

# How the Middle Ages brought European institutions together

*Lessons learned from four years of international  
collaboration in the CEMEC network*



*Europe is the result of a  
multiplicity of cultures.*

*Diversity is essential for  
building the future.*

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# Preface

This publication presents the lessons learned from the European collaboration project called ‘CEMEC’ (Connecting Early Medieval European Collections), which took place between 2015 and 2019. It is aimed at our colleagues working in the field of cultural heritage: museum management and museum specialists, university specialists (interested in) collaborating with museums, and people in technical and creative companies with museums among their regular customers.

The lessons we would like to share with you relate to inter-institutional and international collaboration, the organisation of travelling exhibitions, the development and user evaluations of digital applications, and last but not least: business-model innovation in museums. All those issues are central to the current operation of museums and to their future.



Co-funded by the  
Creative Europe Programme  
of the European Union



Connecting  
Early  
Medieval  
European  
Collections

**ALLARDPIERSON**  
DE COLLECTIES VAN DE UNIVERSITEIT VAN AMSTERDAM



UNIVERSITY  
OF AMSTERDAM



Hellenic Ministry of Culture and Sports  
BYZANTINE & CHRISTIAN MUSEUM



LVR-LandesMuseum  
Bonn



UNIVERSITÄT BONN



**UJa.**

Universidad  
de Jaén



Instituto  
Universitario  
de Investigación  
en Arqueología  
Ibérica



ART & HISTORY MUSEUM

**museum**  
National Museum of Ireland  
Ard-Mhúsaem na hÉireann



**nóho**  
creative.knowhow

**moobels**



Consiglio Nazionale delle Ricerche



**den**

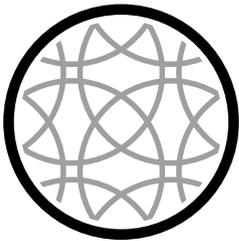
Kennisinstituut  
cultuur & digitalisering



**Fraunhofer**  
IGD

We wish to thank the European Union, which generously supported our project within the framework of the Creative Europe Programme, the partner organisations and individuals who have helped to create the exhibitions and digital tools, and all of the visitors to our museums and users of our applications who were kind enough to share their experiences and opinions with us.

If you have any questions or comments regarding this publication, feel free to contact us at [info@allardpierson.nl](mailto:info@allardpierson.nl) (coordinator of the project).



**Connecting  
Early  
Medieval  
European  
Collections**

# Introducing CEMEC: who, what, when?

CEMEC – *Connecting Early Medieval European Collections*

## Goal

To build a sustainable collaboration on a network-exchange base, with reusable contents, reusable tools, reusable experience, on-going spin-off research and a new business model.

## Thematic focus

Cultural exchange in Europe in the Early Middle Ages (300–1000)

Vanishing of the Roman rule – cultural continuity – demographic changes – great migrations – evolving territorial nations – cultural shifts – climate change – new political and cultural centres – cultural connectivity over large distances – the multicultural roots of modern Europe



## Bringing Collections Together

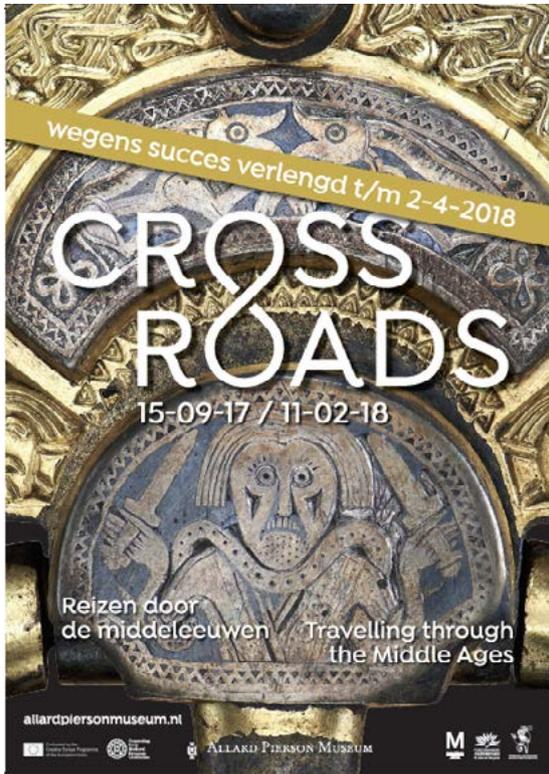
### About

Connecting Early Medieval European Collections (CEMEC) is an EU-funded cooperation project that aims to create a collaborative network, and a cost-effective business model, between eight European museum collections and six technical partners.

Drawing on objects from participating museum collections, the project will produce 'CROSSROADS', a travelling exhibition focusing on connectivity and cultural exchange during the Early Middle Ages (300 -1000) in Europe.

Read more





Exhibition *Crossroads. Reizen door de Middeleeuwen (Crossroads. Travelling through the Middle Ages)*, Allard Pierson Museum, Amsterdam, 15 September 2017–2 April 2018



Exhibition *El Museo de Jaén y al Proyecto Europeo CEMEC (The Museum of Jaén (Spain) and the European Project CEMEC)*, Museo de Jaén, Jaén, 29 September–31 December 2016



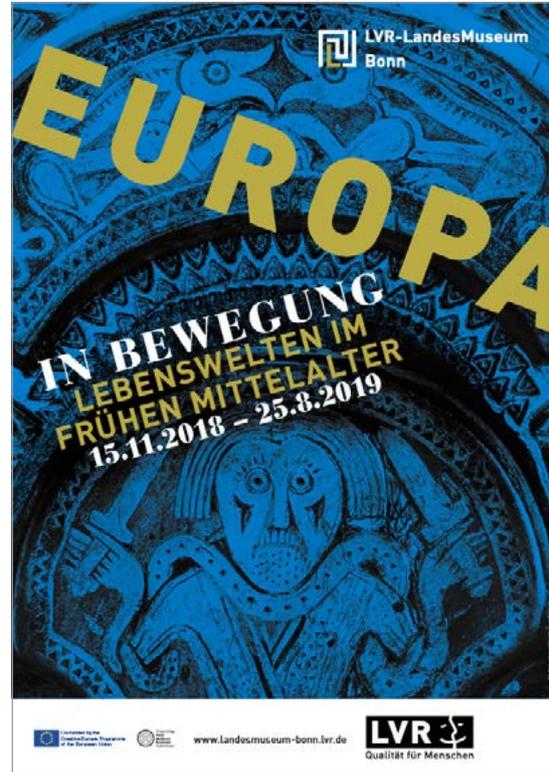
Exhibition *Crossroads. Reizen door de Middeleeuwen* (*Crossroads. Travelling through the Middle Ages*), Art & History Museum, Brussels, 27 September 2019–29 March 2020

Exhibition *Το Βυζάντιο και οι άλλοι κατά την πρώτη χιλιετία: Μία αυτοκρατορία σταθερότητας σε περίοδο κλυδωνισμών* (*Byzantium and the Others in the First Millennium: An Empire of Stability in a Turbulent Era*), Byzantine & Christian Museum, Athens, 18 May–10 October 2018





Exhibition *Életre kelt Avarok (The Avars Revived)*,  
Hungarian National Museum, Budapest, 3 March–  
9 April 2017



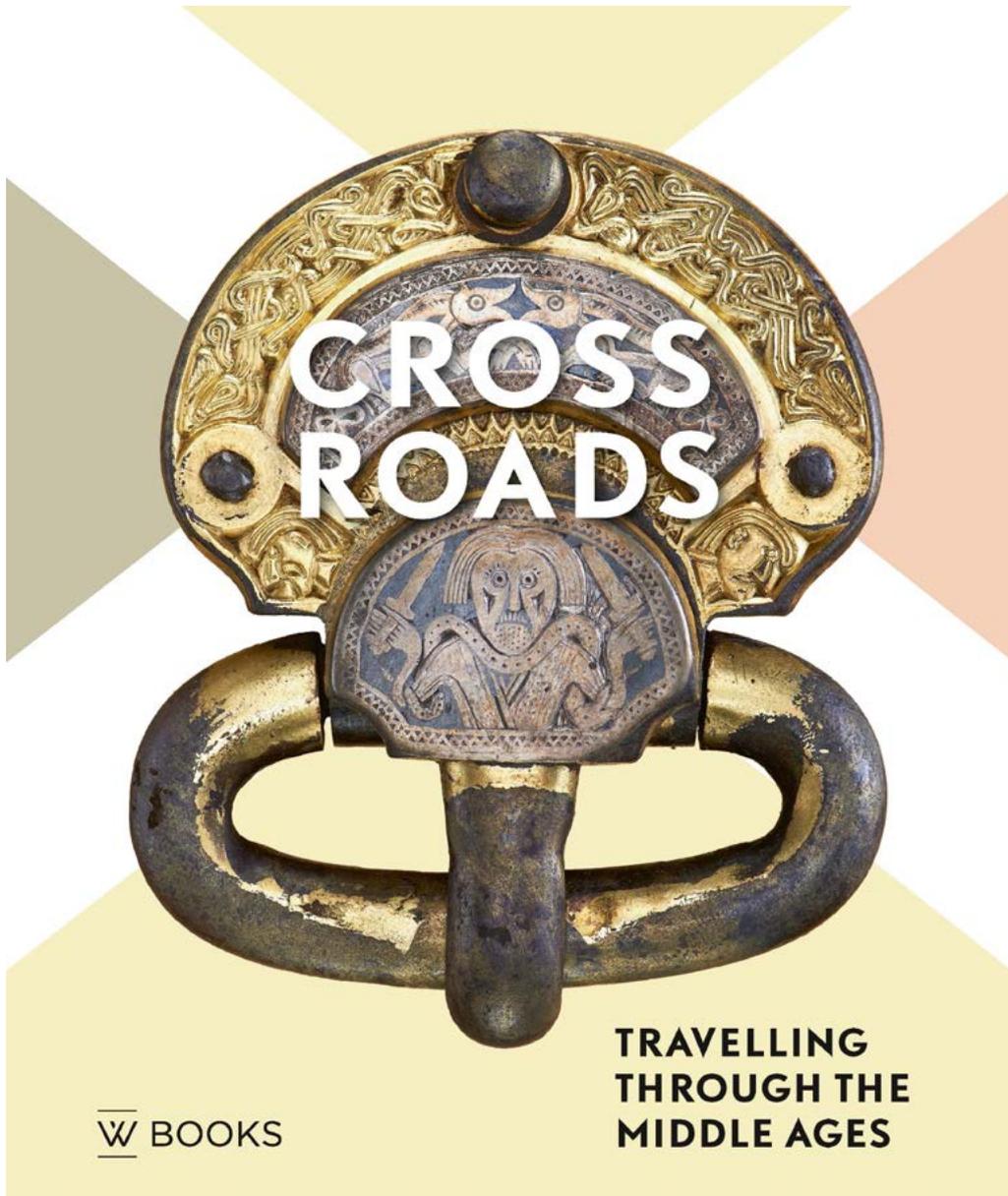
Exhibition *Europa in Bewegung. Lebenswelten im frühen  
Mittelalter (Europe on the Move. A Journey through the  
Early Middle Ages)*, LVR-LandesMuseum, Bonn,  
15 November 2018–25 August 2019



Belt buckle, found in a grave from the Avar period in Kölked-Feketekapu. Gilt bronze, silver, niello, c.580–620. Hungarian National Museum, Budapest (MNM79.1.12).  
Photo: HNM



Merovingian gravestone, found at Königswinter-Niederdollendorf. Limestone, 7th century. LVR-LandesMuseum Bonn (Oo.14189).  
Photo: J. Vogel, LVR-LMB



Cover of the CEMEC publication *Crossroads. Travelling through the Middle Ages*, Zwolle/Amsterdam 2017 (also published in Dutch and German)



Start: October 2015

End: September 2019

Duration: 4 years

## Countries involved

8 (Belgium, Greece, Germany, Hungary, Italy, Ireland, the Netherlands, Spain)

## Institutions involved

7 Museums:

- Allard Pierson, Amsterdam, the Netherlands
- Byzantine & Christian Museum, Athens, Greece
- LVR-LandesMuseum, Bonn, Germany
- Museo de Jaén, Jaén, Spain
- Hungarian National Museum, Budapest, Hungary
- Art & History Museum, Brussels
- National Museum of Ireland, Dublin

#### 5 Universities:

- University of Amsterdam, Amsterdam, the Netherlands
- University College Dublin, Dublin, Ireland
- University Institute of Iberian Archeology, Jaén, Spain
- Eötvös Loránd University, Budapest, Hungary
- Universität Bonn, Bonn, Germany

#### 6 Technical Partners:

- NoHo, Dublin, Ireland
- Moobels, Hilversum, the Netherlands
- CNR (Consiglio Nazionale delle Ricerche), Rome, Italy
- EVOCA, Rome, Italy
- DEN (Digitaal Erfgoed Nederland), The Hague, the Netherlands
- Fraunhofer IGD, Darmstadt, Germany



The connectivity of peoples and cultures in Europe in the Early Middle Ages – the thematic focus of the CEMEC project – is illustrated by the stories of a number of people who travelled great distances. One of them was Ohthere, a man who lived in the north of present-day Norway and was appointed by King Alfred the Great of Wessex (r. 871–899) in southern England to travel around the northern areas of Europe (present-day North Cape, Finland, Russia, Ireland and Denmark) and report what he saw. Still from an animation created for the CEMEC exhibitions by Usfolk Design in Belfast and Noho in Dublin



Byzantine princess Theophano (960–991), niece of the Byzantine emperor, left her home in Constantinople when she was twelve years old to be married to the Ottonian prince Otto II in Rome. As the new emperor and empress of the Holy Roman Empire, they travelled the empire from residence to residence in present-day Germany, the Netherlands and Italy. Still from an animation created for the CEMEC exhibitions by Usfolk Design in Belfast and Noho in Dublin

## People involved

116 people within the partner institutions (directors, department managers, curators, professors, lecturers, independent scientists, research assistants, registrars, conservators, project managers, advisors, programmers, web managers, 3D-scan operators, 3D modellers, 3D-animation developers, software developers, computer animators, designers, interactive developers, user experience evaluators, writers, photographers, graphic designers, communication managers, technicians, controllers, administrators)

... and many more independent contractors and colleagues from other institutions

## Deliverables

- 4 venues of a large-scale travelling exhibition with in total more than 300 objects on view from more than 25 different collections, visited by 38,444 people in Amsterdam, 19,110 people in Athens and 81,857 people in Bonn, who rated the exhibition with a 7.6 (out of 10) on average. The fourth venue, in Brussels, was still running at the time of writing this report.
- 3 evaluation studies on visitor behaviour and satisfaction at the first three venues, involving more than 4,000 visitors
- 2 smaller-scale exhibitions of local collections in Budapest and Jaén (with exhibition catalogue in Spanish and English, 90 pages), visited by 38,000 people in total
- 1 thematic publication 'Crossroads' (207 pages), published in 3 languages and 8400 copies in total
- 1 'Cross Culture Timeline', an interactive application to view exhibition objects on a timeline and map, together with their 3D models and related information and images
- 6 holographic animations on specific objects in the exhibition, presented in 4 small and 2 large showcases, together with the objects themselves (also made available on video)

- 1 trailer movie for the promotion of the exhibition through the social media and web channels of all partners (<https://vimeo.com/239680098>)
- 9 movies on the general story of the exhibition, thematic stories and specific objects in the exhibition
- 53 newly created 3D models of objects in the exhibition
- 1 educational toolkit, to help academics integrate the project deliverables in their teaching (<https://ucdcemec.crossculture.ie/assets/educational%20toolkits.pdf>)
- 2 websites presenting the project (<https://cemec-eu.net/>) and the project results (<https://ucdcemec.crossculture.ie/>)

To make this possible:

- 11 network meetings in Amsterdam, Athens, Bonn, Brussels, Budapest, Dublin and Jaén
- 295 discussions on Basecamp
- 622 shared documents
- 35 Skype conversations
- and innumerable good old e-mails...



### Highlights

**Bronze Bell Buckle**

This bronze bell buckle from the Hungarian National Museum was found in a grave at Kolboc, a large Avar settlement. The beautiful buckle is decorated with fighting animals who are biting each other, and a man in the middle. But who is that man in the middle? He is wearing a sword in each hand while wrangling a snake-like monster! Maybe he is Týr, the German god of storm and war? Or he might be a forgotten hero or god from the many Germanic legends.

**The Shrine of St. Patrick's Bell**

This object is a computer-generated image of The Shrine of St. Patrick's Bell, the origin of which can be found in The National Museum of Ireland. The Bell Shrine, a reliquary, was made in somewhere in the 17th century in order to house The Bell of St. Patrick, an object which was believed to perform miracles. Explore the timeline and view other objects and artefacts from this period.

Online exhibition *Crossroads*, including an online version of the Cross Culture Timeline, <https://ucdcemec.crossculture.ie/>

# How did CEMEC evolve?

CEMEC was created on the basis of a growing partnership among a number of museums and technical partners, and emerged from the idea to connect early medieval collections in a more meaningful way. The idea was in fact simple: connect these collections within a travelling exhibition and create a new narrative that will be conveyed using innovative visualisation techniques. An additional aim was to create a lasting support tool for digital curation that enables heritage professionals to use their own creativity and expertise in the visual storytelling domain. The network consisted of museums, technical partners, SMEs, and a policy partner.

The partners were more or less experienced in EU projects and one of the main lessons that was learned by the coordinator was to prevent the development of fancy prototypes that are not open or too complex in use for cultural-heritage professionals. In the end we were able to create an easy-to-use support tool for digital curation. On the other hand we had a big ambition to create new narratives for our audiences. With three (later four) venues and very different museum organisations and audiences,

maybe this was a bit over-ambitious. Evaluation studies have shown us that it is very difficult to convey a layered and open narrative to different visitor groups. It was already a big step to create a new narrative. The next step to multiple narratives, to be selected or chosen by the visitors, takes a different context and project. At the same time we realised a huge visibility, reached many CH professionals and created a hoard of ideas for new collaborations and projects.

CEMEC was more than a project: its aim was to bring professionals together, foster ties between different disciplines, create enduring and flexible support tools and, maybe most importantly, create the awareness of openness and inclusivity toward partnerships and new practices and methods. CEMEC was the cradle of a new way of collaboration as it stimulated new and exciting models of collaboration and innovation.

# The added value of a network collaboration

CEMEC's central goal was to set up an international network to create a sustainable partnership between the project partners, going beyond a one-off collaborative exhibition project. This has had a great added value.

Benefits for institutions involved:

- institutions can work together towards tangible deliverables, while being aware that these are not the ultimate goal. This allows for more flexibility in the collaboration and more mid-term evaluation to improve later results;
- investments in the inter-institutional contacts pay off also after a one-off project;
- being part of an international network raises the profile of the institutions involved and leads to international recognition and higher visibility;

- the network can serve as a permanent international context for local objects, not just for one exhibition, but for collection presentations in general;
- good practices from other partners can be adopted for the long term;
- including different types of organisations in the network (not just museums) broadens the experience by working with partners outside the institution's 'usual circle';
- opportunities to use the collaboration to inform national or regional policies and decision makers by bringing in good practices from other countries/regions;
- more opportunities for staff development (see below).

#### Benefits for people involved:

- personal contacts can grow over time and be a strong basis for future collaborative projects;
- collaboration with people from different types of organisations brings together different perspectives to enrich your own;
- the network gives you the opportunity to look behind the scenes at related institutions and raises an awareness of your own way of working by comparing it to others;
- collaboration helps to increase knowledge on themes that are central to the cultural-heritage field, such as digitisation and digital tools;

- the international character of the network allows for more network opportunities, internationally, but also within the region and the institution.



Colleagues from the Hungarian National Museum in Budapest and the Consiglio Nazionale delle Ricerche in Rome discuss the development of the holographic application featuring the Kunágota sword, one of the key objects from the Avar section of the permanent collection of the HNM Budapest, October 2016



Members of the CEMEC network preview the exhibition of objects from the Visigoth and Islamic periods of the Iberian Peninsula at the Museo de Jaén in Spain, September 2016



Discussion of the first version of the Cross Culture Timeline at the Hungarian National Museum in Budapest, March 2017



Presentation of plans for the first venue of the travelling CEMEC exhibition in Amsterdam at the CEMEC meeting at University College Dublin, April 2017



## Checklist

To get started...

- Take the time to get to know one another's institutions (social/cultural/economic/legislative background) and what this means for the collaboration. Be aware of administrative hurdles that have to be overcome (for financial issues, for making decisions, for giving loans...).
- Take the time for making practical arrangements: who will do what, when, under what conditions, from what budget, who takes decisions, who manages risks, etc.
- Carefully check your available resources and staff availability and plan the corresponding expenditures and staff input in advance.
- Appoint a central coordinator who takes into account the interests of all partners and who is responsible for continuous supervision, feedback and stimulation.
- Establish an online platform for internal communication and for sharing and working together on documents. Spend time on training and provide troubleshooting from the network to help raise each other's skills and make the most of such collaborative tools.
- Develop a communication strategy for the network, integrated with the communication on specific public results (decide what channels

will be used, for what messages, and who will control and update them).

... And to keep going

- Meet regularly with representatives from all network partners to keep everybody informed, but work in smaller groups to reach actual results.
- Make clear agreements to lay down formal arrangements for the collaboration, in the short and long term (decision-making processes, financial investments, staff involvement, intellectual property rights, etc.).
- Leave room for experiment, shifts in focus, and the opportunity to grab chances as they come by, but constantly check compliancy with the original agreements or update them.



Launch of the beta version of the Cross Culture Timeline at the rotunda of the National Museum of Ireland, April 2017



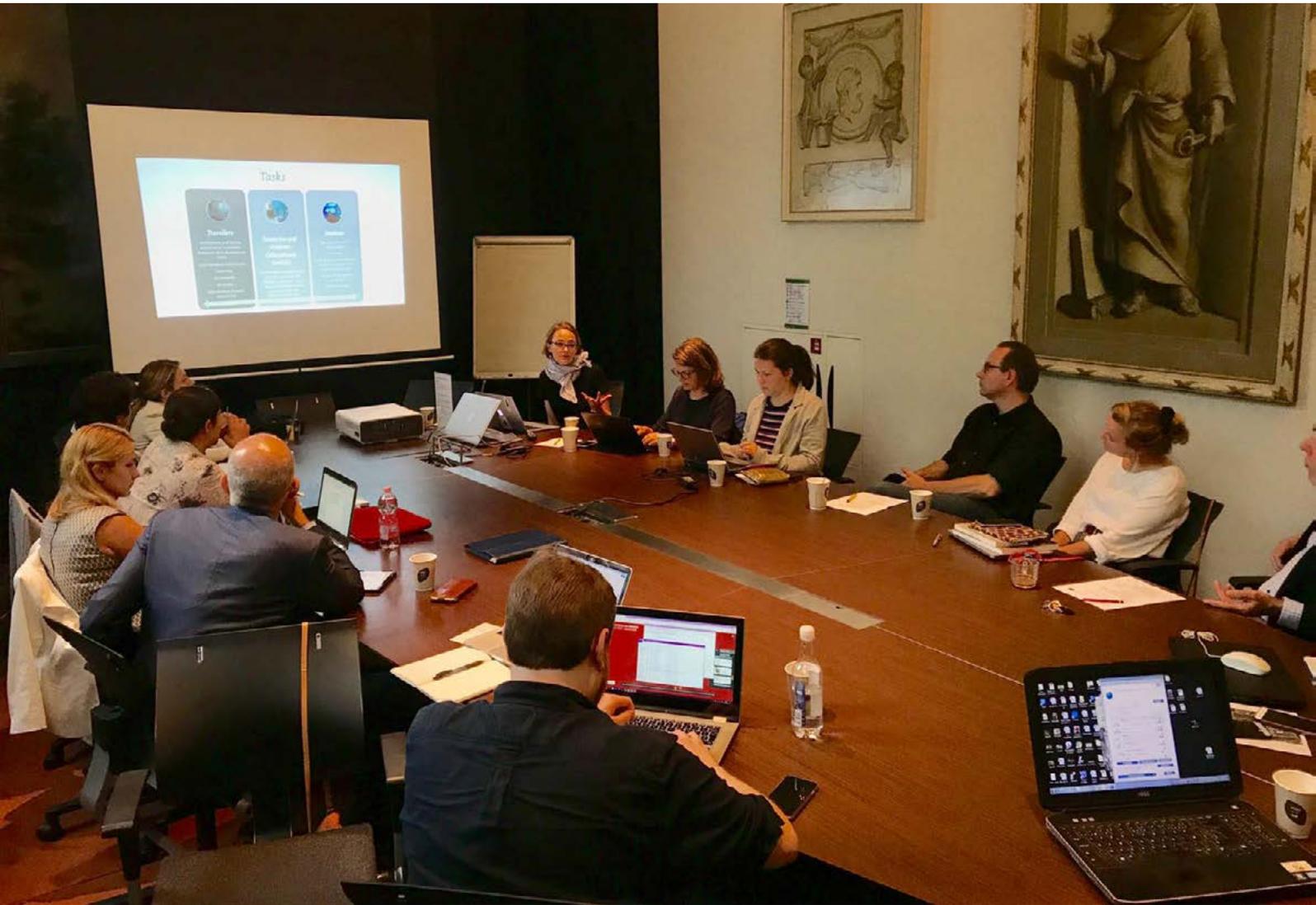
# ΤΟ ΒΥΖΑΝΤΙΟ

«ΚΑΙ ΟΙ ΑΛΛΟΙ»

κατά την πρώτη χιλιετία

Μία Αυτοκρατορία  
σταθερότητας  
σε περίοδο  
κλυδωνισμών







CEMEC meeting at the Allard Pierson in Amsterdam, July 2019





Presentation of the online *Crossroads* exhibition at the final CEMEC meeting in Brussels, September 2019

*'Above all, CEMEC made it possible for us to establish numerous institutional and personal contacts, which led to the planning of future projects.'*

LVR-LANDESMUSEUM, BONN

*'This cooperation of different cultural institutions within the EU promotes the European cultural exchange and the configuration of a common cultural heritage.'*

BYZANTINE & CHRISTIAN MUSEUM, ATHENS

# Travelling exhibitions

## Dos

1. Before you start working, create an **open dialogue** to get to know the expectations of everyone involved. Include in this conversation (from each venue): experts on the contents and collections (curators), experts on the organisation and process (registrars), policy and decision-making level (directors) and experts on public involvement (marketing & communication). Make room for discussion, with respect for each other's position and situation.
2. Decide – together – what **type of joint exhibition** you are going to develop: will you co-create a 'fixed' exhibition that will travel from venue to venue without alteration, or will you develop a more open concept that can be adapted by each venue? Both options have pros and cons:
  - a. The more **fixed**, the more time you will need for preparation and getting everyone on the same page. But: less costs, less organisation

time, knowing at the beginning what you are up to (loan agreements, insurance and transport can be organised for all venues together).

- b. The more **open**, the sooner you can start with the first venue, the more you can use experiences from this and improve things for the next venue, or better adjust it for a local audience. But: more costs, more organisation work, less surety of the outcome (changes to the loans list mean expensive extra transports). If you go for this open concept: agree on what is the '**core**' of the **exhibition** and what should thus stay the same at each venue to do justice to everyone's input and preserve the original concept and message.

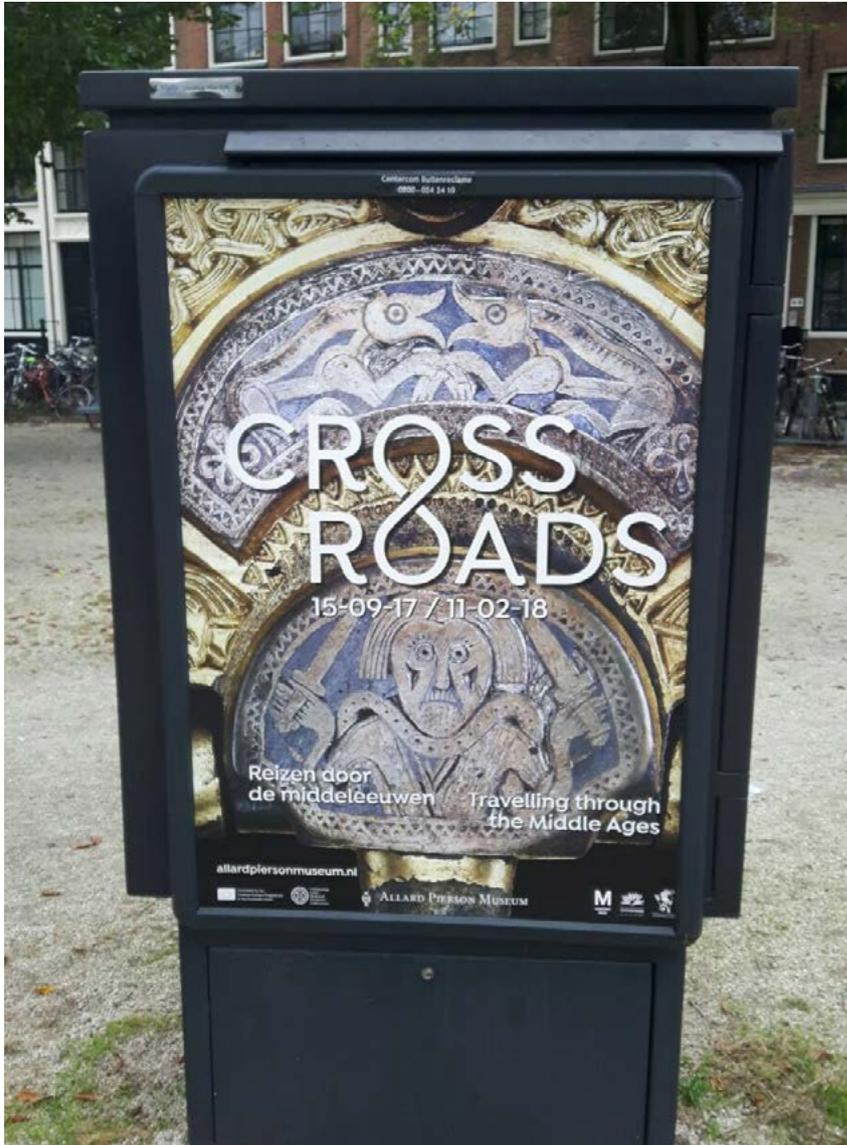
And of course there are many options in between...

3. Explore the possibilities for a **joint catalogue** (one of the fields where some museums are more bound to local regulations) and a **joint promotion package**. If you know in advance that you can share this with more venues, you can get better deals for image credits, translations, design, etc. and save costs.
4. Balance between **classic** ways of museum presentation and **innovative** digital installations. Museums have ceased to be mere spaces for preserving and exhibiting works and collections and have become

places where visitors can interact with the objects and become involved with the stories around them. There is no substitute for the experience of looking directly at a unique museum object, but explanation and contextualisation can be improved by using different interactive and digital resources (see also the next chapter).

5. Gather all information on **local, regional and national regulations** regarding loans, transportation systems and possibilities for extensions of venues. Check if loans need to return to the lender between venues, if extra security measures are required, if objects can be stored between venues, etc. There are many differences between countries and between institutions. Accept that some museums are more bound to policies and regulations from governing bodies, while others can operate more independently.
  
6. Make a clear and realistic **budget**, distinguishing between costs for the benefit of all venues (such as transport crates, pedestals and mounts, digital applications, overall management, etc.) and costs for one venue only (such as customised design, installation and de-installation, etc.). Agree who will take the costs for all venues and how this will be reimbursed. Make sure that each partner has the necessary budget to participate.

7. Look at the possibilities for **reuse of constructions and materials** for the sake of efficiency, economy and waste prevention. This could also be reuse of materials for another project at one of the venues. Things like showcases are usually cheaper to produce again at each venue than to transport over long distances.
  
8. Give partners the **freedom to choose the title of the exhibition** for their venue. This will give them the opportunity to align the exhibition and its marketing-and-communication campaign with their own visitor profile and institutional style. This applies to the publication's title as well.
  
9. Seize **opportunities** when you have the chance: an extra partner, an extra venue, smaller local presentations as preparatory stage or spin-off, etc.



An outdoor campaign in Amsterdam, a TV commercial, social-media attention and, last but not least, positive reviews in local and national newspapers, magazines and online attracted over 38,000 people to the CEMEC exhibition at the Allard Pierson



Opening of the first venue of the travelling CEMEC exhibition in Amsterdam by Allard Pierson director and CEMEC initiator Wim Hupperetz, September 2019. Photo: Monique Kooijmans



Exhibition *Crossroads. Reizen door de Middeleeuwen* (*Crossroads. Travelling through the Middle Ages*), Allard Pierson Museum, Amsterdam, 15 September 2017–2 April 2018. Photos: Monique Kooijmans



Exhibition *Crossroads. Reizen door de Middeleeuwen* (*Crossroads. Travelling through the Middle Ages*), Allard Pierson Museum, Amsterdam, 15 September 2017–2 April 2018. Photos: Monique Kooijmans

## Don'ts

1. Don't assume that the **situation in your institution** – the one that you are used to – will be **the same as in other institutions**. Accept the fact that there are many differences and make sure that you get acquainted with the local situations as soon as possible.
2. Don't think that there will be 'one audience' for your exhibition. Respect the differences between age groups, group compositions and audiences from different cultural and social backgrounds and from different countries. Each group has its own level of existing knowledge on the subject, its own attitude and know-how towards digital applications, and its own preferences for experiencing an exhibition. **Get to know your different visitor groups** and involve them in the exhibition-making process in order to make their visit to the exhibition **as relevant and accessible as possible** for them (see also the chapter on Visitor evaluations).
3. Don't stick to **knowledge and expertise sharing** in your own usual circle, but share with a wider and diverse group of people. Pooling knowledge from different museums and universities will broaden the scientific approach. Pooling expertise from different work fields

will bring the results to a next level and broaden the experience of everyone involved.

4. Don't **disrespect each other's fields and control**. Curatorial contents should not be changed without the consent of the curators responsible for creating them. The same goes for creations of developers and designers.
5. Don't stick to your '**dream team**' if it turns out that some of the institutions cannot join – for whatever reason. You might spend a lot of time and energy that could also be spent on alternatives. Sometimes a museum is too small, understaffed or dependent to become a partner. In this case a local university might be interested and able to join the team.



Exhibition Το Βυζάντιο και οι άλλοι κατά την πρώτη χιλιετία: Μία αυτοκρατορία σταθερότητας σε περίοδο κλυδωνισμών (Byzantium and the Others in the First Millennium: An Empire of Stability in a Turbulent Era), Byzantine & Christian Museum, Athens, 18 May–10 October 2018. Photos: Nikos Mylonas





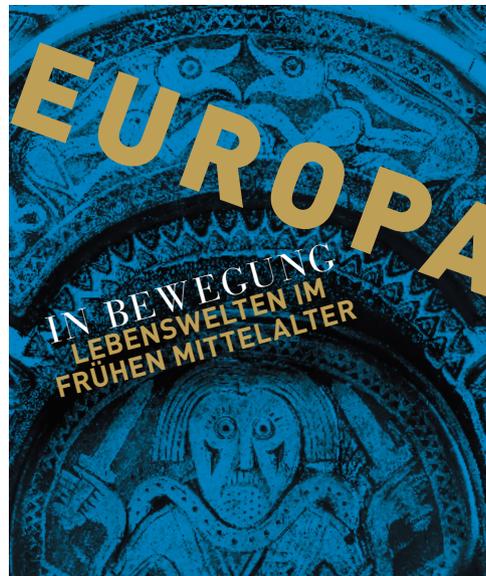
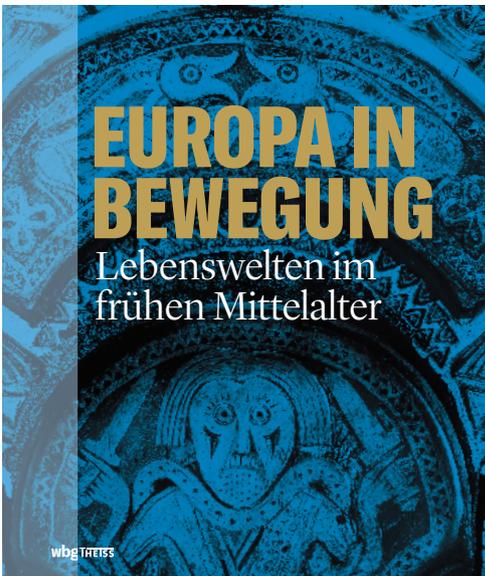
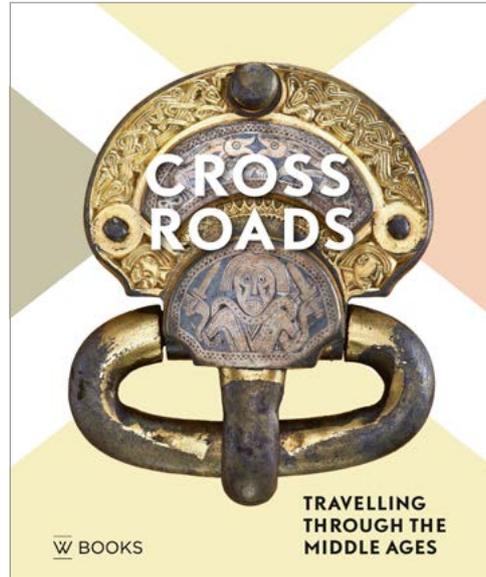
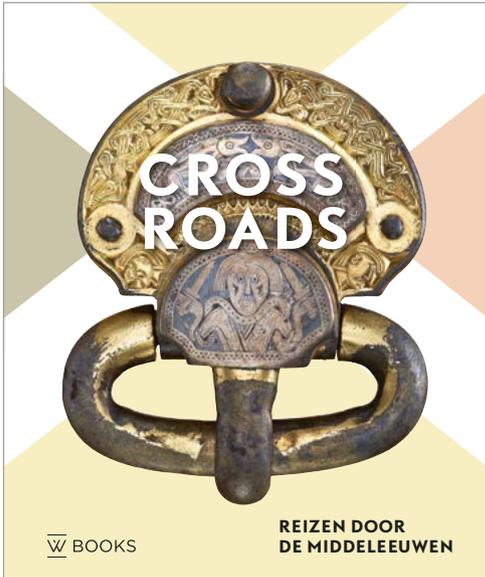
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Exhibition *Europa in Bewegung. Lebenswelten im frühen Mittelalter* (*Europe on the Move. A Journey through the Early Middle Ages*), LVR-LandesMuseum, Bonn, 15 November 2018–25 August 2019. Photos: J. Vogel, LVR-LandesMuseum Bonn



Exhibition *Europa in Bewegung. Lebenswelten im frühen Mittelalter* (*Europe on the Move. A Journey through the Early Middle Ages*), LVR-LandesMuseum, Bonn, 15 November 2018–25 August 2019. Photos: J. Vogel, LVR-LandesMuseum Bonn



# Book publication

The travelling exhibition was accompanied by a lavishly illustrated book publication of 208 pages. This publication was supervised by an Editorial Board consisting of representatives from the partners in the CEMEC project. Coordination was carried out by the publication manager of the Allard Pierson, who worked closely with the general project manager. This setup had great advantages as to content, planning, and efficiency. An added bonus was that work on the publication contributed to improving the exhibition concept.

The book was published (in Dutch and English) and distributed in cooperation with wBOOKS Publishers in Zwolle. The English edition was on sale at all four venues of the exhibition. In cooperation with wbgTheiss Verlag in Darmstadt wBOOKS also published the German edition. The fact that the publication's layout was identical in all editions led to lower cost and greater efficiency. Only the cover and front matter were adapted to the German venue's communication campaign.



The book publication was presented during the opening event of the Crossroads exhibition at its first venue, by Geert ten Dam, President of the Executive Board of the University of Amsterdam. Photo: Monique Kooijmans.

The publication was not venue-specific nor was it a traditional exhibition catalogue, but rather a thematic publication that included as many objects from the travelling exhibition as possible. Authors were requested to write with a general readership in mind, and provide context and extra information as necessary. Additional sale of all the editions in bookstores and online enhanced the international exposure of the CEMEC project as well as the book's authors and editors.

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*'CEMEC created an international cooperation between institutions that reached far beyond general loan agreements. This fine network of institutional and personal contacts could certainly be the basis for future collaborations.'*

HUNGARIAN NATIONAL MUSEUM, BUDAPEST

*'Objects from the Visigoth and Islamic periods in our collection had long been obscured by the influence and presence of other powerful cultures in the province of Jaén (the Iberians). Thanks to CEMEC, those objects were put in the spotlights, removed from their local context and given a European dimension.'*

MUSEO DE JAÉN

# Digital contents and applications

Presenting digital applications in an exhibition allows you to use the **power of visualisation** in many different ways. A mix of applications can make exhibitions attractive, informative, thought-provoking, and emotionally stimulating. Experimenting with digital tools will help you to get to know new ways of working and new scientific approaches.

## Co-creation between museums & developers

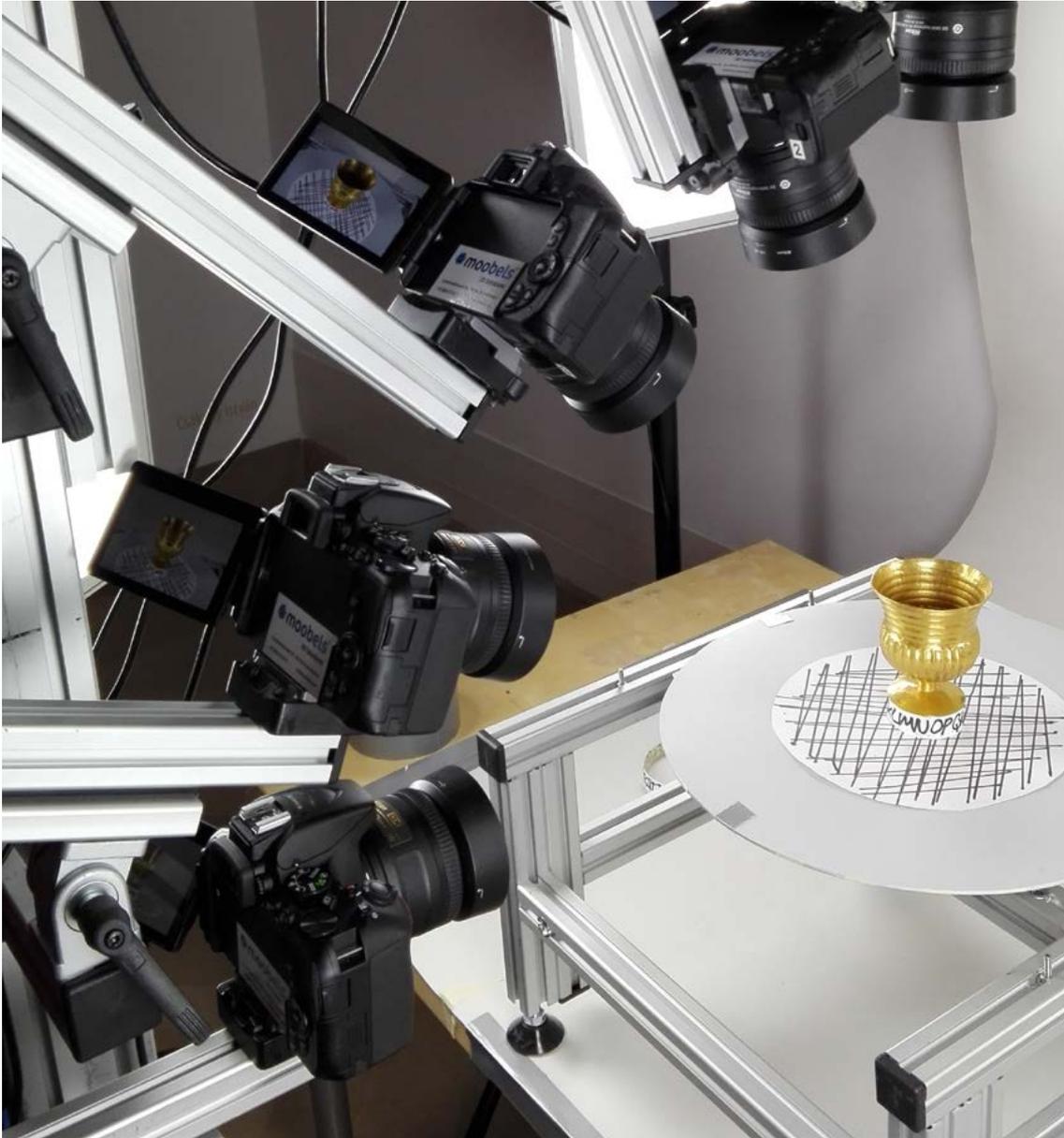
One of the special features of CEMEC is the close collaboration between museums and technical/creative companies. Usually, if a museum orders a digital application from a creative company, there is a clear relationship between **client and contractor**: the client (the expert on the contents/collections) determines the assignment; the contractor (the expert on technology/design) executes the assignment. If, however, museums and technical/creative companies enter into a partnership or a bigger network with others, like CEMEC, this relationship changes. In this case, there is an opportunity to build a true cross-sector collabo-

ration, bringing together the best of both worlds. However, as there is no longer a traditional relationship between client and contractor, this collaboration needs to start with an open dialogue about expectations, worries, strategies, usual practices and best practices, etc. Even though both types of organisations are more equal as co-creators, there will still be a strong need for central coordination and careful planning.

Apart from application developers, CEMEC also involved **3D-digitisation companies** in the co-creation network. 3D scans are important building blocks for many digital applications. If you do not have those yet, and you can have one company creating them for all network partners, you can ensure consistency in processing, archiving, quality, and a fair price. However, it requires a lot of transport of the full scanning equipment. In an international context, it also makes sense to involve local partners working in close communication with each other, using the same standards.



Colleagues from Moobels, a Dutch 3D-digitisation company, digitise early medieval objects in Amsterdam, Budapest, Athens, Bonn, Jaén and Brussels, to produce 3D models for the digital applications for the CEMEC exhibitons



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Colleagues from Moobels, a Dutch 3D-digitisation company, digitise early medieval objects in Amsterdam, Budapest, Athens, Bonn, Jaén and Brussels, to produce 3D models for the digital applications for the CEMEC exhibitons

## What tools for what purposes?

Not every tool is fit for every museum, every exhibition, every user group, every type of story, etc. It is important to discuss **what tool fits what purpose**. A good user experience with digital applications can be achieved by carefully reflecting on:

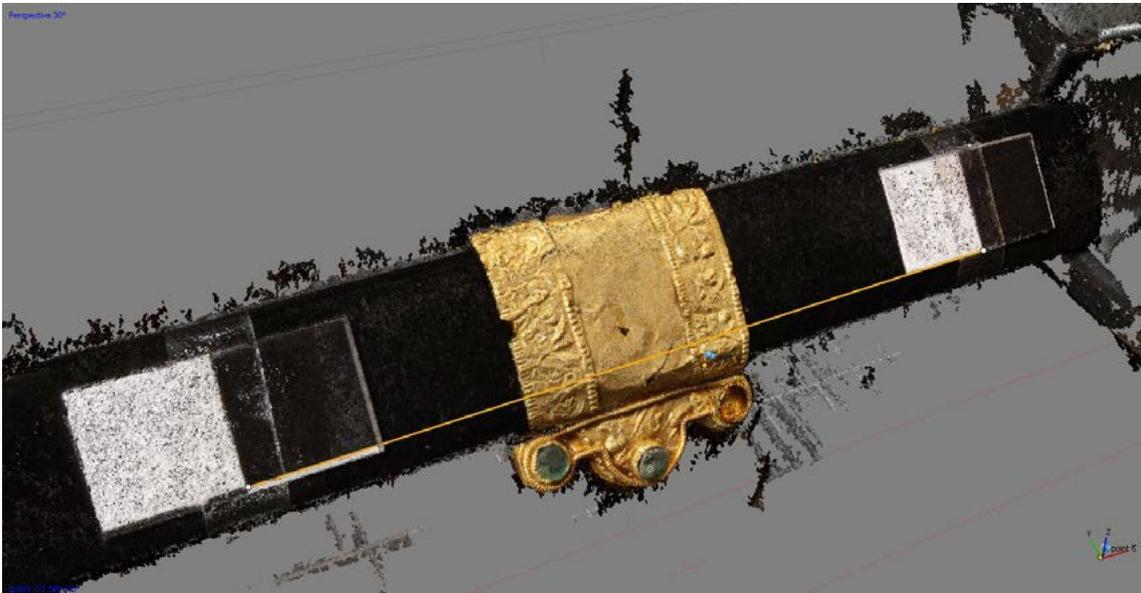
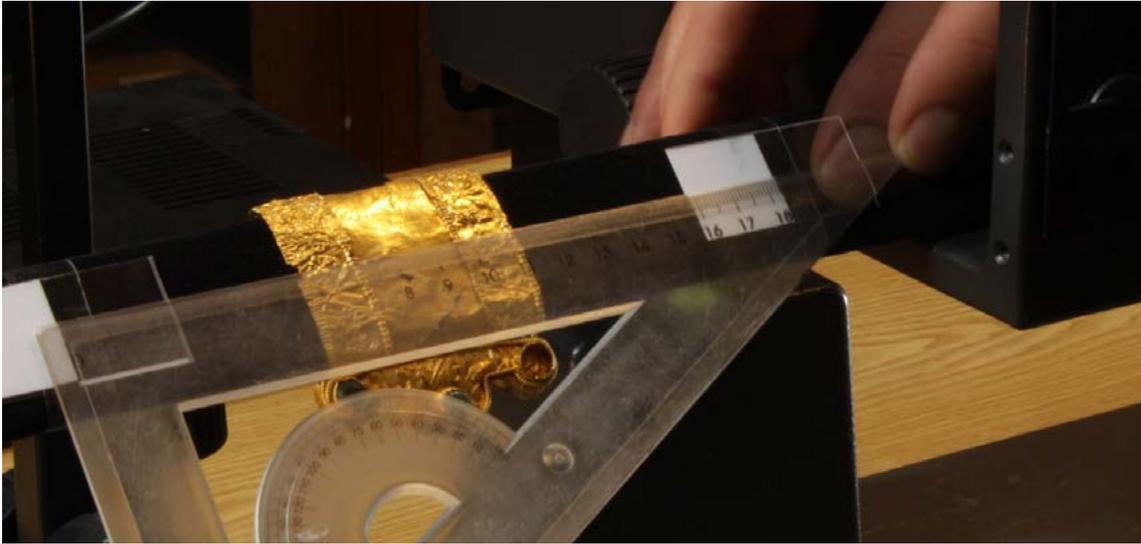
- the context of use (in an exhibition or more standalone);
- longevity and possibilities for reuse (the application as well as the hardware and constructions around it)\*;
- the concept, storyline, design of the exhibition and all the elements that will be included (objects, texts, audio, video, etc.);
- the environmental conditions (silent or noisy, dark or illuminated, secluded or crowded);
- the possibilities of the physical space hosting the installation (dimensions, location of other elements);

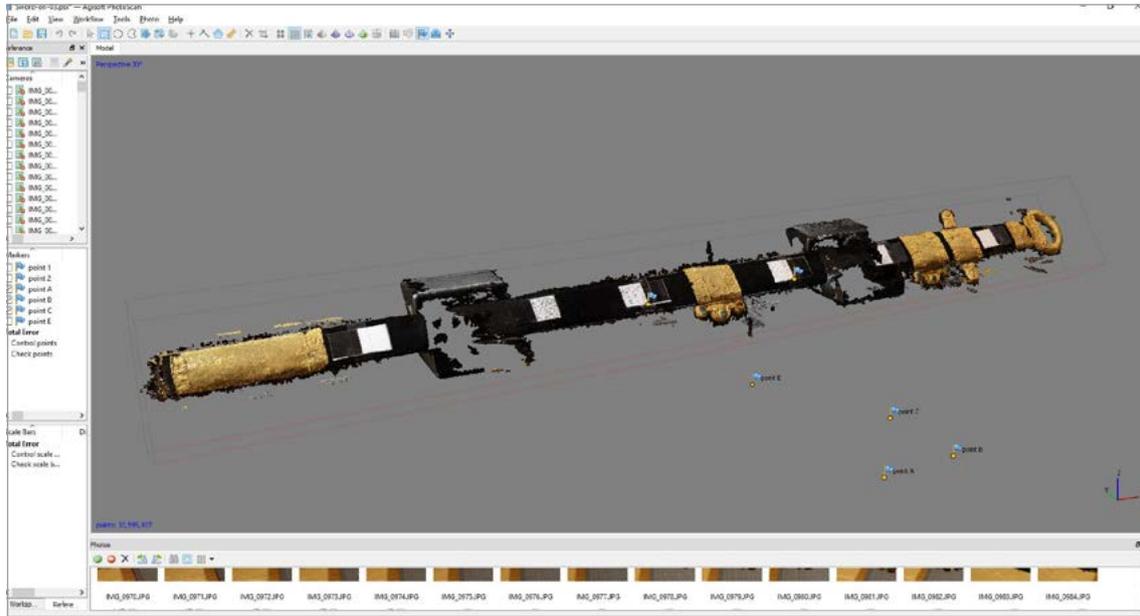
\* Applications created for an exhibition can be **updated, reused and employed in other areas**, such as education. Creating them requires great investments in time and money. So why not do it for more than one use? This also works the other way round: sometimes the application that you are planning to develop already exists in some form and only requires updating, translation or extension. CEMEC for instance reused an animated map of the great migrations from a previous exhibition in one of the partner museums, and it was a big success.

- the characteristics and behaviour of the targeted visitor group(s) (average group size, average age, average eye level, languages, need for subtitles, need to sit down, etc.);
- the accessibility of the contents (how much information and visual documentation is available to visualise a story around an object. This includes a lot of context information, such as architecture, clothing, etc.);
- intellectual property rights on the contents to be used, and the resulting application (can it be presented online as well?);
- security and conservation issues (if applications are presented in the same space or close to original objects, installation and de-installation and possible maintenance work of the applications' hardware needs to be done safely);
- the presence of local IT support (the less support, the simpler it should be);
- the local situation regarding power supply (type of plugs, lengths of cables needed, etc.) and other supplies (materials that are easy to buy in one country might be very hard to get hold of in other countries);
- and last but not least: the presence and stability of an Internet connection in the galleries (important for the installation process and possibly troubleshooting from another location).



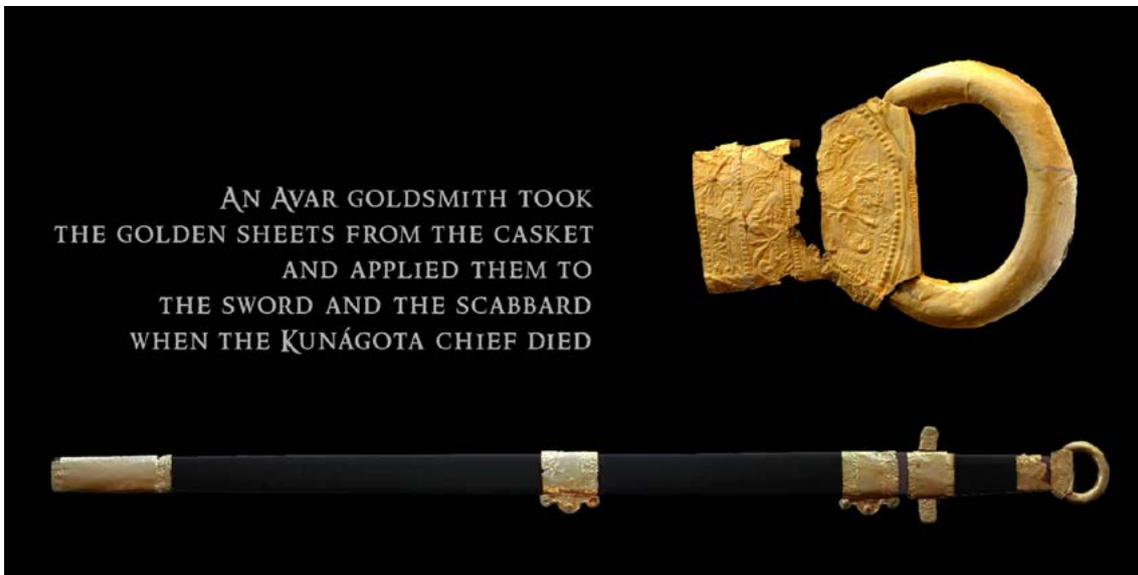
Production process of the holographic application featuring the Kunágota sword, one of the key objects from the Avar section of the permanent collection of the Hungarian National Museum in Budapest, developed by the Consiglio Nazionale delle Ricerche and EVOCA in Rome. Photographs and exact measurements of the objects are used to elaborate the 3D model of the sword created by the Dutch network partner Moobels, leading to a very precise rendering of the object's small details in Photoscan, used for the final animation.







IT WAS DISCOVERED IN THE WASTE,  
STEPPE-LIKE SOUTH-EAST REGION OF  
HUNGARY, INSIDE THE TOMB  
OF THIS PRESTIGIOUS AVAR CHIEF



AN AVAR GOLDSMITH TOOK  
THE GOLDEN SHEETS FROM THE CASKET  
AND APPLIED THEM TO  
THE SWORD AND THE SCABBARD  
WHEN THE KUNÁGOTA CHIEF DIED

All these aspects – to be discussed in a multidisciplinary team – should influence the choice of hardware and software, the level of interaction, the duration and the choice of the style of visualisation and storytelling of the applications.

And all these aspects need to be taken into account *again* when testing and evaluating the applications, which is of great value throughout the development process (see also the next chapter).

Besides a large number of small videos and animations, the CEMEC network developed two special applications:

### **Cross Culture**

Cross Culture is an easy-to-use application for making engaging interactive timelines for cultural heritage. Curators and heritage professionals can easily create content and stories themselves, linking together 3D objects, stories and events on an interactive timeline for a chosen period. The timeline can be deployed on the web, on mobile, or as a touchscreen application within the museum.

The CEMEC exhibitions served as a testing environment for this application. It enabled the visitors to explore the rich cultural history and diversity of early medieval Europe. The Cross Culture timeline is not bound to a specific time or region or to use in exhibitions. It has already

been successfully employed as an educational toolkit by students of University College Dublin. CEMEC was definitely not the final destination for Cross Culture. It will be further developed and launched as a generic tool in 2020.

Cross Culture development: Noho Creative knowhow (Dublin), Allard Pierson (Amsterdam), University College Dublin, with 3D scans made by Moobels (Hilversum) and input from all CEMEC museums

More information: <https://noho.ie/index.php/contact/>

### **Holoboxes**

Holographic animations presented together with the objects in the same space (together in one showcase, with object and animation overlapping) brought objects in the exhibition 'back to life' by presenting more developed stories on multiple aspects, while the attention of the viewer remains focused on the objects themselves. The showcases serve as small theatrical stages, equipped with controls for the direction and synchronisation of lights, audio (voices and soundscape) and projections of animations and video (which even included real actors handling (replicas of) the objects in full scale). The effect of mixed reality (seeing the object and the projections) surprised and engaged visitors to the CEMEC exhibitions. These 'boxes

of stories' were best appreciated when visitors had the option to select their preferred language and could sit down.

Holoboxes development and evaluation: CNR (Consiglio Nazionale delle Ricerche) and EVOCA (Encoded Visions on Canvas, Rome), Hungarian National-Museum (Budapest), Byzantine & Christian Museum (Athens), LVR-LandesMuseum (Bonn)

More information: [www.itabc.cnr.it/pagine/where-we-are](http://www.itabc.cnr.it/pagine/where-we-are)

## Getting started?

If the use of digital applications is quite new to your institution, start by making a strategy (from the short to the longer term) for this. Make sure to invest in:

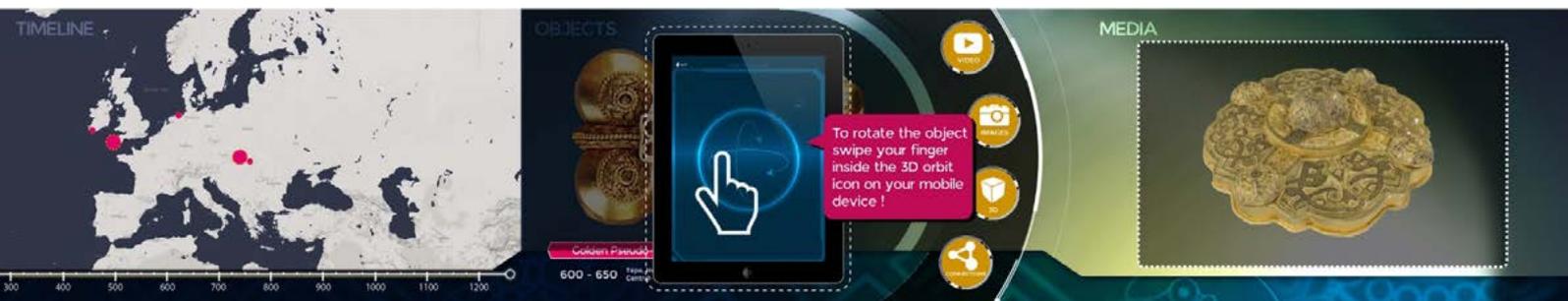
- good Internet connections, especially in the exhibition rooms;
- presence of IT resources (computers, interactive screens, mobile devices, etc.);
- availability of specialist personnel to control the IT resources;
- staff IT skills and mentality (willingness to accept new technologies);
- updating/replacing legacy systems from the past;
- active control of websites and social media to engage with a digital audience.



Installation of hardware for the holographic animation featuring three items of the Mytilene treasure from the Byzantine & Christian Museum in Athens



Animation with a 3D reconstruction of the sarcophagus from Apamea (Syria) from the collection of the Art & History Museum in Brussels showing how it was used to consecrate oil that pilgrims could carry with them in small flasks. Both the original objects and the animation, created by CEMEC partner Moobels, were part of the travelling CEMEC exhibition



First design for the Cross Culture Timeline application to be presented on panoramic screens in the travelling CEMEC exhibition, developed by Noho in Dublin. See also the paragraph on Business-model innovation

*'The biggest success of the CEMEC project is to have joined in a common experience with partners coming from different EU regions, with different perspectives, backgrounds and ideas, fostering dialogue among them.'*

CNR AND EVOCA, ROME

*'Exchanging experiences with partners from abroad was rewarding and interesting.'*

UNIVERSITY COLLEGE DUBLIN

# Audience research

An extensive visitor research programme was carried out before and during the travelling CEMEC exhibition's stay in Amsterdam, Athens and Bonn by and/or under the supervision of specialists from the University of Amsterdam (Media Studies Department) and Bonn University (Psychology Department), and with the help of student volunteers in Athens and Bonn.

The Consiglio Nazionale delle Ricerche (Rome) evaluated the use of the holographic showcases they produced together with EVOCA, to make improvements to the applications for each subsequent venue of the exhibition.

The research focused on digital as well as curatorial aspects, including the quantity, quality and usability of digital and curatorial content (to be developed for the exhibition). While the outcome of this specific research is mostly interesting to the museums involved (each museum has its own distinctive visitor profile), the setup of the study could benefit others as well.

## Why do it?

1. To **better understand your visitors** and communicate with them more effectively. The visitor's worldview can be very different from that of the museum's staff. Visitor research before and during an event – and on an on-going basis – will give you a clearer image of what groups your audience consists of and how they perceive your museum. Especially a long-term continuation of more quantitative methods (see below) will provide you with valuable information about your visitor profiles and their backgrounds.
2. To **improve your future activities** (exhibitions, digital applications, etc.). Audience research may highlight crucial visitor 'misunderstandings', from a conceptual point of view, or 'bottlenecks', from a practical point of view, and determine the strengths in contents and design. Results from one exhibition may help you to adjust it if it travels to a next venue, or help you make more informed decisions regarding new exhibition plans or changes to your permanent collection presentation. Studies with visitors/users of digital applications (usability testing) is especially valuable during the development process, as it will help you to make each new version of the tool a bit better.

3. To **measure the impact** of your activities and exhibitions, as is often required to account for funding given for the activity, or to help convince funding agencies for new projects. This can either be quantitative (did we reach the numbers and grades we set as targets?) or more qualitative (did we reach the desired effects?).
  
4. To **benchmark** your results and compare them with the results from other organisations with similar activities, in order to benefit and learn from this as a collective. In collaboration with other museums (for instance those which host the same exhibition or those which are located in the same city) you can decide what elements you want to measure and how you determine the 'quality' of these elements (e.g. the number of visitors, rates given by visitors or a specific type of impact that they have experienced, etc.). If you do exactly the same type of research for all institutions involved, you can compare the results to each other, or to an 'anonymous' average of all institutions if you prefer. You can get to know your own strengths and weaknesses compared to others and to position yourself accordingly.



Kick-off for the public test of the pilot version of the Cross Culture Timeline application in the Digital Museum Lab of the Allard Pierson in Amsterdam by Inge Kalle-den Oudsten, PhD from the University of Amsterdam involved in the visitor studies for the CEMEC exhibitions, and Allard Pierson director Wim Hupperetz, October 2016



### Two gold coin pendants



1800 1850 1900



Two gold coin pendants

### Two gold coin pendants

1800 1850 1900

Two gold coin pendants  
The pendants were made of gold  
and were used as a form of  
currency. They were made in  
the 18th century and were  
used in the Caribbean. They  
were made by the Spanish  
and were used by the British  
and the French. They were  
used as a form of currency  
and were made in the 18th  
century.







## How to do it (right)?

1. Integrate audience research into the whole of your organisation as an on-going process, instead of doing it as one-off and *ad hoc* activity during a certain exhibition with a small group of people.
2. Research every stage of the work on exhibitions/applications:
  - **Before the design process:** discover as much as possible about the background of potential visitors. What do they already know about the exhibition topic, what are their feelings regarding it, how does it relate to their lives? This type of information is crucial in determining how to approach the topic, how to get potential visitors interested in it by linking familiar information to new information, and how to make the museum's information personally relevant to the visitors.
  - **During the design/development stage:** test particular elements of the exhibition, such as digital applications, to improve their final design. This stage focuses very much on usability: is it clear what the visitor should do, does he/she know how to use the application, is everything readable, etc. Applications can be tested in a focus group with representatives from different target audiences or – as was done in the CEMEC project – in a public space in your

museum, allowing for more interaction with visitors in the design stage and thus highlighting this part of museum work, instead of only presenting finished products.

- **During the exhibition:** investigate how visitors interact with the exhibition as a whole and with specific elements/applications in it in order to evaluate your work in the previous stages, to account for your end result and to inform your next activities.

3. Combine different types of research methods, quantitative and qualitative, to obtain both mass (in numbers) and depth (of information). Quantitative methods will be used to provide a broad base of elementary visitor information, on which qualitative studies can then be built focusing on more in-depth questions with fewer visitors. The combination of the two methods will then be able to compensate for the shortcomings in both.
4. Do not combine audience research with marketing; secure the privacy of your visitors. Do not gather personal data like names and addresses in the process. If you want to use data for further analysis in an academic context, you will need to ask participants to sign an 'informed consent' form to prove that they agree with their data being used (even if it is anonymous).





Photo: J. Vogel, LVR-LandesMuseum Bonn



## Research methods

Seven different research types have been applied in the CEMEC project, from (mostly) quantitative to (mostly) qualitative. The combination has proved to be very successful in delivering a rich data set:

1. **Head-counting:** people behind the ticket desk at the entrance of the museums/exhibition rooms marked simple characteristics for each visitor on a paper form (gender, age group, group composition, international tourist/non-tourist) on the basis of their best guess – to not be too intrusive – for the entire duration of the exhibition (to compensate for the inevitable mistakes in guessing by the large numbers).
2. **Short on-site digital survey:** a tablet stationed at the exit of the exhibition presented the visitors with a small survey of 10 questions taking about 1 minute to fill out (again including age group and group composition, to link with the head counting, but also time of visit and visitors' satisfaction about certain elements). The survey was built with the QuickTapSurvey tool, which automatically collected the data online and offered downloading to a spreadsheet for further analysis.

3. **Paper questionnaires:** volunteers and/or other museum staff working on the floor asked people at the end of their visit if they wanted to help out by completing a questionnaire on paper (for a small incentive, such as a poster or a free cup of coffee). These surveys were significantly longer and included a lot of open-ended questions. To link to the basic data from the previous sources, the questionnaire again had the basic questions about age, group composition, amount of time spent in the exhibit, etc. Then it had more in-depth questions about the contents of the exhibition: what did people think of certain elements and what did what was it about the exhibit that they would remember? To avoid misunderstandings and have more extensive data, there were several similar questions focusing on the same issue.
  
4. **Accompanied visits:** participants for this type of research were recruited beforehand through social media and other museum channels, and included representatives of different visitor groups. The researcher walked through the exhibition with a visitor, while the visitor was asked to 'think aloud' and describe the experience. There were no predefined questions from the researcher (except the prompting to keep thinking aloud); the visitor took the lead. The information was captured through audio recordings that were later transcribed and analysed.

5. **Exit interviews with photos:** before entering the exhibition, the (previously recruited) participants were given a camera or asked to use their mobile phone, and to take photos of what they found interesting, nice, fun, or the opposite. After the visit, the visitor was asked to narrate his/her experience based on the photos taken. Again, there were no predefined questions by the researcher; the photos provided the structure for the conversation. Results were recorded and transcribed.
  
6. **Observations:** as there is always an interviewer bias that makes participants not be entirely honest or not admit certain things in a face-to-face conversation, their behaviour in the exhibition should also be observed. This is especially useful to study how people interact with digital and audio-visual applications. The researcher sat near an application (but not too close or obtrusive) and recorded standardised data (time a visitor spent in the room and with the application, best guess of age group, group composition, gender) and notes on a paper form, which were transcribed afterwards. The more complex the application, the more time it took to get to know the different visitors' behaviour patterns.

7. **Guestbook analysis:** on top of all the other data, paper books that allowed visitors to leave a comment at the end of an exhibition were transcribed and analysed. There is obviously a large bias in the comments, as visitors may only write in the book when they have something to praise or to complain about. But where other methods will elicit more 'polite' responses, comments in visitor books may be more honest; the paper is a safer space for criticism. Even though these comments are more out of context because you do not have a lot of information about the authors, the responses still remain valuable to complement the data from other methods.

Sample questionnaires and other materials that were used by CEMEC are available for reuse or inspiration. Contact: [info@allardpierson.nl](mailto:info@allardpierson.nl)







Presentation of results of the audience research of the exhibition in the Byzantine & Christian Museum in Athens in 2018

## Further reading

The focus of the audience research during the CEMEC project was on the meaning-making processes of the visitors and the role of new media in this. Project-team member Inge Kalle-den Oudsten from the Media Studies Department of the University of Amsterdam (UvA) is writing a dissertation on this subject:

I. Kalle-den Oudsten, *A Chance for Change? New Media in the Transforming Museum*

To be published in UvA's Digital Academic Repository in Summer 2020:

<https://dare.uva.nl/>

The research results of CNR and EVOCA focusing on the holographic showcases were published in: Pietroni E., Ferdani D., Forlani M., Pagano A., Rufa C., 'Bringing the Illusion of Reality Inside Museums – A Methodological Proposal for an Advanced Museology Using Holographic Showcases', in: *Journal of Informatics*, Volume 6, Issue 1, 2019, available through: <https://doi.org/10.3390/informatics6010002>

The CEMEC research gratefully built upon work done by others in the field:

Lindauer, Margaret, 'What to Ask and How to Answer: A Comparative Analysis of Methodologies and Philosophies of Summative Exhibit Evaluation', *Museum and Society*, 3 (2005), 137–52

Kelly, Lynda, 'Evaluation, Research and Communities of Practice: Program Evaluation in Museums', *Archival Science*, 4 (2004), 45–69

Hooper-Greenhill, Eilean, *Museums and the Interpretation of Visual Culture* (London: Routledge, 2000)

–, 'Research and Evaluation', in *Museums and Their Visitors* (London: Routledge, 1994)

–, 'Studying Visitors', in *A Companion to Museum Studies*, 2007, 362–76

Economou, Maria, 'Evaluation Strategies in the Cultural Sector: The Case of the Kelvingrove Museum and Art Gallery in Glasgow', *Museum and Society*, 2 (2004), 30–46

Davidson, Lee, 'Visitor Studies', in *The International Handbooks of Museum Studies: Museum Practice*, ed. by Conal McCarthy (Hoboken, New Jersey: Wiley-Blackwell, 2015), 503–27.

# Business-model innovation

One of the main aims of CEMEC was to improve the business models of the museums and heritage organisations (specifically those with early medieval European collections) through a lasting network of collaboration, the exchange of objects and the pooling of knowledge and tools, especially by making use of digital services and digitised collections.

This process was informed and guided by two previously existing tools, developed by DEN (the Dutch knowledge centre for digital heritage, also a partner in CEMEC) and Kennisland (an independent Amsterdam-based agency that aims to study and design social progress) and commissioned by the Dutch Ministry of Education, Culture and Science:

- [Guidebook Business Model Innovation Cultural Heritage](#): an introduction to business-model innovation as an instrument for heritage organisations to acknowledge the fact that digitised collections and digital services are gaining in strategic significance as they strengthen the role of cultural heritage in digital society.

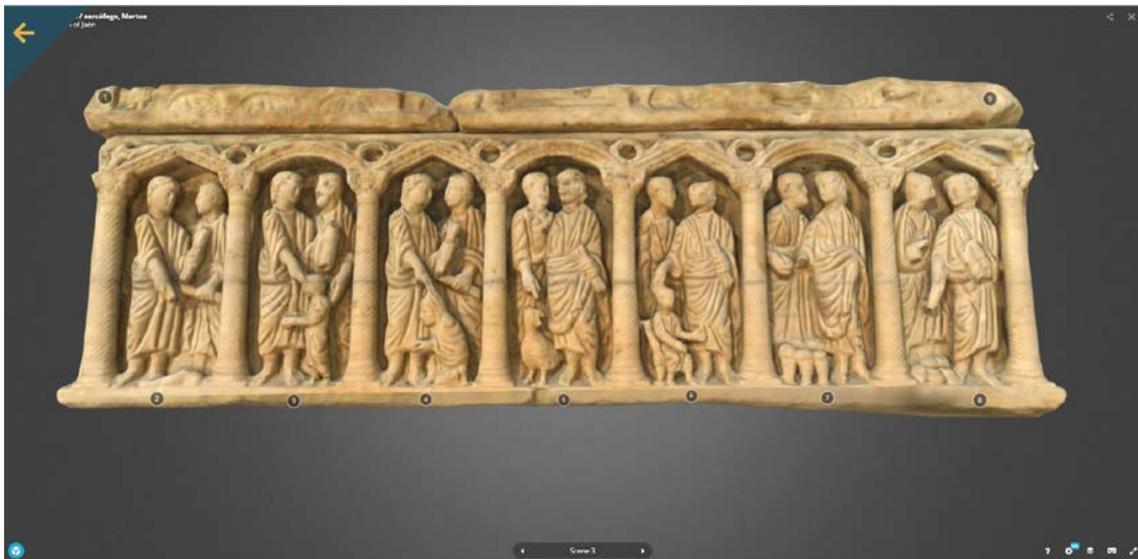
The publication provides insight into the choices facing the heritage sector in the digital age and provides tools that enable heritage institutions to make well-founded decisions regarding their role(s) in the digital age.

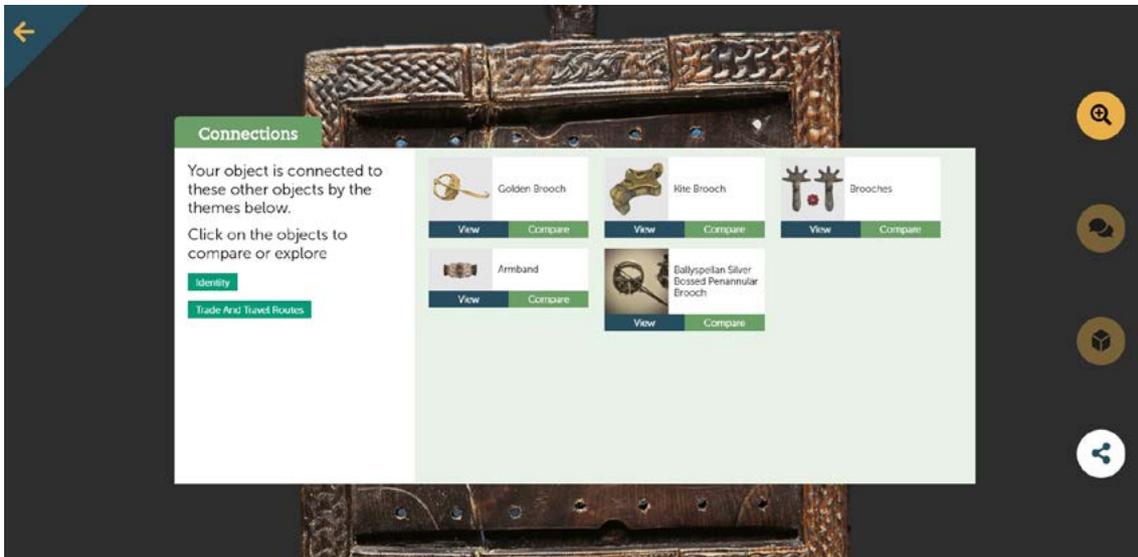
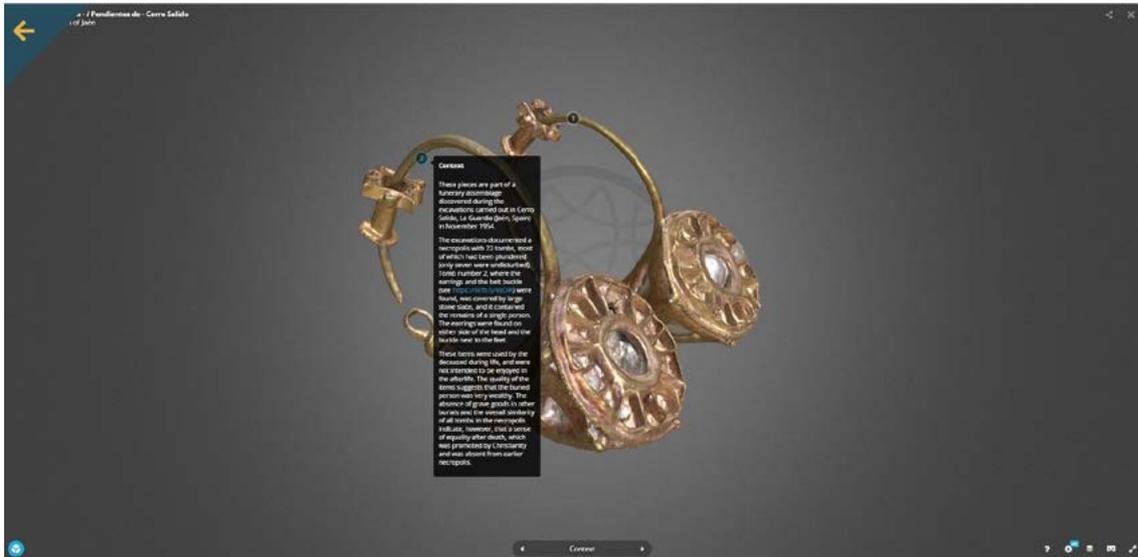
- Business Model Innovation Cultural Heritage Step-by-Step Plan: this so-called 'BMICE Roadmap' was developed by DEN as an extension to the Guidebook, in close collaboration with digital-heritage and business-model experts. The roadmap comprises seven steps that can be repeated regularly on a long-term or occasional basis to help heritage institutions to permanently embed new or existing digital service concepts into their business models, involving both managers and users.

Business-model innovation within CEMEC focused on one of the digital tools, the Cross Culture Timeline.

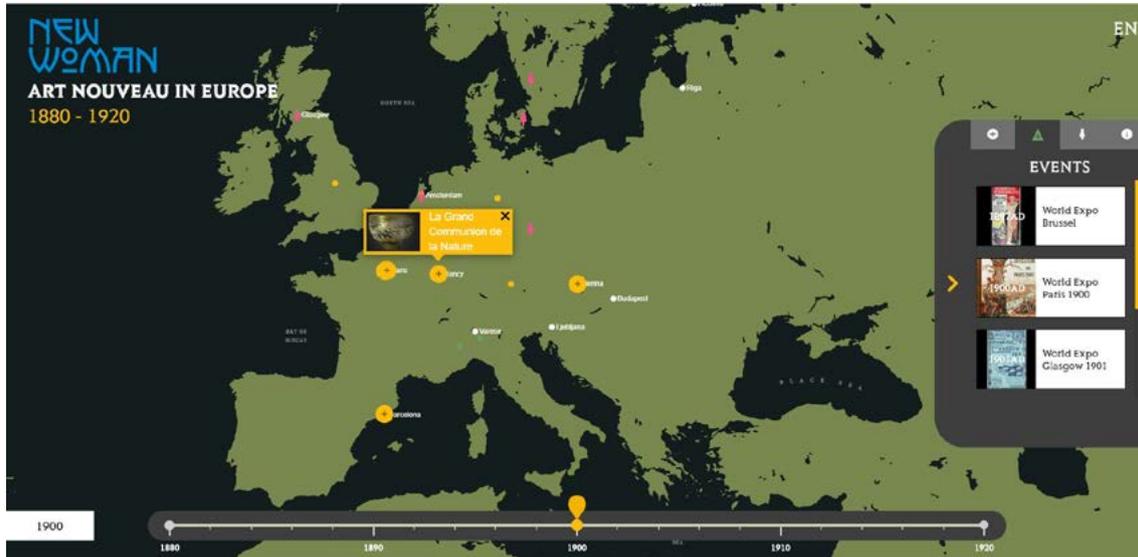
During the CEMEC project we saw the great potential and need for an easy-to-use support tool for digital curation for CH professionals. At first the Cross Culture Timeline was envisaged as a visualisation tool for presentation purposes in the travelling exhibition. The basic idea was to create a business model by using a collaborative approach, and developing a way of creating an exhibition together. That should lead to an effective and beneficial collaborative model in which exhibitions could be produced. Using the new presentation concepts and applications should enhance this model as well. In practice it turned out that this is not feasible yet. The differences in financing, organising and planning projects are too big for efficient collaboration within this context. The collaborative approach in the exhibition, the publication and the presentation tools was useful, but there were many aspects that were frustrating a 'real' collaborative and efficient practice. The differences in exhibition spaces, technical staff and financial means were enormous. The support tool had great potential and we decided to focus on this aspect and use the evaluations to improve this tool, the usability and the content. Furthermore it was important to prove that the tool would be simple, easy to use and powerful in presenting the content. Enabling CH profes-

sionals to use, create and manage the digital content on CH collections was the final step before we could work on the actual business model. The Allard Pierson was willing to invest in the tool by implementing it in the semi-permanent presentations and NoHo was willing to invest in the technical development. This led to the phase where the CMS on the Cross Culture Timeline was improved step by step. NoHo is offering the system on the basis of a license in three levels. The CCT is deployed for CH professionals as an online tool and as an onsite tool in the museum. We intend to have a tiered pricing model with subscription. The first tier allows users to access a basic form of the CCT and the CCT manager. The second tier allows unlimited hotspots and access to all the CCT's features, while the third tier is for customisation and additional multimedia content, done in collaboration with the museum. All users will have free access to an online demo to test the suitability of the application for their needs. The Allard Pierson and NoHo are in the process of giving training seminars to museums, to implement the CCT for educational purposes (see <https://ucdcemec.crossculture.ie/> and <https://ucdcemec.crossculture.ie/timeline/>) and in many different projects on various collections (see: <https://allardpierson.crossculture.ie/nouveau/index.php>)









The Cross Culture Timeline being used for a different time period and theme: *New Woman. Art Nouveau in Europe, 1890–1910*, an upcoming travelling exhibition of the Allard Pierson, the Badisches Landesmuseum in Karlsruhe, and the Braunschweigisches Landesmuseum in Braunschweig (<https://allardpierson.crossculture.ie/nouveau/index.php>)

## Credits

This publication was written by the partners of the CEMEC project.

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