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Working Paper

## Use of XR to revitalize and activate shop windows

*Suggested Citation:* Kueffmann, Karin (2024) : Use of XR to revitalize and activate shop windows, ZBW - Leibniz Information Centre for Economics, Kiel, Hamburg

This Version is available at:

<https://hdl.handle.net/10419/284102>

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## ***Use of XR to revitalise and activate shop windows***

### Content

Initial situation and objectives .....	1
Virtual, augmented and mixed reality.....	1
Research of existing XR appearances in presence and online.....	2
XR use in the presence area .....	3
Could XR contribute to vacancy revitalisation? .....	3
XR frames as a concept for visible immersive interaction surfaces .....	5
Evaluation .....	6
Conclusion .....	8
Acknowledgements.....	8
References.....	8

### Introduction

Immersive technologies, as virtual reality (VR) and augmented reality (AR) are closely linked to head-mounted displays, complex software development and intensive computing power. Virtual extensions in conventional showrooms and museums, virtual product presentations, particularly in the luxury segments, virtual fitting of glasses, property tours and technical maintenance work have become reality. Retail chains and manufacturers in particular are expanding their online offering with 3D products and views by adding real added value. A small student project considered whether AR could be used to revitalise vacant properties and foster activation.

## Initial situation and objectives

In former mining periods, Gelsenkirchen-Ueckendorf was home to several large collieries with a flourishing shopping street, many splendid shops and town houses. The withdrawal of the industries was followed by high unemployment and the economic decline of the town and therefore the shopping street. Restoring the local urban development began in 2010; town houses were renovated for student accommodation, shops, children's, youth centers, bars and restaurants.

Space was created for local artists, creatives, start Ups and ICT specialists got room in the renovated buildings. The church was converted into an event hall where meetings, conferences or cultural events take place. Today, the district court, NRW Talent Centre and science park border the northern side of the street, while a park and schools border the southern side. In recent years, events and festivals from a broad spectrum of VR and AR, art and urban development topics had regularly taken place in the old shopping street around the church. Young life has now returned with various small companies, youth facilities and restaurants; beneath IT-Start Ups is a XR-Start Up located on the small church square in the centre of the old shopping mile and changed it in an urban real-world laboratory.

Focussing the target groups of the street, our project – as an initiative from mxr storytelling - examined whether an event - related or permanent revitalisation using AR or VR would be conceivable. The focus laid on the online-offline networking of the local neighbourhood's art and creative scene, the local restaurants, shops across all hours of the day using AR as a participatory concept. One of the ideas was to familiarize event visitors with the street and network with the local scene.

## Virtual, augmented and mixed reality

Virtual reality describes an artificial, non-existent or similarly existing immersive environment. Immersive games and learning environments or virtual meetings of several avatars in co-operative environments are widespread. The immersion, i.e. the immersion in the spatial representation, is achieved by special 3D construction of the objects, their surfaces and properties, so that they appear real and can be rotated and moved 360° in virtual space, for example. VR goggles or projections onto special walls and surfaces are

used to display these objects. It is more complex to produce than a normal film; the virtual spaces are displayed 360° spatially (esp. for both eyes). The movements of the objects in the room are triggered by the user using special control handles and tracking functions. The visual representations in the VR glasses change according to the user's actions. Free-standing head mounted displays without cables with fast image build-up times are currently still expensive and yet not very widespread.

Augmented reality (AR), on the other hand, describes an extension of reality with virtual content in real time, e.g. multimedia animations or information, 360° environments, 3D or moving images that are loaded from a cloud onto an end device. AR can be interactive using cameras or touch displays, with visitors gesticulating or making selections. The real world is enhanced by virtual content, such as images in books that "come to life". These additional Information may be useful, surprising or entertaining nature.

In the easiest case, the screens of mobile phones can serve as display surfaces, which offers more scope for use by everyone. Some AR technologies use GPS positioning so that virtual content can appear at certain locations, for example images or explanations during a city tour.

Mixed reality or extended reality (XR) was initially used as a synonym for AR; XR is now used as an umbrella term for different levels of reality/virtuality between reality and complete VR, i.e. "mixed reality".

## Research of existing XR appearances in presence and online

The initial research revealed that XR has arrived in practice in retail, art, architecture and urban planning with a wide range of applications, for example:

- Online Adidas shoe fitting with 3D products and filters,
- Online cosmetic consultation, glasses try-on using an app and camera,
- 360° online showrooming, for example from Lancôme, Lego,
- digital artificial clothing, available online as NFTs from Chanel,
- Zara, Timberland with virtual fitting rooms with screen and camera in the physical shop,
- Hologram display of animals on special foils in presence,
- a fully immersive adventure world with 3D glasses in the presence of

Globetrotter,

- an interactive Magic Mirror for virtual AR kites in a busy mall,
- virtual product presentations with VR glasses from Porsche in the showroom,
- online and stationary XR art in museums,
- City development and city touristic tours with AR elements, available online as well as in presence,
- Gaming events for single persons or a group, in presence and online.

The examples vary in their technological implementation; they range from mobile phone cameras to special holographic displays or screens with cameras to complete VR worlds with glasses and tracking in virtual space. The use cases were generally exciting, fascinating, entertaining, informative and offered added value for their users. Most installations were only available temporarily. Elaborate and sensitive technologies are mainly installed indoors; busy squares, streets or dedicated showrooms are often chosen for XR experiences.

In the online sector, permanent XR applications are nowadays established, such as spectacle fittings, car and property viewings, furnishings, room dimensions with furniture selection etc.; they have established themselves as useful and convenient for customers due to their positive effects and bridge the online-to-home distance.

## XR use in the presence area in real world

Conventional physical exhibitions and showrooms are also increasingly enhanced by immersive presentations with XR. In the simplest case, these are posters or objects that are linked to XR elements in the cloud and thus trigger experiences with additional useful, exciting or funny information. Virtual machines, immersive animals or art can thus be brought from the cloud into the real showroom via the network anytime and anywhere. It is therefore conceivable that the empty showroom could be expanded with 24/7 additional services or event-related and temporary with new opportunities for sales, event or city centre management.

## Could XR contribute to vacancy revitalisation?

The analysis showed that stationary XR use cases with high customer or target group specific added value need to be found. Immersive presentations can take place

temporarily, event-based or permanently outdoors at shop windows or indoors in empty shops. Individual players would have to provide permanent offers in shop windows; the alternative is an exchange platform or organization for many players with the simplest possible technology for the use and creation of immersive content. In order to promote interaction and networking in our use case, the temporarily empty shopping windows a simple participatory solution was favoured. It was thought about the interaction and networking of permanent entrepreneurs and residents with each other as well as with temporary visitors to create immersive temporary or permanent XR experiences. An immersive extension of the permanent offer for information and socialising purposes, shopping, learning, playing and entertainment seemed particularly suitable for the existing target groups and residents.

On the supplier side, the local gastronomy scene, local entrepreneurs, local trade, festival and conference organisers, temporarily active artists and XR specialists as well as players from the universities and schools were identified.

On the demand side art and conference visitors, local residents and artists, schoolchildren, scientists, city planners, young people of the environment with affinity for technology were identified as potential customer groups.

Immersive content could be presented parallel to specialist congresses, artists' meetings and cultural events in the church; artists could expand their real exhibition objects with virtual content or experiment with XR. The empty showrooms could be immersively enriched from time to time by local restaurants, event organisers with their offerings. One goal was to expand real networking in the district with digital content 24/7 and activate the empty street. Many other opportunities arise from the local start-ups, schools and small businesses in the neighbourhood. It is of course possible to use the showrooms with playful, amazing or advertising content as a VR playground for many players in the region.

The technological setting should be as intuitive as possible for providers and consumers using familiar technology, such as mobile phones with GPS and radio technology, displays and cameras.

## XR frames as a concept for visible immersive interaction

The showrooms of the XR-Start Up are located on the small church square and the surrounding empty spaces seemed to be an ideal place for "XR Frames"; XR Frames are colourful picture frames with objects, screens and posters in it, which are linked via cloud to immersive content. The colourful frames are easily recognisable for customers and encourages participation to activate the immersive content. Instructions "how to do XR" should be made visible on posters or screens. Thanks to available WLAN an easy-to-use app can be downloaded on the users mobile phone, as an always there device.

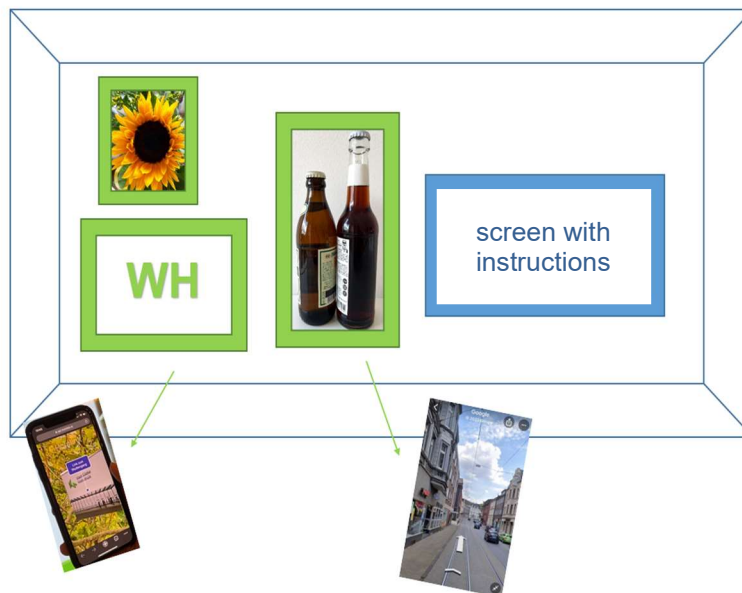


Figure 1: XR frames in the shop window to activate immersive content

In our case, the Artivive and HoloLink apps were tested in a demo version; small films, pictures, routing informations and 360°views were wired from the image content to the app cloud provider. As outlined in Figure 1, objects, logos and images were placed in the shop windows of our XR Start UP on the small church square and linked to immersive content. By pointing the mobile phone camera on these objects - a bottle in the XR frame - the linked content, in this case the directions to the local retro pub, was activated and displayed from the Artivive cloud via WLAN and image recognition. A university logo "WH" - realised here with HoloLink - activated a 360° room, in which you may move virtually and branch out to websites with information on Bachelor programmes. In addition to the XR frames, the instructions have to be shown on posters or screens. Flowers

may activate an urban gardening event or the offers of a nearby flower shop.

Several XR frames were planned for several shop windows, so that immersive window shopping proves to be varied and stimulating.

An easy-to-learn and stable platform can have an integrative, participative and networking effect for many participants. The XR content could thus be created in a simple way as a street experience by many stakeholders, making the different offers of the street and its stakeholders virtually more visible. A wealth of variety and many stimulating moments with information, games and interesting facts would appear to be important so that it remains lively and interesting for consumers and attracts them to the immersive presentation more often. In addition to project weeks for schools, science and conferences, QR codes or links to purchasable products in vacant properties as concept stores are also possible.

## Evaluation

This prototype was intended to test the technical feasibility as well as the organisational factors for a possible revitalisation of vacant properties and to shed light on the prerequisites and framework conditions.

In order to revitalise the street and interconnect the residents with the help of flexible usable XR frames and immersive elements, interesting formats and content and sufficient frequency are needed to create a participatory effect for the target groups. A participatory effect can only be achieved if apps and handling are easy-to-use and stable technology platforms are used. This could be achieved with the help of a few selected and licensed apps. Clear recognisable features such as the XR frames mentioned above are important triggers for trying out and participating.

Target group-specific project weeks parallel to events with suitable content - art, culture, science, adventure, shopping - seem to be a good basis for sufficient frequency and perhaps the test of some monetarization models. Suitable formats and psychological motivations for shop window use and XR use would have to be evaluated in more detail in order to make general statements. The events taking place in the street would be a good opportunity to test precisely this.

The stationary application examples initially researched showed a temporary and event-based character; the medias were gaming, surprising, informative or useful nature. Their



technological realisation varied in complexity and pursued different goals; retail chains or producers have different technical and monetary resources, test and roll-out options than small owner-managed retailers.

The online offers considered were mostly of a more permanent nature, available 24/7 and represented customer-oriented added value - personalisation, individualisation, usefulness, convenience. With this type of 3D object, online retail can reduce the proximity to the customer anytime and anyplace. "Wiring" online product and service offerings using AR would bring individual products from online retail back into the city centre and integrate them digitally.

It was shown that XR can be used to revitalise a square in our small shopping street.

Some constraints have to be taken in mind:

1. Temporal limitation is important for interesting liveliness and variety.
3. Supply of thematic target group XR offers is directly linked to thematic and occasion-related events and congresses. This may be the chance of monetarization through more appealing and attractive content.
4. Technical openness and intuitive usability is fundamental to allow users of different ages and technical background to participate as easily as possible. It is essential to lower the entry threshold for the supply side and increases the participatory effect with a higher variety of immersive content.
5. The flexible implementation with customizable XR Frames can incorporate a different number of shop windows through the frames in different sizes, colours and varying content.
7. Central planning and organisation by a coordination office is necessary. In order to increase the quality of stay and frequency on the empty square, a coordinator is necessary to plan the events and coordinate the XR Frames. In addition to technology and training, the technical implementation also includes licences; as XR frames could also serve as advertising space, revenue generation would be conceivable in principle.

## Conclusion

XR technologies could be even nowadays suitable for turning smaller spaces in the increasingly empty city centres into points of interest, socialising and action. An immersive extension of retail showrooms in the evening or at weekends is also conceivable to attract visitors. With the help of organisers and small invest, empty streets and vacant spaces could be transformed thematically, temporarily into art miles, architecture and urban design exhibitions, art and event locations or gaming areas. As envisaged with the XR frames, it is also conceivable that they could be used as advertising space or as a shop-in-shop system to generate advertising revenue.

## Acknowledgements

The pulse generator of this project study were the founders of mXR Storytelling in Gelsenkirchen, who already had a wealth of experience in the immersive world thanks to several years of organising VR\_Places. Thanks to our students Robin Splettstößer, Robin Tschoeke und Manuel Nowaczyk for the experiments, design and realization of the small prototypes. The ideas will be taken further and need to be tested and validated in future events.

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