

The proven concept of ‚hands on research‘ is supported by psychological research that points out „touch is both the first sense to develop and a critical means of information acquisition. Physical touch experiences may create an ontological scaffold for the development of intrapersonal and interpersonal conceptual and metaphorical knowledge, as well as a springboard for the application of this knowledge. [1]

The need to support not only collaboration and exchange but also events requires a flexibility of the infrastructure to allow this multifunction. A showroom therefore provides meeting facilities like conference tables, interactive whiteboards, video conferencing etc. At the same time, it is a place for demonstrating technologies in a tangible and accessible fashion. The presentation of prototypes or systems which have already undergone field testing is particularly informative – visitors can gain experience and find out how such systems “feel”. A number of workable solutions are already available, however very few people have, until now, had the opportunity to try them out for themselves. Basic tactile sensations are thus shown to influence higher social cognitive processing in dimension-specific and metaphor-specific ways.[1]

The exhibition is therefore intended to create a more serious, but still playful, approach to these technologies, thus boosting their acceptance. Experts of various disciplines as visitors of the showrooms can get inspired by new technologies and its applications as well and can address needs and problems of their own application domains by scaffolding. According to Ackermann [1] scaffolding, and the related principle of "neural reuse", describe the process by which higher-order cognition emerges from bodily experience: Physical actions and sensations are used to acquire an initial comprehension of more abstract concepts and, as such, become automatically tied to their activation.

TZI at University of Bremen as Lead Partner of the BONITA network already has been having good experiences with a showroom as a window to scientific innovation that transforms abstract research to understandable demonstrators for more than five years now.

In Bremen, Wearable Computing – computers worn by the user on their body – is one example of technological exciting topics in a showroom. Technical advances in this field have produced developments whose results and application potential are generally still only known to experts. The developments often employ a strongly visual component such as for example miniaturized, radio-networked high performance computers or head mounted displays. This visibility provides Wearable Computing with a certain “realness” which can be easily implemented into interesting exhibits. Of far more interest are, however, those aspects transcending the obvious. The simple, tangible communication of such a potential intrigues many people since, as a rule, the benefits of such computer systems are often obscured by a wide variety of misinterpretations and prejudices. Wearable Computing requires more in-depth explanation if it is to be perceived as more than a

desktop computer worn on a belt – whereby this aspect is actually only a marginal element of the true potential.

An important aspect of the concept described here is the ongoing evolution of the exhibition. Since the technologies concerned are continuously developing, the exhibition continually has to reinvent itself. The single showroom, on the one hand, is part of a conventional, interdisciplinary research institution carrying out independent research and developing innovative solutions in cooperation with industry. On the other hand, within a network of showrooms exists a strong European partnership and cooperation with institutions, companies and other research bodies. They are the route via which diverse research findings, prototypes or products find their way into the exhibition. To fulfill this function all showrooms share common elements.

The presentation of what is now technically feasible should be just one aspect of the showroom. It also creates a connection to what is technically imaginable, whereby the visionary aspects of the technology are communicated. The combination of tangible benefits and visions for the future is an interesting one. On the one hand, it will allow specific innovations to find their way to market more quickly, since they gain a higher profile and are in the public eye. On the other hand, long-term trends can also be created and discussed. For this reason, the concept is to be seen less as a purely museum-based exhibition but rather far more as an innovative concept for fast-growing technological research institutions.

Furthermore the physical showroom will allow the access to the virtual exhibits. Therefore the extension of the physical exhibition to a sort of parallel “Interseum” is obvious for the presented showroom concept. The term Interseum is derived from the classical “museum”, enhanced by several key features.

2.2 Concept of the virtual showroom “Interseum”

A given thematic focus of the showrooms goes far beyond merely investigating, for example Wearable Computing. In a connection of real and virtual events under communicative aspects like collective experience and collective planning, it also includes an examination of innovative aspects of mobile information processing. TZI’s showroom is seen as a scientific arm of Bremen’s ICT research cluster. Expanding the showroom into virtuality is auspicious, since it allows different audiences to actively engage in enhancing the knowledge about the exhibits– both in the scientific and the commercial sense.

These exhibits are media based interactive presentations of research results that are provided by all partners of the showroom network. A pilot group using multi-touch technology gains access to the virtual showroom in an intuitive way within the physical showroom.

Need for internet-accessibility: Still the accessibility of a physical showroom is usually restricted to a single location with space for a very limited number of exhibits. In case new exhibits arrive, old ones may lose their place. Visitors need to make appointments and when they do so, a professional tour guide who has knowledge about all exhibits might be short in supply. The virtual showroom makes all the information about current, former, and future exhibits available in the internet. According to the National Science Foundation’s (NSF) Science and Engineering Indicators 2006, the internet became the second highest source for science news selected by individuals seeking science news. Thereby, the range of also virtual showroom visitors is broadened to a great extent since the information is available from almost everywhere in the world at any time. Obviously “the growth of the Internet offers unique opportunities for science to establish additional channels of communication with the public. Science topics and information will be there, but the question is, will the scientific community have a prominent role in disseminating it?” asks Suleski et al, [8] with good cause. As Kua et al. [5] advise, scientists must learn to translate research both in “language and in idiom.” The Internet presents a forum, but the message must still be catered to be understood by its potential audience. Adopting this advice the virtual showrooms offer different types of representation of exhibits. The representation may vary from

institution to institution, be it as a graphically intense, Flash-animated virtual tour or simply a more fact-oriented, wiki-like hypertext structure. This offers the added value of a more holistic explanation of the theory and research behind the exhibits. Thereby, the public presentation of the institution itself benefits to a great extent, creating a positive impact on the transfer to and from possible industry partners.

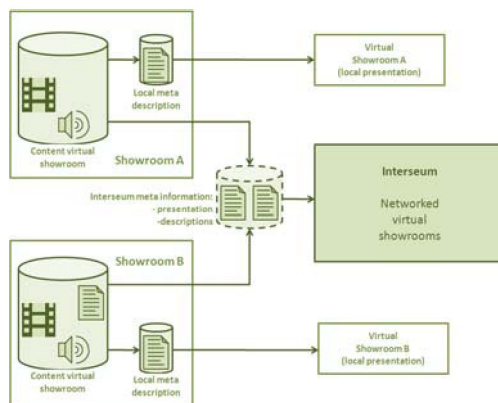


Fig. 2 – Networked virtual showrooms: Interseum

Need for interconnection: Precondition of the operative connection of the showrooms from different institutions is to introduce a unified protocol to describe exhibits and exchange associated information. Only few museums already offer some form of a virtual museum on their website where the user can browse through a number of exposed exhibits. However, the problem is if each one uses its own format, making them stand-alone application. Exhibits of the showrooms should be described by their field of research, age, target group, current location, etc., as well as visually represented by multimedia objects such as videos or pictures. Thereby, new showrooms can easily be integrated into a network of already existing ones. The system can be seen as a non-centralized, global showroom with overlapping networks of local showrooms and their exhibits. Showrooms with relatively similar content may form a network and link subsets of their contents to each other. That way, a recommendation engine can be incorporated to suggest new exhibits to the (virtual) visitor, i.e. the visitor may see a recommendation such as “If you liked this exhibit, you may also like Exhibit ABC in Showroom XYZ.” In the area which is only accessible to researchers, the recommendations and manually created links to other research material may be even more complex. This feature can also be used to coordinate research on an exhibit. For instance, all currently involved researchers could state their progress and arrange to split up into non-overlapping research directions. People can start to generate thematic maps or user generated tours that put distributed research regarding a certain topic into a common context. The main idea is to use the BONITA network as a starting point that is providing the initial critical mass for the virtual showrooms. However, the main intention is to invite people to join this idea and to grow the number of projects that are part of a virtual exhibition.

Need for interaction: Based on the former research under the name “Wikiseum” as a web-based presentation environment and collaborative authoring system with the option for social and intellectual interaction [2, 3], Interseum will allow the interactive involvement of the users with the content. It represents the exhibits of a showroom in a dialogue with its visitors, which will ultimately benefit both parties. Visitors can incorporate their knowledge and thus to enrich the existing content. Optionally, they can describe their impressions and opinions on the issue. The interactivity includes visitors, institutions, and researchers, all having certain roles with different permissions, to access and edit the content. The information being available via virtual tour for example is usually written by technical experts and prepared for the presentation. However, different types of showroom visitors might have sometimes even a well-established expertise on a subject that is close to in depth expert knowledge.

For the future, Interseum will offer the user more interaction opportunities for influencing the presentation as such. The mentioned above selection of information, navigation through the information service, etc. restricts the user in the dealing with the system to socially and intellectually passive information consumer. This argument against passivity has strong grounds for the network of showrooms: First, is the existing knowledge, which bears a visitor to a showroom in itself, is lost. Second, the intellectual passivity builds a barrier between the visitor and the showroom and its researchers are in. This barrier will be reduced significantly if the visitor gets the opportunity to participate with their own contributions to the presentation content. Understanding these contributions as voluntary, the concept supports the idea of Laursen "collaborating with Citizen Scientists":

"If scientists are trying to get volunteers to help out, making them feel like their work adds to the whole picture [it gives them] a tremendous amount of energy." [6] However, Interseum goes beyond the point of an enhanced multi-wiki since different target groups as well as institutions may require different views. Therefore, the presentation of the information will be fully flexible. For instance, a visitor from the general public would probably like a more visual representation where he may comment on the exhibits or ask general questions. Thereby, he is able to interact with the professionals, allowing researchers to gather new knowledge concerning their research. Also the institution – especially the persons responsible for the showroom – may gain knowledge which of the exhibits people like or dislike. This allows them to improve their marketing and the presentation of the content to attract a broader audience. While that type of interaction is more focused on the exhibition itself, researchers may use a restricted content area of the system to communicate and share insights about the exhibits and the associated research. Currently this interaction is mostly achieved with special email-lists, expert forums or personal connections. However, to access the research about an exhibit, the starting points are mostly the associated research topics. On the contrary, Interseum will allow research to be more centered on the actual exhibits. Furthermore, another important advancement to a wiki will be an automatic quality assurance module. Whereas in a regular wiki basically everybody may edit everything every time, here we not only have a set of restrictions on editing the content, typically assigned to different roles such as technical administration, marketing, researchers, visitors, and so forth. In addition to those restrictions, the quality assurance will automatically deduce required actions from statistical data. For instance, in case a certain piece of information is always edited immediately after someone is visiting it, the quality is probably very low.

Inter-adaptation: The designer-term inter-adaption refers to content presentation not only being adapted to the individual user by means of personalization. In this case, it also means the adaptation mechanism also includes information from other showrooms and is able to distinguish between different target groups. For instance, a virtual visitor from the general public may be provided a virtual tour. Therefore a sequence of different subsets of all available information is presented to him. If one showroom has good experiences with a certain format of a virtual tour, this format might directly be incorporated into another showroom. Furthermore, experts who visit the virtual showroom and directly prefer to skip the visual representation can continue with a more fact- and text-based one. The system can adapt to this behaviour and store general user profiles as well as user profiles for those who are registered and have a user-account.

Internationalization: A local showroom usually exposes the information about its exhibits such as marketing material, the website, virtual tours, etc. in the local language. This makes it rather impossible to share the resources with institutions, researchers and general visitors from other countries. The virtual showroom aims having a built-in language module, requiring all material to be at least published in English, too. The problem that pages in certain languages are outdated will be prevented by the system by certain functionality, such as required inputs or reminders. This will be achieved by the integrated quality assurance module mentioned earlier.

Interdisciplinary: Usually when experts of different research communities work together – i.e. archaeology in combination with computer science – communication and understanding can become tough since every discipline has its own language. It becomes even harder when the available information is fragmented into research papers from both communities. The virtual

showrooms avoid discipline specific gaps of communication by having a centralized pool for all information, establishing a common language from the start. Furthermore, Interseum allows different views on the information. Thereby, users from all educational and cultural backgrounds and of different generations may only see the information which fits best their needs.

3 Conclusions

The showroom as a specified and topic-centered technical exhibition is a proven concept for transmitting technological knowledge and science and a within a region. Furthermore, it is used as operative connectors of the partner regions of BONITA for concrete transnational cooperation gaining access to the virtual showroom in an intuitive way within the physical showroom. This supports the transregional collaboration of experts and generates an important European value. The virtual extension with a unified protocol to describe exhibits and exchange associated information bridges the gap between the physical and virtual world of museums and showrooms and between the expert and the visitor with main benefits in:

- centralized access to locally distributed knowledge
- active engagement of different audiences in enhancing the knowledge about exhibits
- optimized interdisciplinary
- improved communication of science and scientist.

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