



Meyouandus: Interactive in-venue displays

Research and Development Report

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Executive Summary

‘Can the public spaces in an arts venue engage visitors directly and personally?’

‘Will this increase the dialogue, visibility and relationship of the organisation and its public, to inform and affect the behaviour of all parties?’

‘Will providing a flexible digital platform facilitate arts organisations to explore their own digital strategies?’

These are the proposition/research questions submitted to the Digital R&D Fund for the Arts in December 2012 and resulted in a project, TILO, installed in two venues starting in July 2013 and ending in December 2014.

Looking back on a concentrated 17 months, I feel a strong sense of achievement that we accomplished 90% of what we hoped for, as well as many new things along the way. However, this is tempered with a small sense that we missed some opportunities.

The instinct that informed the original application was proven: public spaces in cultural venues are ripe for digital innovation – digital screens can engage visitors directly and personally.

The central concept of the project was that an arts venue is more than the sum of its parts. We wanted a system that displayed content on public screens and that blurred the lines between the marketing and curatorial teams. We wanted our screens to show information about upcoming events one minute, and the next an interactive piece of media art – to play a short video showcasing an organisation’s community outreach project, followed by a rich visualisation based on live data. We wanted the screens to represent all the activities and inhabitants of a building in creative and interesting ways.

This was an artistic concept but our research partners came back and told us it had commercial value: if people found the screens interesting and engaging they would give them more attention generally. This

means that people would look at the more basic promotional information in anticipation that something more engaging would appear.

We also discovered that people trust the cultural sector and that 37% of visitors questioned would be happy to share access to their social networks and even GPS (location) data with an arts venue. They also expressed an implicit expectation that cultural venues would use digital technologies in interesting and thought-provoking ways.

From an arts, technology and audience perspective this was great news. Nevertheless, our small sense of missed opportunity comes from our experience that organisations can be slow to take full advantage of digital tools. Staff and budgets are already stretched and it can be difficult to get them to embrace new ways of working. This meant that some of the other ambitions of the project – of creating an interface and dialogue between the organisation and its visitors – were not as successful.

We also discovered that some organisations had experienced friction trying to collaborate between internal marketing and curatorial teams in the past, and that this acts against TILO's holistic ethos.

We finish the project more passionate than when we started. We are confident that we can work around the challenges that might prevent arts organisations fully benefiting from a TILO system and we are making plans to continue developing TILO after the funding period.

Alastair Eilbeck: Director, MeYouandUs



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Can the public spaces in an arts venue engage visitors directly and personally?

Background

Digital screens pervade public spaces, broadcasting adverts on the high streets, in shops, transport hubs, buildings, and even (within the city of London) on bins. The commercial sectors are rapidly evolving the way digital screens are used to create a more connected experience for consumers, merging online and offline behaviour and interactive hardware.

These new screen approaches are categorised as 'connected' or 'smart' screens, as they are both online and take advantage of much of the underlying technology and software deployed on smart phones. While these screens have significant audience engagement and commercial potential, there has been little uptake in the cultural world, outside of projects such as Bloomberg Connects by Tate.

Moving forward, there are therefore three clear reasons for cultural venues to consider installing connected digital screens or upgrading their existing screens.

- Visitors will come to expect them in venues, galleries and cultural institutions as they grow more pervasive in other parts of life
- There are a range of commercial incentives attached to the use of such screens
- Cultural venues have high-profile buildings with a large captive and receptive audience.

The project partners for this work were Meyouandus, a media arts practice and the lead organisation on the project. They worked with Amaze, one of the UK's top five digital agencies, and Pixel Inspiration who are digital signage experts.

There was also a mix of commercial and arts-based experience on the research side. The Institute of Consumer Psychology (IOCP) predominantly works to understand the effectiveness of marketing strategies within the retail sector. Meanwhile, The Creative Exchange (CX) at Lancaster University explores issues around a concept called the 'digital public space'.

The project

The project partners for the work set out to answer the following research questions:

‘Can public spaces in an arts venue engage visitors directly and personally?’

‘Will this increase the dialogue, visibility and relationship of the organisation and its public, to inform and affect the behaviour of all parties?’

To answer these questions the TILO team focused on three key activities. The first requirement was to develop a cultural sector-focused digital-signage system (Platform) that was flexible enough to support a variety of hardware and technologies. A series of creative interventions (Projects) were then installed onto the platform to test the proposition. Running in parallel, the researchers evaluated, observed and informed the whole process (Research).

Practically speaking, TILO consisted of computer hardware connected to a video wall of several large digital screens. The system was installed in prominent public spaces within two mixed arts venues: [FACT](#) in Liverpool and [Phoenix](#) in Leicester. Both venues cater to cinema and art audiences, and also offer popular bar and cafe areas.

The digital-signage system, TILO, was based on a commercially available platform called Scala, which provided the framework on which TILO ran. The platform consists of a variety of software and hardware features centred on a customised computer linked to multiple screens. This enables the system to display various types of media that are scheduled and controlled from a central server and content-management system.

From the basic foundation the functionality was developed to integrate with external data that allowed visuals on the screens to be automatically updated in real time. The platform also supports hardware at various levels of sophistication. TILO was designed from the ground up to program hook-ups to external data streams from either web feeds or hardware sensors (e.g. image streams or a weather sensor). TILO

also allowed for other computers, tablets or pieces of hardware, such as Raspberry Pi, to input into it through a simple connection lead.

Content projects

Alongside the platform a series of projects was created to test the flexibility of the system and the original proposition – a mixture of interactive, data-driven and simple information/media display projects. In addition the Foundation for Art and Creative Technology (FACT) organised and curated several artists to show media artworks on the screens.

The idea of mixing interactive, visually rich, creative and informational (marketing) content in the same space was originally conceived from a desire for the screens to reflect all the activities of a building and its host organisation.

The most interesting projects developed combined interactive and data-driven content and reflected the higher ambitions of creating a personalised dialogue between visitor and building, where visitors leave a mark that is recorded and re-presented at a later time.

Research

Two academic organisations undertook the research for TILO:

- The Creative Exchange (CX) used qualitative methods to research the arts and cultural sector significance and the strategic organisational opportunities
- The Institute of Consumer Psychology (IOCP) researched the quantitative impact of TILO on visitor flow and dwell times, as well as assessing whether the system affected brand perception of the organisation. They used sensory tracking (including eye and facial tracking) systems to gauge how visitors were engaging with TILO.

The qualitative research led to a range of conclusions on the use of this technology in the cultural sphere. Early analysis and reflection on the sector context and implications of TILO reveal that it has great potential for positive impact, if concerns are taken into account and TILO's offer is

positioned appropriately. TILO can bridge the gap between aspiration and implementation of digital and data in mid-size institutions, allowing cross-departmental teams to collaborate on producing rich and engaging screen-based content which the sector specialists interviewed felt could improve visitor experience.

The ability to collect data about the demographic of visitors, or in the right context to provide just-in-time information, was for many interviewees the tipping-point between TILO being seen as a fancy screen and an invaluable utility. Most institutions highlighted a disparity between the rhetoric of data and the 'data-shaped institution', and the reality of legacy processes, highlighting a need to redesign institutional relationships and services so that they could act on and respond to data.

The quantitative data gathered by IOCP showed that an interactive display system significantly outperforms a static display system, both in terms of how long visitors engaged with the sign and the dwell time in the vicinity of the sign. When glances are excluded from the analysis, visitors spent an average of 19.1 seconds engaging with the display system in the fully operational condition compared to 10.8 in the static.

The dwell time in the area surrounding the display system for all participants was 57% longer once the screen became fully operational (16.7 seconds in the interactive condition vs. 10.6 seconds in the static condition).

Outputs

The project produced a range of outputs, which are detailed below:

- Comprehensive website www.TILO.org.uk, including a large blog section detailing project milestones and references to related content
 - Appearance and presentation of the working system at two showcase events – the AHRC showcase and Digital R&D annual event
 - Both TILO installations at FACT and Phoenix continue to be supported and invested in. Phoenix has commissioned additional
-

functionality and is also planning a big upgrade to its screen hardware

- Spin-off mobile app project, emofie.co.uk, based on one of the interactive TILO projects due to launch in June 2015
- Facial tracking data of 21,447 people recorded over three 15 day periods
- Two questionnaires were created and resulted in 569 respondents – 404 from IOCP and 165 from CX
- Three semi-structured interviews were designed by different researchers with 82 people
- Ten artists have created content specifically to take advantage of TILO's interactive functionality
- Twelve complex projects that used either interactivity or live data have been developed and tested.

Results and insights

'Can the public spaces in an arts venue engage visitors directly and personally?'

In relation to the original R&D proposition, the project demonstrated that the TILO system gained much more attention than a more conventional digital-signage system.

- 1 When the TILO system became interactive the time visitors spent engaging with the screen almost doubled, increasing from 10.8 to 19.1 seconds. However, people visiting FACT art gallery are much less interested in the screens than those visiting the cinema or for other purposes.
 - 2 Showing mixed content creates internal difficulties for organisations when digital screens are situated in a public area and showing mixed content, and requires the collaboration and support of multiple stakeholders within an organisation – operations, marketing, programming and public engagement. This adds a layer of complexity to the running of a system like TILO.
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- 3 Location is crucial for the mode and quantity of interaction with the screens – venues should review their building and document potential locations based on footfall and the complexity of installing screens, and look for areas that provide enough space for people to interact comfortably with screens.
- 4 Frequently, venues have regular programming aimed at specific demographics – TILO can react quickly in order to interact with different demographics or groups, depending on visitor patterns.
- 5 The curatorial aspect of a TILO-type system offers venues the potential to create a commissioning layer that can run parallel to their main programming activities, or an agile curatorial space to complement special events or exhibitions. This allows them to engage with their local artistic community and to have a more frequent turnaround of artists' work on display.
- 6 TILO is a networked system – public spaces in arts venues share a commonality, which means projects created for one venue are easily translated to another.
- 7 Software, art, research and people – the complexity of the project, across two venues, utilising two research organisations, two technology companies and one arts organisation, could have led to difficulties had the core project team not worked together before.

Future of the project

Meyouandus believe there is an opportunity to develop TILO beyond the research project and have been exploring business models that target key insights and their own expertise as a media arts organisation, with the ambition for TILO to become the industry standard for public screens in cultural venues.

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When the TILO system became interactive the time visitors spent engaging with the screen almost doubled, increasing from 10.8 to 19.1 seconds

Introduction

Digital screens pervade public spaces, broadcasting adverts on the high streets, in shops, transport hubs, buildings and even (within the city of London) on bins. The commercial sector is rapidly evolving the way digital screens are used, to create a more personal experience for consumers and merging online and offline behaviour and interactive hardware. These new screen approaches are categorised as ‘connected’ or ‘smart’ screens, as they are both online and take advantage of much of the underlying technology and software deployed on smart phones.

The results of these changes to public space will be screens that:

- Take advantage of all the profiling tactics employed on the web
- Know a person’s purchase history, so promote umbrellas when it’s raining
- Make it easy to browse products or information based on personal preferences
- Take payments
- Interact with the full range of sensors on individual mobile devices and connect to their online services and accounts.

In contrast, public spaces in cultural venues show very little digital innovation (Tate’s recent Bloomberg Connects project being a notable exception),¹ and cafes, bars, walkways and entrances have changed little to keep pace with wider innovations in this area.

So why is this important? Looking again towards the commercial retail sector and their motivation:

‘... the more hooks you can get into your consumer the better off you’re going to be long term.’

Courtney Lapin (**Westfield labs**)
<http://www.westfieldlabs.com/>

‘Providing digital experiences that create an atmosphere and entertainment in-store can help:

¹ See, <http://www.tate.org.uk/visit/tate-modern/things-to-do/bloomberg-connects-interactive-activities>

- 1 Increase average purchase amount by 29.5%
- 2 Raise in-store traffic by 32.8%
- 3 Grow repeat buyers by 32.8%.’

infotrends

‘By 2020, Deloitte predicts that physical stores will exist only as a showroom for a retailer’s products.’

Computer Weekly

There are therefore three clear reasons for cultural venues to consider installing connected digital screens in their venue or upgrading existing screens:

- 1 Visitors will come to expect it, as digital–physical interactions become more widespread.
- 2 Many of the commercial incentives also apply to cultural venues – there are many cross-promotional opportunities between cafes, bar, shops and exhibitions, cinemas etc.
- 3 Cultural venues have high-profile buildings with a large captive and receptive audience of smartphone-carrying visitors and are well placed to take advantage of this technology.

There are also three clear reasons preventing adoption:

- 1 **Cost:** Installing multiple screens can be expensive.
- 2 **Time:** Many organisations are already working to capacity.
- 3 **Experience:** To fully benefit from this technology requires new skillsets.

This project explored the opportunities and challenges of using interactive and connected screen technologies in this context.

Project partners

Meyouandus are a media arts practice and the lead organisation on the project. In general, they create ephemeral artworks for public spaces and have close links within the creative industries. They saw an opportunity to apply their arts experience and some of the commercial insights gathered from technology partners to develop a new digital-signage system for the cultural sector. They worked with Amaze, one of the UK's top five digital agencies, and Pixel Inspiration who are digital-signage experts to some of the largest and best-known retail and commercial brands in the UK and Europe.

This commercial and arts-based collaboration was also key to the research strategy. The Institute of Consumer Psychology (IOCP) work predominantly to understand the effectiveness of marketing strategies within the retail sector. In the project they used quantitative methods to understand the public's flow and behaviour in a venue without screens and a conventional digital signage setup, and after the introduction of the full TILO system (a digital display system that is not only responsive to its audience, but can genuinely interact with it).

The Creative Exchange (CX) (www.thecreativexchange.org/) at Lancaster University explore issues around a concept called the 'digital public space', defined roughly as the ability of anyone, anywhere, to create using data streams and digital archives. They took a qualitative research perspective on how an arts organisation and its visitors might take advantage of connected screens in these spaces, exploring the marketing, branding, social and curatorial impact of such a system, issues around privacy and personal data, and what the current perspective and appetite for this type of technology was within the cultural sector.



Figure 1: View of main video wall at FACT

The Project

Can the public spaces in an arts venue engage visitors directly and personally?

The additional proposition and research question for the project was:

‘Will this increase the dialogue, visibility and relationship of the organisation and its public, to inform and affect the behaviour of all parties?’

To answer these questions the TILO team focused on three key activities. The first requirement was to develop a cultural sector-focused digital-signage system (Platform) that was flexible enough to support a variety of hardware and technologies. A series of creative interventions (Projects) were then installed onto the platform to test the proposition. Running in parallel, the researchers evaluated, observed and informed the whole process (Research).

The first six months of the project focused on the development and testing of the platform and projects. The research, arts and technical teams then worked together to integrate the TILO system into the pilot venues in three stages:

- 1 Without screens.
- 2 With a basic digital-signage system, broadcasting information only.
- 3 With a basic digital-signage system, broadcasting information only.
- 4 The fully featured TILO system, adding interactive, data and artistic content.

A blog was created to chart progress and share related content from other sources, which has now been integrated into the project website:

www.TILO.org.uk/blog

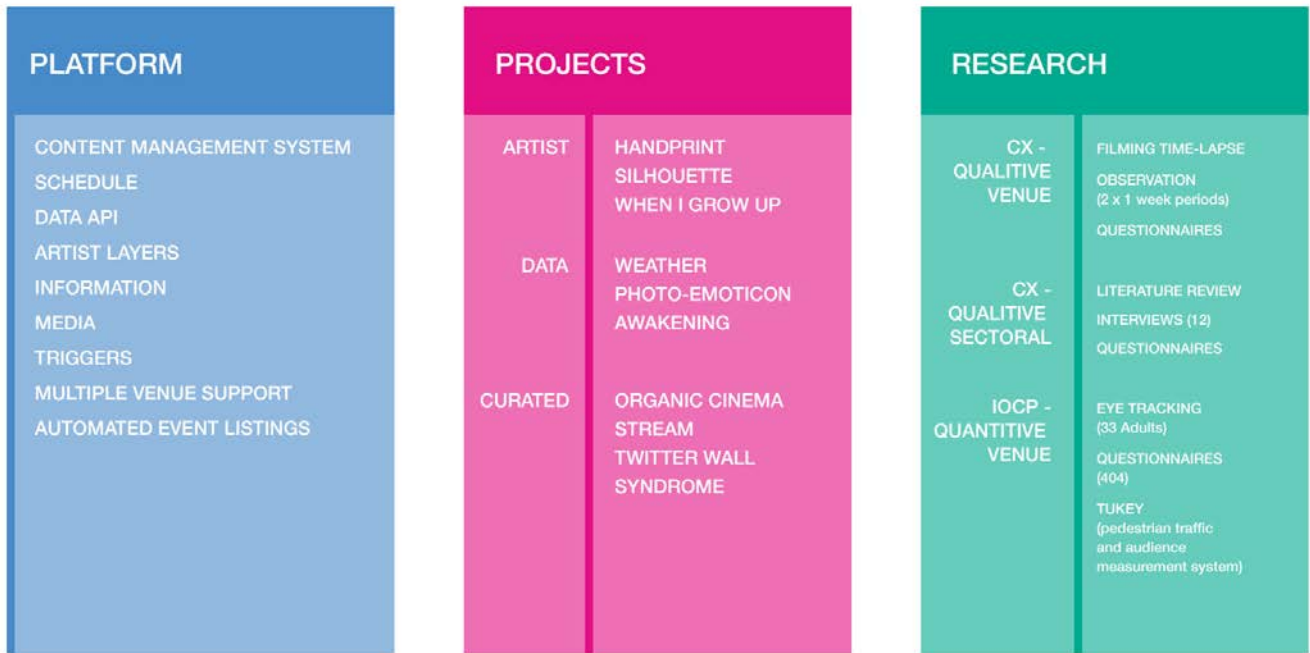


Figure 2: Diagram giving an overview of the different project strands and work undertaken



Figure 3: Diagram mapping activities over time of project

Platform

There are numerous digital-signage systems commercially available. Until recently, these systems have all offered very similar and limited functionality for scheduling and displaying video and information content. This has resulted in no specialist or dominant brand in the cultural sector. Digital signage could be seen as a utility that is procured in the same way as a venue might order a sound system or general IT equipment.

One of the core principles for the technical development of TILO was 'Don't re-invent the wheel.' The team did not want to spend valuable development time re-creating functionality that already existed. The biggest outcome of this approach was the decision to use **Scala**, a popular commercial digital-signage system as the basic framework behind TILO. Scala was chosen because its functionality can be extended and new features added using standard programming languages.

The platform consists of a variety of software and hardware features centred on a customised computer linked to multiple screens. This enables the system to display various types of media that are scheduled and controlled from a central cloud server and content-management system. This allows staff to add, administer and edit content, and control how it is displayed on TILO remotely over the internet via a computer, smart phone or tablet.

From the basic foundation, the functionality was developed to integrate with external data, which allowed visuals on the screens to be updated automatically in real time (keeping the content fresh with very little, if any, maintenance by the venue staff). For example, at a simple level, weather-related film quotes were displayed based on a live BBC weather feed.

The platform also supports hardware at various levels of sophistication. TILO was designed from the ground up to program hook-ups to external data streams from either web feeds or hardware sensors. For instance, a more complex weather project was developed that incorporated a physical thermometer, weather data and Flickr (image-hosting site) to present a rich visual display of weather and time.

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This highlighted the project's emphasis on 'soft' data. The intention is not to collect data to be used for direct marketing purposes but to allow people to leave personal marks that reflected their personality and emotions

It was important that TILO could be used to curate complex media artworks. One of the unique and innovative features developed was the ability of TILO to take control of the display of other computers by simply plugging a video cable from a windows computer, Mac or even a Raspberry Pi (<http://www.raspberrypi.org/> – a credit card-sized computer popular with the hacker and maker community) into inputs on a TILO computer.

As an example, a media artist could walk into a venue with their own specialist equipment (computer, cameras and/or other sensors) and very quickly have their work displayed and controlled in a variety of ways. The TILO content-management system can schedule the work to be shown on specific dates and times, or even display the work based on triggers, such as if a visitor presses a button, clicks on a website or raises a hand, or even if it's raining outside.

Content projects

Alongside the platform a series of projects (some listed at the end of this section) were created to test the flexibility of the system and the original proposition, involving a mixture of interactive, data-driven and simple information/media display projects. In addition, the Foundation for Art and Creative Technology (FACT) invited several artists to present media artworks on the screens.

The idea of mixing interactive, visually rich, creative and informational (marketing) content in the same space was originated from a desire for the screens to reflect all the activities of a building and its host organisation. In reality, the research showed that getting this mixture right was key to the success of the system and the commercial viability of TILO.

TILO encourages visitors to spend more time looking at marketing/promotional content because they expect more artistic and engaging content to follow. A crude analogy would be the way people accept an occasional advert on YouTube in order to watch appealing videos.

The most interesting projects developed combined interactive and data-driven content and reflected the higher ambitions of the project to create a personalised dialogue between visitor and building, where visitors leave a mark that is recorded and re-presented later.

A perfect example of this was 'When I grow up', a very successful commission from Phoenix Arts Centre in Leicester. The organisation commissioned Meyouandus to create an interactive project to run specifically on TILO during the Sparks children's festival in May 2014. A mobile-optimised web app (an application that runs in a web browser like Internet Explorer, designed with the small screens of a mobile phone or tablet in mind) was developed to communicate with TILO's socket server (this is, technology allowing people's mobile devices to talk directly to the screens over the internet).

Phoenix allocated one of their gallery assistants to hold an iPad and invite young people to use the interface to select a career, and then to make a photo-fit-style version of themselves. This was then instantly sent to the main video wall, creating a life-size illustrated puppet that mirrored their movements. Two hundred puppets were created over the weekend.

The artwork was then shown extensively over the summer holidays without the gallery assistant. Whenever a visitor walked in front of the video wall, they would be randomly reflected as one of the 200 puppets collected, with the name and age of the child displayed. If they jumped up then a new character would be reflected.

This project highlighted the project's emphasis on 'soft' data. The intention is not to collect data to be used for direct marketing purposes but to allow people to leave personal marks that reflected their personality and emotions. That is not to say that, over time, this type of interaction will not increase visitors' receptiveness to more commercially led approaches.

The team had hoped to explore more personalised projects but encountered difficulties gaining permission from the host venues. They initially looked at creating a membership app that would connect visitors' social-media feeds to the screens or allow them to control screen

content direct from their mobile device, but the host venue felt this would complicate their existing membership offer.

They also wanted to take advantage of the venues' Wi-Fi log-in page (a captive portal used by visitors to access free Wi-Fi internet) to encourage visitors to have a dialogue with the building, but the venue felt this would introduce privacy and data issues. Interestingly, the project research revealed that most visitors would have not seen this as a problem (see page 36).

The team expect that it would not take many creative projects like 'When I grow up', all aimed at different demographics, for the building to begin to reflect the marks of visitors and the local community around the venue. Many venues regularly programme events for different audiences. For example, FACT holds young people's events and weekly cinema screenings for the elderly. TILO could dynamically show interactive, personalised and informational content specifically targeted and related to these visitors and their activities.

Although showing mixed content on the screens could be seen to blur the lines between curation and marketing, the research findings show that visitors treat cultural venues very differently from commercial brands, in that they are prepared to engage more deeply and are more willing to share personal data in a cultural rather than a commercial context. If viewed as relevant, visitors will see no difference between the different types of content TILO supports (artistic and promotional rather than commercial advertising). However, research also discovered that there is sometimes organisational friction between the marketing and curatorial teams, which seems out of step with the visitor's perspective.

Traditionally, the public spaces of venues are seen as marketing and information led, but the digital sphere is slowly breaking down the physical walls that hold a venue's cultural offering. The public already expect a cultural organisation to publish curated content online, and TILO can be seen as providing just another digital platform for a cultural organisation to engage with visitors.

Obviously, there are cost and production overheads to creating richer and more interactive content and the project team is therefore looking at business models that could enable organisations to share these costs.

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TILO encourages visitors to spend more time looking at the marketing/promotional content because they expect more artistic and engaging content to follow

Basic media and notices (digital posters)



Figure 4: Example of basic media and notices

Type: Information; **Content:** TILO player **Target audience:** All

Staff can simply add and schedule content using a variety of rich media (images and video) to promote activities and events through TILO's cloud-based content-management system.

Awakening



Figure 5: Example of 'awakening'

Type: Data; **Content:** TILO player; **Target audience:** All

Staff can schedule messages based on a time and date planner or use their mobile devices to send instant messages to the screens.

Credits: Meyouandus, Creative Exchange

Automated film and exhibition listings

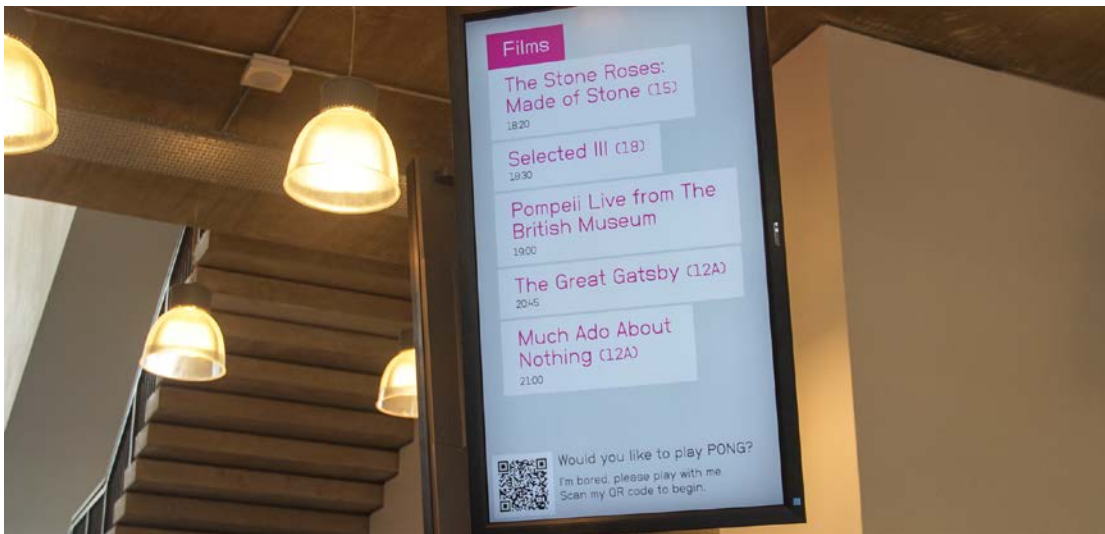


Figure 6: Example of automated film listings

Type: Information; **Content:** TILO player; **Target audience:** All

TILO can hook into any existing events' feed to automate events listings from a venue website/box office system or other xml feed.

Mirror and silhouette



Figure 7: Example of interactive mirror and silhouette

Type: Interactive art; **Content:** Artist layer; **Target audience:** All

Two artworks that use webcams to reflect passers-by as they walk past the screens and encourage performance and playfulness.

Credits: Meyouandus,

When I grow up

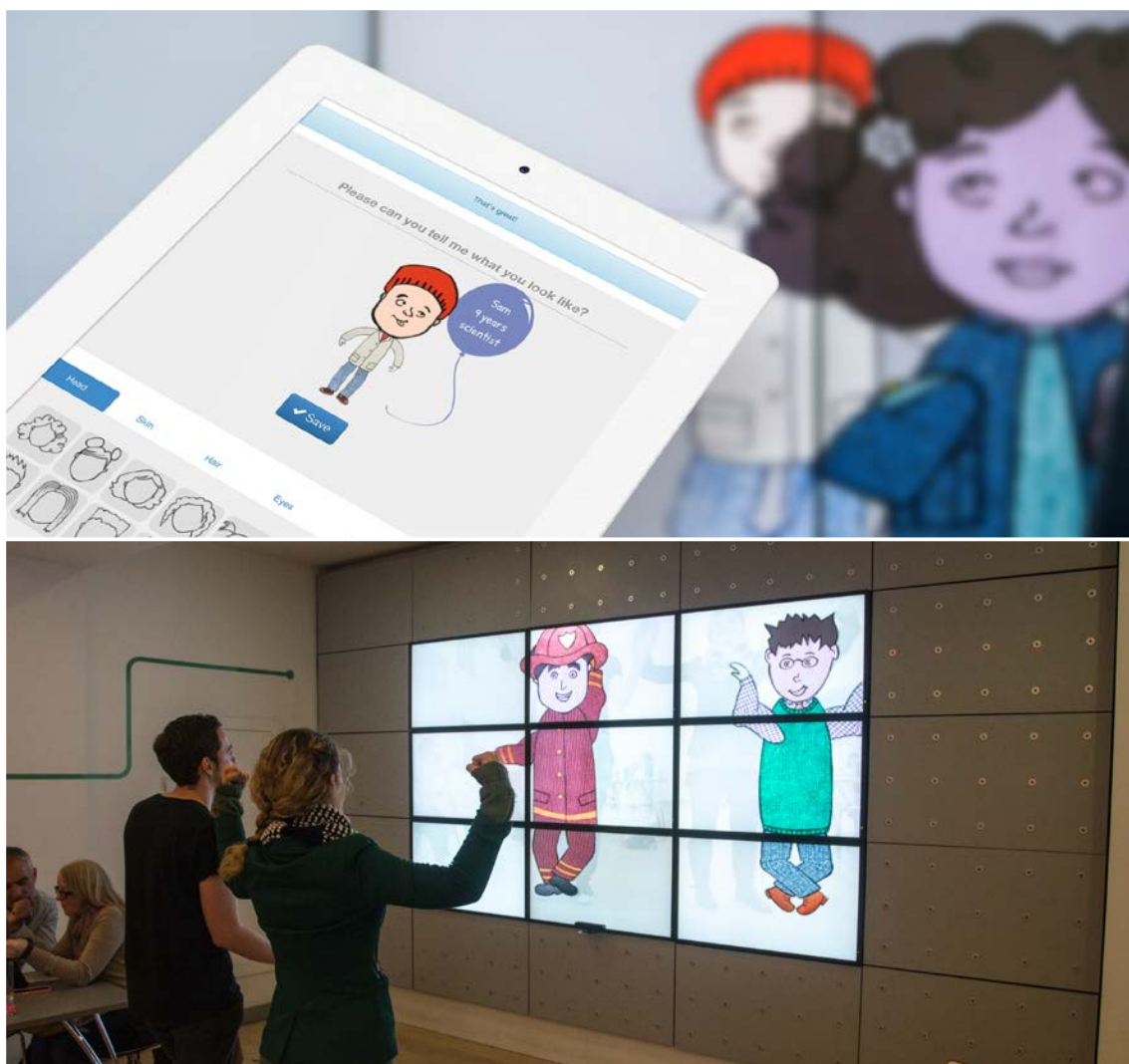


Figure 8: Image of 'When I grow up' interactive artwork

Type: Interactive artwork and data; **Content:** Artist layer

Target audience: Young people

A fun interactive way to animate the space and promote community. Works in two modes – passive and active. In active mode, visitors can use a mobile-optimised web app to select their chosen future career, gender and appearance. They will then see themselves reflected as an avatar on the screen, which mimics their body movements. Their avatar will be stored in a database and displayed to subsequent visitors. In passive mode, any visitor who walks in front of the screens will be reflected as one of the previously saved avatars.

Credits: Meyouandus, Phoenix arts centre, Illustrations by Maria Pearson

Weather

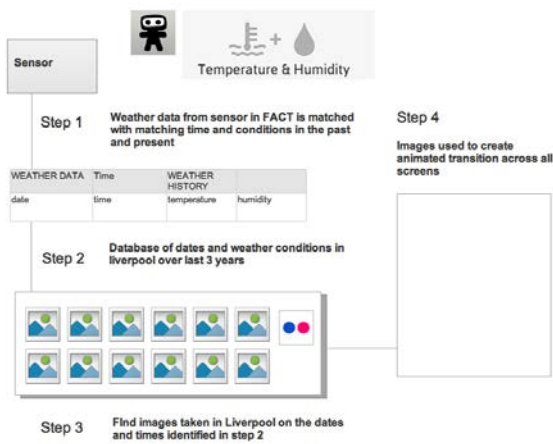


Figure 9: Example of weather data visualisation and schematic

Type: Data visualisation; **Content:** TILO player; **Target audience:** All

Uses live local weather data from the BBC (and local temperature sensors in venue). This data is then combined with the time, date, sunset and evening to create keywords that are in turn used to query a curated list of Flickr groups (these can be configured locally to point at any Flickr group). Contextual images are then used to form a simple animated visualisation, to create surprisingly mesmerising and, during sunsets, even a little romantic imagery. An automated way to keep screen content fresh, contextual and rich.

Credits: Meyouandus, Paul Robertson

Handprint



Figure 11: Example of interactive artwork on TILO screen

Type: Interactive art; **Content:** Artist layer; **Target audience:** All

Uses a custom hardware hand scanner positioned next to the screens. When a visitor places their hands over the scanner the screen is immediately taken over by the artwork and the hand-scanning process starts and ends with an offer to visit a link or scan a QR (Quick Response) code.

This project reflects the idea that visitors to a venue can leave a mark and so over time a visual timeline of visitors is built up across different artistic interventions. It was also a simple way to attract attention and encourage visitors to engage more deeply. The intention was that most people would leave anonymous handprints, whilst some would take up the invitation to identify themselves and create a digital profile that they would use when interacting with other personalised artworks

Credits: Meyouandus

Photo-emoticon

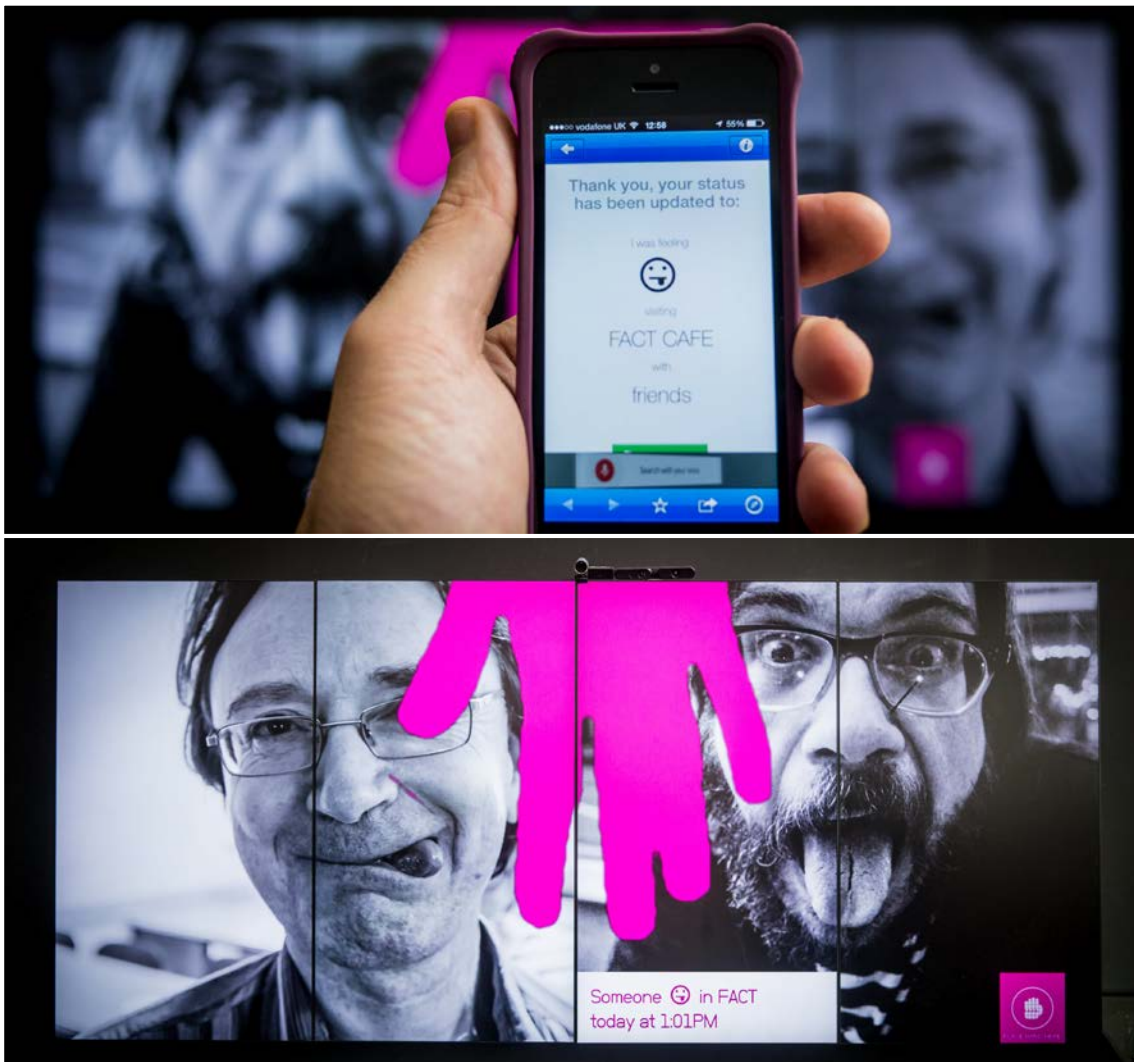


Figure 10: Example of photo emoticon on TILO player

Type: Data; **Content:** TILO player; **Target audience:** All

After visitors have left their handprints, they are invited to visit a web site with their mobile device and are asked three simple questions: Why are they visiting? How do they feel based on a list of photo emoticons? And who are they with? These marks are re-presented to them using images from a Flickr group with the same tags, and are displayed again as part of the basic schedule in the following days.

Credits: Meyouandus, TILO

Research

Two academic organisations undertook the research of TILO:

- The Creative Exchange (CX) used qualitative methods to research the arts and cultural sector significance and the strategic organisational opportunities.
- The Institute of Consumer Psychology (IOCP) researched the quantitative impact of TILO on visitor flow and dwell times, and assessed whether the system affected brand perception of the organisation.

Creative Exchange qualitative venue-based approach

Their main focus of CX was to pursue mixed-methods research to understand if the visitor's experience in the public spaces and relationship with FACT had been affected. This research was designed to complement the IOCP observations. Within this strand, CX also used motion-capture and freeze-frame surveillance to observe and amalgamate patterns of movement and see how they were affected by the intervention of TILO.

CX key milestones

- CX collected two datasets regarding visitors' experience prior to the TILO installation (TIME 1), and their experience with TILO in two gallery spaces (TIME 2, 3 and 4)
 - 14 January 2014: initial data-collection planning meeting with all partners (FACT)
 - 25–31 January 2014: 1st ethnography/data collection (Location 1, FACT, no screens) – **TIME 1**
 - 5 March 2014: development meeting for intervention – brainstorming
 - 10 March 2014: development meeting for intervention, building
-

database of messages

- 27 March 2014: exhibition launch, pilot of intervention – **TIME 2**
- 11 April 2014: workshop with FACT
- 9–16 June 2014: 2nd ethnography/data collection (Location 2, FACT, no screens) **TIME 3**
- 27 July–2 August: 3rd ethnography/data collection (Location 2, FACT, screens) – **TIME 4**

Analysis method

A combination of observation, questionnaires and interviews were employed to gain an understanding of visitor habits, opinions, reasons for visiting and collective flow through the public spaces of FACT. These in turn informed an artistic intervention “awakenings” that coincided with the opening of “Science fiction a new death” on 27th March 2014.

Activities between January and August 2014	Numbers
Questionnaires	165
Semi-structured interviews	44
Ethnographic observation	10 days in two periods

Table 1: Research activities conducted

Does the installation of an interactive digital display system change the way the general public experience the venue? (Lara Salinas)

To help answer this, the team undertook some basic research into people’s reasons for visiting FACT, how frequently they visited and how they valued the experience.

Consistently, the atmosphere, the building and the openness of space were highlighted as the best part of the experience as a whole (regardless of what had motivated the visit). Exhibitions with a higher number of interactive artworks – ‘Time and Motion’ and ‘Science

Fiction: New Death’ – seemed to encourage visitors to explore and interact with the screens, even if their main motivation for visiting the venue was not related to the art gallery.

The results of the questionnaire showed that cinema was the main attraction, with 38% of visitors interviewed attending the cinema exclusively and 52% the cinema and other activities.

Date	T1 25–31 January	T3 9–16 June	T4 27 July–2 August
Location	1 st location	2 nd location	2 nd location
Status	Control	Control	Interactive
Participants	65	50	50

Exhibition	Time and Motion Film award season	Science Fiction: New Death	Liverpool Biennale
Exclusive cinema audience	38% (25)	8% (4)	29% (17)
Exclusive art gallery audience	22% (14)	36% (18)	30% (18)
Exclusive cafe audience	6% (4)	24% (12)	2% (2)
Various activities	34% (57)	32% (16)	39% (23)
New visitors	22% (14)	24% (12)	38% (23)
Returning visitors	34% (22)	18% (9)	18% (11)
Frequent visitors ²	44% (29)	58% (29)	44% (26)
Value the FACT experience	23% (15)	30% (15)	18% (9)

Table 2: Questionnaire data for exhibitions

Informational, reactive and interactive content

Observations revealed that the richer and more interactive content engaged visitors much more than passive informational content. An important observation revealed how crucial it was to get the right

² Frequent visitors are those who visit the gallery a minimum of four times a year, which allows them to potentially visit all the exhibitions.

mixture of content. Researchers noticed firsthand a phenomenon known as ‘anchoring’. This describes how people’s expectations are influenced by how they initially perceive the screens. For instance, if the balance of content is mainly informational, then that is what they expect and they will be less likely to engage with more interactive content in the future.

The team did not research in detail the optimum mix of content, but did set out an approach that 30% would be basic information and video content, 20% creative use of data/real time generated content, 30% curated artworks and 15% personalised.

Awakening – art research intervention

After observing visitors’ behaviour, the CX team in collaboration with Meyouandus designed an artistic intervention to generate relevant data for research purposes. Named ‘Awakening’, this intervention used the TILO video wall to display text-based messages, as if the building itself was alive and addressing visitors. Some of these messages were scheduled for specific days and times based on previous observation and the venue’s programme for that week. Other messages were sent directly (‘pushed’) to the screens from a mobile phone or tablet over the internet. The idea was to make the screens appear to have artificial intelligence and then to gauge visitors’ reactions.

‘Awakening’ was first shown on 27 March, during the private view of the exhibition ‘Science Fiction: New Death’. Researchers secretly sent instant messages to the screen’s programme.



Figure 12: FACT, 'Science Fiction: New Death', 27 March 2014: showing the passive intervention

Several actors within a radius of 20 ft of the screen using Apple iPads connected to a web-based interface posted messages based on personal observations. It became crucial for the actors to be within sight of the screen, to observe the message in-context and to gauge visitor response to it.

Two different types of intervention were tested. The first presented the messages as purely passive information, while the second presented the messages in an interactive mode whereby a live silhouette of the people in front of the screen was shown as a background to the messages.

When messages were presented in the passive broadcasting mode visitors did not react, tending to perceive them as part of the wider information, and not give their full attention. Messages presented during the interactive mode were perceived much more personally and created a more animated response.

Does the re-use of personal data create a tipping-point where visitors are reluctant to engage inside cultural venues? (Joel Porter)

To test their willingness to share personal information with an arts venue and assess how they would feel if the screens used some of

the technology frequently used by supermarkets and other commercial sectors to profile and observe customers habits, visitors were asked the following theoretical question.

‘If the screens at FACT were able to obtain personal information about you to give you a better service, would you engage with it?’

Personal data results

Option 1

The screen could identify the visitor by gender and age in order to supply more targeted information and preferences.

HAPPY TO ENGAGE	DECLINED TO ENGAGE	UNDECIDED
22 (55%)	14 (35%)	4 (10%)

Option 2

The screens could access the visitor’s social network and GPS data. The consequences of the latter would provide locative patterns, while accessing visitors’ friends and family information from a mobile phone or tablet computer.

HAPPY TO ENGAGE	DECLINED TO ENGAGE	UNDECIDED
15 (37.5%)	18 (45%)	7 (17.5%)

Table 3: Personal data results from questionnaire

Regular visitors were inquisitive about the venue’s intentions; they expected FACT to commission challenging artworks and would have been interested in engaging with the screen if it were more intelligent.

Among visitors interviewed, 12% trusted FACT as a brand and expected the organisation to challenge the concepts of privacy and identity in a safe and artistic environment. In contrast, the second option obtaining personal social network information was not accepted with the same interest. Though some visitors were intrigued to see how FACT would represent more detailed personal information, they were wary that personal content might be used for commercial gain. Of the 55% of visitors that said yes to Option 1,

37% said yes to Option 2 and were happy for their personal data to be used. A figure of 10% were undecided.

The sample below taken from interview #16 demonstrates the visitor response to FACT as a trusted organisation:

Interviewer If the screens at FACT were able to obtain personal information about you to give you a better service, would you engage with it?

Visitor	It depends. If it was just FACT they could do it. Maybe, probably.
Interviewer	So on the scale between 'not at all' or 'completely'? And you said because it was FACT.
Visitor	Just FACT, not like other companies like Google that sell information to other people. If it was just FACT I wouldn't mind.
Interviewer	Why is that? Why is FACT different?
Visitor	Because it's not like a big company. It's about arts, with other things you get branched off and people find out things.

Table 4: Sample of in-depth interview

When visitors did engage with the screen interface they did not see their interactions as a way of collecting information, as the following interview (#10) demonstrates.

Interviewer If the screens at FACT were able to obtain personal information about you to give you a better service, would you engage with it?

Visitor	We played with the screen last time.
Interviewer	You played with it?
Visitor	We were having coffee and I got up to play and interact with the screen
Interviewer	And that was fun?
Visitor	Yes.
Interviewer	And if that information (interrupted)
Visitor	That was not information, it was art or playing with space and time
Interviewer	So if it is playful this is OK? Maybe it was recording that you are female?

Visitor	That's maybe different, that is private information.
Interviewer	And if it were gathering other information, where you have travelled from?
Visitor	Big brother information!

Table 5: Sample of in depth interview

One interesting observation took place on 2 August 2014 (below), after the screens had been temporarily moved to a new location near the box office in a natural alcove. Even though the family were surrounded by screens they were preoccupied with their own mobile screen devices.



*Figure 13: Visitors engaging with their own screens during the **Time 4** stage, July 2014*

How does the availability of an intelligent, interactive display and the data it gathers affect the museum/gallery, and what are the possible sector impacts of this? (Hannah Stewart)

Method phase 1 (July–October 2013)

A literature and context review was undertaken to place TILO successfully within the history of screen use and similar interventions with screen-based technologies. Particular attention was placed on engagement with visitor data and whether this data was subsequently used to feedback to the visitor.

As well as conventional reports and evaluations by the funding bodies, the researchers included grey literature, such as institution-specific memos and blog posts as well as social-media reactions to the funding bodies' publications (listed in the 'Further reading' section of the appendix).

The outcome of the review was a clearer understanding of TILO's unique approach and revealed some disconnections between the rhetoric around the digital and its use within organisational processes. In short, what was noted was the distance between the potential offered by digital technology and the reality of how the digital is used on a daily basis and within complex hierarchies that sometimes stifle its creative use.

Method phase 2 (August 2014)

The second phase of the sectorial research used the findings of Phase 1 to influence the content and selection criteria of interviews and questions with key individuals working in the arts sector.

The questionnaire itself was designed so that the first half revealed the interviewees' experience of, and approach to, digital and data-based interventions, followed by an interval to be introduced to TILO via a short film, concluding with questions specifically about TILO and its envisaged or potential use within their setting, and the approach to the future of data and screens in their institution.

Sector impact interviews approach

The interviewees selected were representative of a broad range of sector specialisms. To avoid focusing on 'digital people' in key museums and galleries, it also included audio-visual (AV) specialists, directors and trustees, operations managers, engagement consultants, curators and social-media leaders. This reflects TILO's unique approach to displaying curatorial, marketing and operational content.

Sector interviews

The qualitative sector interviews were conducted with 12 industry professionals. They consisted of 21 questions, ranging from the experience of digital interventions and screens within their associated institution to questions around concerns about data collecting interventions, through to their reaction to TILO and how they could see it working within their setting. The interviews concluded with questions surrounding business models and the future of screens, data and digital in museum and gallery settings.

Interviews were conducted face to face. Full consent was obtained and participants were informed via an information sheet that although the data would be anonymous their answers might identify them. They had 14 days after presentation of the transcripts to remove any answers they did not feel comfortable with.

Headline results from interviews

Content that has multiple functions can cause organisational issues

Organisations showed some resistance to the idea of a system that crossed departments/disciplines. They suggested installing two distinct versions with similar characteristics and attributes, with each identified by a clearly defined utility and purpose. For example, an information screen that had the attributes of TILO in being able to add visual emphasis and live data feed was felt to be a great attribute to the commercial, marketing and operations teams in institutions. However, they felt this should be combined with a separate cultural content TILO, which could accommodate curatorial interventions, collections highlights and bespoke commissioned content, especially for collection-heavy institutions.

Reaction to TILO network and shared content

In early interviews the larger institutions expressed little or no need for networked or shared content based on their previous attempts to share digital assets, and felt that lack of control would introduce serious governance concerns. In contrast, smaller institutions were more familiar with needing and maintaining cross-institutional relationships, often working as a consortium for funding bids and the delivery of engagement work. Hence the idea of shared content and networked commissioning fitted within their existing workflow and governance.

Purchase and content commissioning tension

The purchase decision for both types of institutions was ambiguous in relation to the hybrid TILO product, and contrasted with the TILO production team's assumption that an asset purchased by the operations and marketing team to deliver fresh curatorial content would be financially advantageous for cash-strapped cultural institutions. Again, many interviewees expressed concern about friction between the marketing and curatorial and collections teams.

This highlighted that the reality of implementing digital interventions is sometimes more affected by human challenges and social structures than technological issues. Based on these interviews, we would recommend that purchasing and implementing TILO is undertaken by the operations manager/director, as s/he can manage the relationship and usage of both teams and have an informed perspective on TILO's strategic utility and core functions.

Income-generation options – reactions

Regarding other potential income-generating services that TILO could incorporate, there was concern around the governance of sponsored content and adverts, though if a clear management protocol was in place most interviewees could see value in such content. The trialling of TILO did not involve the display of secondary adverts or sponsored content so an assessment of the potential of this content (in terms of income and value generation) was not undertaken. Additionally, many institutions host out-of-hours corporate events and find that their usual daytime screen content is inappropriate. They currently mitigate this by simply displaying an image of the company or association logo on all screens. It was felt

that TILO could offer a platform to produce a richer screen-based experience for these core income-generation events.

Content production overhead

The final observation from the interviews was a concern among all interviewees as to who would be responsible for the production and content of the TILO screens. Although screens within many of the institutions represented have the capacity to display rich content and a range of formats, production time constraints mean they restrict themselves to displaying simple images on rotation. The smaller institutions do not have capacity to produce specialised content in-house, or the budget to commission an external agency.

Conclusion

In conclusion, early analysis and reflection on the sector and the implications of TILO reveal that it has great potential for positive impact if concerns are taken into account and TILO's offer is positioned appropriately. TILO can bridge the gap between aspiration and implementation of digital and data in mid-size institutions, allowing cross-departmental teams to collaborate on producing rich and engaging screen-based content, which interviewees felt could improve visitor experience.

The ability to collect data on visitor demographics, or in the right context to provide just-in-time information, was for many interviewees the tipping-point between TILO being seen as a fancy screen and an invaluable utility. Most institutions highlighted a disparity between the rhetoric of data and the 'data-shaped institution', and the reality of legacy processes, highlighting a need to redesign institutional relationships and services so that they could act on and respond to data.

The necessary social-shaping element of TILO in an institution is in many ways beyond the scope of a small product-design team, and would require a sector-wide shift that current funding conditions do not incentivise.

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TILO can bridge the gap between aspiration and implementation of digital and data in mid-size institutions, allowing cross-departmental teams to collaborate on producing rich and engaging screen-based content

Institute of Consumer Psychology (IOCP) quantitative research approach

The main focus of IOCP was to pursue a primarily quantitative approach to data capture and analysis, researching the impact of the system based on the type of tactics employed by supermarkets to understand customers' behaviour. The main source of data was an automated pedestrian-traffic and audience-measurement camera system. This could detect people walking past the screens and determine how long they spent looking at them, as well as their age and gender.

Method

Eye tracking, facial tracking and questionnaire data were collected from FACT in three different time periods:

- Prior to screens being installed
- After screens were installed showing informational content (a standard digital-signage system)
- The full TILO system (mixture of interactive, artist, data and information content).

The first period provided a control with which to compare results. The second period provided data to compare against a standard digital-signage system, typical of those currently used in venues.

Data was collected over a two-week time duration in each case. The inclusive dates for each data collection period were:

- 1 November 2013–15th November 2013 (15 days)
- 19 February 2014–4 March 2014 (15 days)
- 5 May 2014–18 May 2014 (14 days)

Researchers aimed to ensure that no time period included any special event that might skew the results (e.g. a one-off carnival that took place near the gallery), although a range of other external factors could conceivably influence the results, such as a prolonged period of

unseasonably good or bad weather or the local football team performing exceptionally well etc.

Activities between January and August 2014	Numbers
Questionnaires	404
Semi-structured interviews	15
Eye tracking	33
Facial tracking	21,447
Observation	300

Table 6: Number of research data points created

Facial tracking

The data for analysis was based on 21,447 faces. A ‘Tukey’ pedestrian traffic and audience measurement system was installed. This recorded a range of dependent variables, including: dwell time (the duration between the first detection of a person and the point where they leave the area), attention time (the part of dwell time during which the viewer actually looked at the screen), participant gender and age. Pilot studies suggest that the unit accurately detects 95% of all faces within its field of vision, a participant’s gender with 85% accuracy, and age with 75% accuracy. The camera for the facial-tracking equipment was incorporated into the design of the wall, meaning that visitors would not be aware their behaviour was being recorded and would therefore not change it. Once the unit was installed in the gallery it recorded data continually for the entire duration.

Eye tracking

A total of 33 adult volunteers participated in the eye-tracking study – 11 in each of the time periods. In order to be eligible to participate in this aspect of the study, participants were required to be over the age of 18, not affiliated to the art gallery, not require glasses for day-to-day activities, and that the primary purpose of their visit was to visit the art gallery. Participants were asked to take part in a study investigating how visitors perceive art galleries and were not provided with any financial remuneration for participating.

During the final review of data, weaknesses were found in the eye-tracking methodology. Firstly, the number of participants was less than planned for because fewer people than expected visited the galleries (average of 25 per day), making the results less statistically reliable. Secondly, accepting only visitors to the art galleries and informing them that the study was looking at 'how people perceive art galleries' had the unforeseen consequence of participants ignoring the public spaces. This provided valuable data on the perception of the specific exhibitions but compromised the core research into the effects of TILO.

Brand questionnaire

FACT has a long history of working with local groups, organisations and individuals, including veterans, schools, the elderly and the local primary health care trust. They are also involved in research and have an influential voice at many festivals and in art networks. A visitor to the venue would see little evidence of this important and valuable work.

An original ambition of the project was for the screens to raise awareness of these hidden activities and share insights about the people who work there. The thinking was that this would have a positive influence on people's appreciation of the organisation/brand.

However, the staff and departments at FACT are so busy with their day-to-day work it was difficult to create sufficient content to support this ambition. Unsurprisingly then, the screens had no discernible impact on people's feelings about FACT, but the research did reveal interesting results about this issue and how it changed over time, although not what the cause was.

Results

The results of the facial-tracking data suggest that an interactive display system significantly outperforms a static display system, both in terms of how long visitors engage with the sign and the dwell time in the vicinity of the sign. When the screen became fully interactive, visitors spent an average of 9.2 seconds looking at the screen compared with an average of only 4.3 seconds when the screen was used purely as a broadcast medium.

Prior to the research, it was expected that visitors would spend longer than 9 seconds engaging with the screen once it became fully interactive. Yet this relatively short duration can be explained by a number of competing factors. Firstly, the facial-tracking equipment is able to capture 95% of all faces in its field of view. As the digital sign was located in the middle of a walkway, a large number of visitors will have walked past the screen who were not interested in the gallery's content. During the research it was noted that a number of people use the gallery as a short-cut (see image 7) or are simply walking through the gallery to enter the bar or cafe.



Figure 14: The area shaded in green highlights the route that participants walked when they were using FACT as a short-cut. Note how this route caused all participants to walk past the screen.

This is supported by evidence from the facial tracking, as exceptionally high-standard deviation figures were detected. This implies that visitors'

behaviour was split between those who walked past with barely a glance and those who stopped and engaged for a considerable length of time. The maximum amount of time an individual participant engaged with the screen was detected as 8 minutes 54 seconds, with over 300 people engaging with the screens for over 1 minute.

Previous research has indicated that people walking to a predetermined destination (e.g. taking a short-cut through the building) will be walking significantly faster than those who are just browsing (Underhill, 2000). While they may well have glanced at the screen, and consequently been recorded as engaging, this will have only been a fleeting glance and so will dramatically reduce the average time. In this case we recorded over 4,672 participants who engaged with the screen for less than half a second. This provides strong evidence that they were either using the gallery as a short-cut or walking to either the cafe or cinema.

The results of this study have successfully demonstrated that a system like TILO can successfully engage visitors at an arts venue. The key findings from the research were:

- When fully operational TILO captured participants' attention for twice as long as a static display system
- When glances are excluded from the analysis, visitors spent an average of 19.1 seconds engaging with the display system in the fully operational condition, compared to 10.8 in the static
- The dwell time in the area surrounding the display system for all participants was 57% longer once the screen became fully operational (16.7 seconds in the interactive condition vs 10.6 seconds in the static condition)
- Visitors whose primary intention was to visit the art gallery spent less time engaging with the screens than visitors to the other attractions at FACT³

³ This conclusion is reached after making comparisons between two different data-collection techniques. Consequently, further research will be needed to verify this finding.

- Although eye-tracking data suggested that participants spent less time engaging with the screens than the average exhibit, considered from a curatorial perspective TILO was still one of the more popular exhibitions
 - Although a change was detected in FACT's brand personality and brand love, this could not be attributed to the installation of TILO and is more likely because of specific exhibitions, films or seasonal influences.
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Visitors whose primary intention was to visit the art gallery spent less time engaging with the screens than visitors to the other attractions at FACT

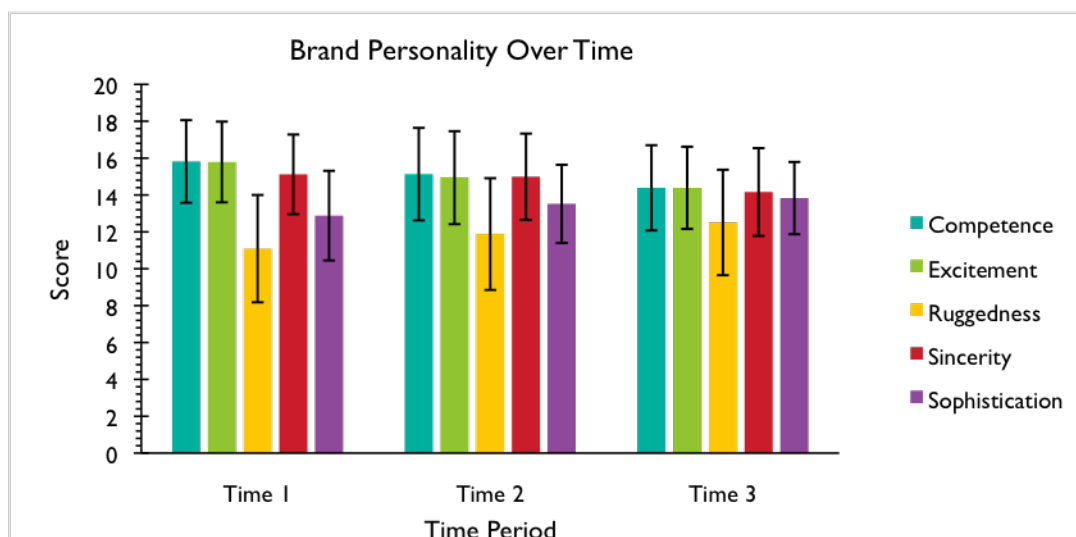


Figure 15: Participants' perception of FACT's brand personality by condition (black lines at the top of the coloured columns are known as error bars and reveal which values might be taking into consideration standard statistical error)

With 68.26% of participants' responses falling within this range, the graph demonstrates a significant decrease in the perceived competence, excitement and sincerity of FACT's brand between Time 1 and Time 2 and an increase in the perceived ruggedness of the brand.

Timelines and locations

The system was piloted in two mixed arts venues, with the research undertaken at FACT.

FACT, Liverpool is a large arts venue incorporating a Picturehouse multiplex cinema, bar, cafe and two large galleries. Two large independent screens were installed next to the box office on the ground floor very early in the project, with content limited to displaying primarily cinema and gallery listings. After six months a large four-screen video wall was installed near the ground floor cafe as the main focus of the research.

Phoenix, Leicester is a smaller independent venue with one gallery, two cinema screens and a combined cafe/bar area. The venue already had a nine-screen video wall situated in the cafe/bar area and a smaller single screen next to the art gallery. Phoenix spent £3,000 upgrading their current system to convert it to TILO.

The project timescale was eventually 17 months (5 months late), mainly caused by an underestimation of how long the internal processes of a very busy arts organisation can take from a decision being made to its practical implementation. This dynamic also impacted the project towards the end, when FACT's contractual arrangements for one of their major exhibitions meant having to temporarily move the screens to a different location (see ground floor plan) within the building. This in turn affected some of the qualitative research undertaken by CX, who had to amend their research plan to include comparing the two locations, and delayed their analysis.

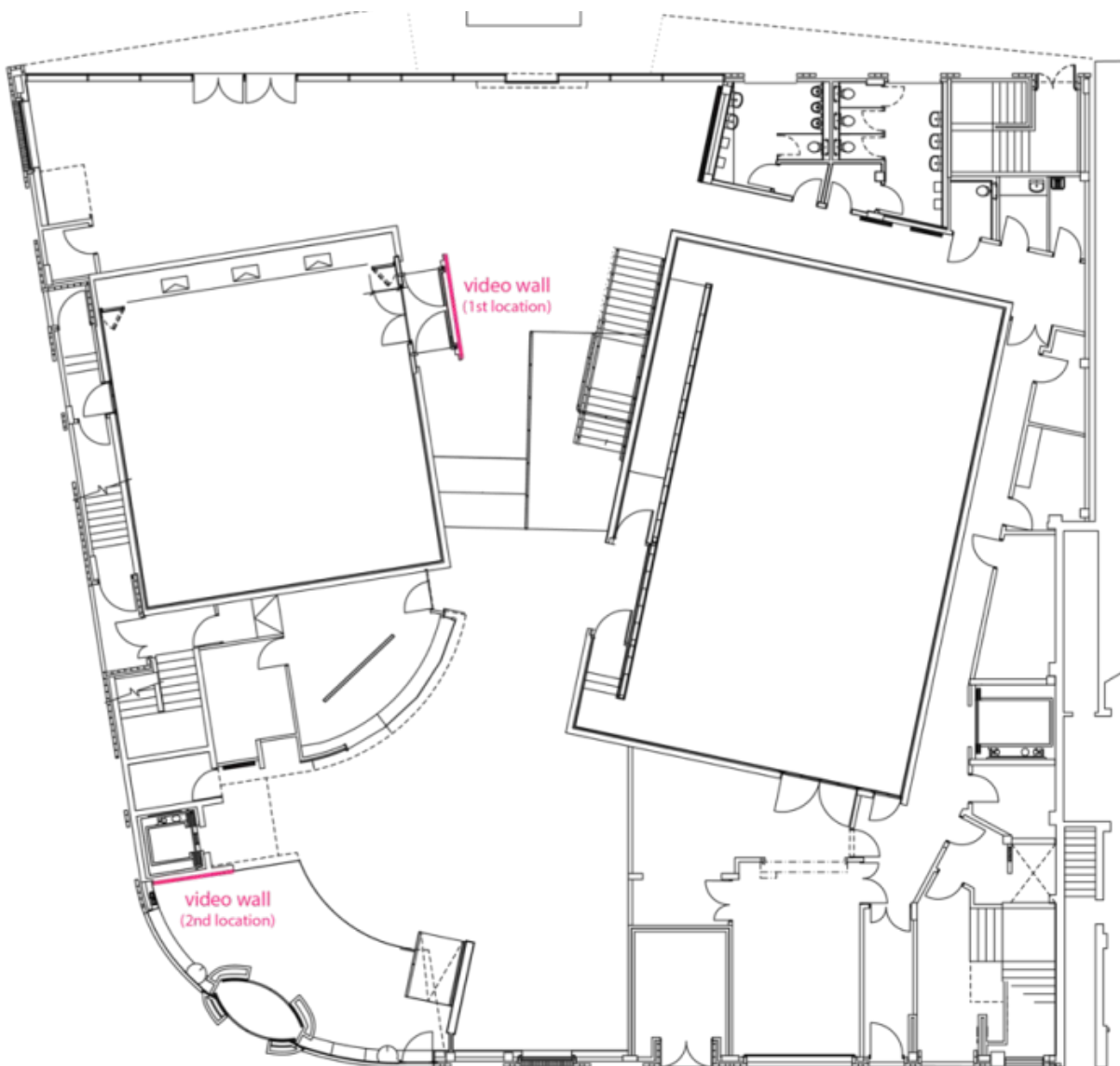


Figure 16: Ground floor plan of FACT with video wall's first and second locations



Figure 17: First location of screens within FACT, March 2014

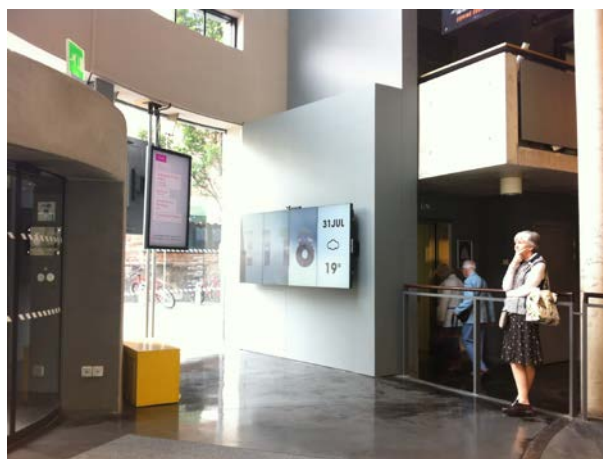


Figure 18: Second location of screens within FACT, June 2014

Roles and responsibilities

Person	Org.	Responsibility
Dr Naomi Jacobs:	CX	Involved in intervention and planning research methodology, workshop planning. Quantitative analysis of questionnaire data
Prof. Andrew Quick:	CX	General project management of CX input and support, involved in developing intervention
Dr Gareth Harvey	IOCP	Quantitative research on visitor behaviour and brand awareness
Alastair Eilbeck	MYU	Creative director, producer and project manager
James Bailey	MYU	Development architect and software developer
Nikk Smith	Pixel	Digital screen installation consultant
Rick Curtis	Amaze	Digital strategy and commercial context
Hannah Stewart	CX	Cultural sector context
Lara Salinas:	CX	Ethnographic observation and questionnaire collection. Involved in developing intervention and delivering workshop with FACT
Joel Porter	CX	Ethnographic observation and interviews, photography and time-lapse imagery. Involved in developing intervention and delivering workshop with FACT

Table 7: Roles and responsibilities of project partners

A breakdown of activities and costs are shown below. It should be noted that these costs do not represent the true value of a project of this size and complexity.

The development capability and small size of the leading arts organisation meant the platform and content projects could be built at a much lower rate than by a commercial technology company (which would have charged twice or three times as much). CX also allocated three PhD researchers to the project in kind.

Development and research time absorbed 80% of the grant, while travel and expenses accounted for 10% and hardware a further 10%.

Cost by key activity	Budget
Platform development	£18,000
Project development	£34,000
Quantitative research	£17,636
Qualitative and sectorial research	£9,000
Total	£78,636

Additional costs (outside R+D grant)	Budget
4-screen video wall (FACT) installation and hardware	£10,000
2 individual screens with bespoke gravity mounts for pillars (installation and hardware) (FACT)	£5,000
Computer hardware upgrade to existing screen infrastructure (Phoenix)	£3,000
Total	£18,000.00

Table 8: Total budget for project

Results

Outputs

The project produced a range of outputs, which are detailed below:

- Comprehensive website www.TILO.org.uk, including large blog section detailing project milestones and references to related content
- Appearance and presentation of working system at two showcase events – AHRC showcase and Digital R&D annual event
- Both TILO installations at FACT and Phoenix continue to be supported and invested in. Phoenix have commissioned additional functionality and are also planning a big upgrade to their screen hardware
- Spin-off mobile app project, emofie.co.uk, based on one of the interactive TILO projects due to launch in June 2015
- Two questionnaires were created and resulted in 569 respondents – 404 from IOCP and 165 from CX
- Three semi-structured interviews were designed by different researchers with 82 people
- Facial tracking data of 21,447 people recorded over three 15 day periods
- Ten artists have created content specifically to take advantage of TILO's interactive functionality
- Twelve complex projects using either interactivity or live data developed and tested.

Headline results

'Can the public spaces in an arts venue engage visitors directly and personally?'

In relation to the original R&D proposition, the project demonstrated that the TILO system gained much more attention than a more conventional digital signage system

When TILO became interactive the time visitors spent engaging with the screen doubled from 10.8 seconds to 19.1 seconds, after glances are excluded (that is, people who were detected looking at the screens for less than 0.5 second). Typically, the commercial sector would aim to increase the amount of time viewers spent engaging with digital screens by half a second (if they were feeling optimistic). If this was achieved, then any advertisements shown are likely to be more successful and the owner of the screen could sell advertising space for a premium. If a marketer or advertiser analysed the results from TILO, the experiment would be considered a resounding success.

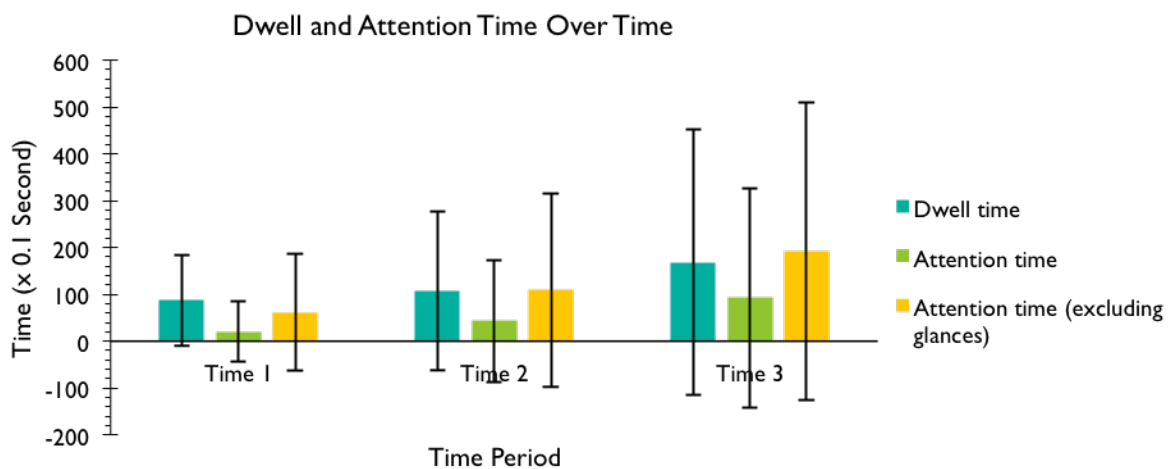


Figure 19: Dwell and attention times of visitors before the screens were installed (Time 1), when they were installed showing just passive content (Time 2), and when they had a full mix of content including interactive (Time 3)

‘Will this increase the dialogue, visibility and relationship of the organisation with its public, to inform and affect the behaviour of all parties?’

This was more problematic, though the research proved that the technology was capable of facilitating this in that we could make people

engage with the screens. The surveys also revealed that a large percentage of visitors are happy to share their digital profiles with organisations, with some even expecting an arts organisation to explore issues of privacy and profiling and to offer visitors the opportunity to engage through on-site digital channels.

These results suggest that there is more potential for a meaningful digital dialogue with a visitor within a venue than when s/he uses a purely digital channel. There are a lot more immersive techniques and hardware available and interaction can also be facilitated by gallery assistants.

Marketers are predicting that in 2015 'Context and not content will be king.'

Rick Curtis, chief strategy officer for Amaze

When visitors are physically engaged in a cultural venue there is a strong context for digital participation – the technology is proven and visitors seem keen. What is missing are the mechanisms to take advantage of this potential. Obviously, it requires time and budget for cultural organisations to adapt to new ways of working and for different departments to collaborate in producing creative and interactive content. It is interesting to consider what the tipping points are for organisations to react to technology. When did it become impossible not to have a website or to operate on social-media channels?

Although the team did not manage to trial enough projects to fully explore this question, we did begin to see organisations discussing and taking steps towards using TILO as a way to showcase aspects of their research and community outreach projects, and towards exploring interactive and participatory ways to do this.

Insights

- 1 The full interactive TILO system captured people's attention for twice as long compared with a conventional system.
 - a Installing screens with no interaction was little different than having no screens at all. An interactive system uses various camera and sensor technology to provide direct feedback and encourage visitors to engage with and leave marks on the screens.
 - b The main cost of any digital screen-based system will be the installation and purchase of screen hardware. Additional hardware to support an interactive system will be minimal. It is worth considering the small additional cost of extra cabling (five or six cables compared to a single one for standard digital signage) to support a future TILO-like system, even if this is not a consideration in the short term (it will be much more expensive to retrofit this additional infrastructure later).
 - c People visiting FACT for the art gallery are less interested in the screens than those visiting the cinema or for other purposes. This was a surprising but welcome result. FACT have a polarised demographic split between the arts and film audiences. The art galleries are generally open in the daytime, whereas the cinema closes at midnight. One of the motives behind the system was to target the cinema audience with the screens to help promote the artistic side of FACT.
 - d Visitors have many different reasons to visit a venue but they all use the public spaces. Using creative and interactive techniques to showcase the breadth of activities is a good way to encourage visitors to experience new things.
 - 2 Showing mixed content creates internal difficulties for organisations.
 - a When digital screens are situated in a public area and show mixed content, it requires the collaboration and support of
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Installing screens with no interaction was little different than having no screens at all. An interactive system uses various camera and sensor technology to provide direct feedback and encourage visitors to engage with and leave marks on the screens

Any tactics used to target people in these spaces in one venue is likely to be equally effective in others. TILO also has a strong emphasis on creative projects that take advantage of live data and public collaboration. The main overhead for this type of project is the development of the logic, interaction and display aesthetic. Once this has been completed, the visual representation is completely determined by a venue's personal context, location and audience (for example, the weather project is related to which local weather feed or image bank the software is configured to).

The research findings also found this to be particularly true of smaller venues and fits within their existing workflow and governance.

- 7 Software, art, research and people.
 - a At a project level, TILO involved two venues, two research institutes, two technology companies and was led by a small arts organisation, which created a complex and spread-out network. A very important factor in the success of the project was that most of the core team members across different partners had previously worked together.
 - b A key learning for any similar future project was that more time should be allocated by the lead partner to allow them to be proactive and maintain frequent dialogue with the other partners.
-

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Meyouandus believe there is an opportunity to develop TIL0 beyond the research project and have been exploring business models

Future

MeYouandUs believe there is an opportunity to develop TILO beyond the research project and have been exploring business models that target key insights and their own expertise as a media arts organisation, with the ambition that TILO could become the industry standard for public screens in cultural venues.

Interactive and engaging projects are key to getting visitors to engage with the screens

- Many media artists create screen-based interactive and engaging projects, and there are many organisations and festivals that specialise in commissioning and curating this type of work (Connecting cities, Cinema-arts-net, Site gallery, Watershed, Future Arts Centres, Futureeverything, AND festival, and Live art, to name a few)
 - These projects can be expensive and time consuming. The majority of this work is shown for short periods of time or within one location as part of an exhibition or festival, before being packed away or scrapped. Each artwork is tailored for that one event and all technical hardware is hired, built and installed. False walls are built, screens mounted, risks are assessed and behind the scenes contracts are drawn up. And before any of this has happened a long commissioning process between artist and curator will have been played out
 - TILO offers an alternative to this approach, based on a network of venues with the TILO system. This would mean:
 - a common and open technical platform
 - media artworks commissioned for one venue will work on all
 - every new piece of work created becomes part of a growing library of works over time that venues can easily access
 - a new channel for media artists to showcase and be paid for their work
-

- venues have a greatly reduced overhead for showing complex media artworks.

Many organisations lack the time and skills to use digital tools to do things differently and better.

TILO is not just about screens, the technology behind many of the projects is also used commercially to connect brands to consumers through mobile devices, social networks and online accounts. The commercial companies involved with the project are at the forefront of this technology. As a network, TILO helps members to benefit from shared experience and to take full advantage of the system and network.

TILO's business model is a hybrid of both these approaches and unique in the market.

- A network of venues with an open and standard technology platform
- Rich content from a growing library of engaging media artworks and creative projects
- Service support to schedule and manage content.

Venues pay a tiered subscription to influence and access content projects and all subscriptions are reinvested into new work. An additional service charge enables venues to access strategic and curatorial support, with TILO focusing on the more complex digital works and venues managing the simpler promotional and informational content. This creates the balanced mix required to make the most of public screens (subscriptions could range from £2000 to £10,000 per year).

The future for the partners

Creative Exchange

TILO contributes to the wider programme of CX by feeding into research work being carried out by members of the team. Doctoral researchers Hannah Stewart, Joel Porter and Lara Salinas will take data and experience gained from working on TILO and incorporate the work into their theses as case studies or as contributions to larger reflective work.

In particular, they will explore links between the TILO work and questions of digital public space, with each member of the team taking a slightly different angle. This also applies to the work of Dr Naomi Jacobs, who is currently writing a book with Professor Rachel Cooper on how digital public space is informed by human cognition and behaviour, which will reference the research of the TILO project in relation to hybrid digital/physical spaces. Additionally, Professor Andrew Quick will incorporate experience from the TILO project into his research and practice.

Amaze

Are looking to continue their involvement and support of TILO directly with Meyouandus through the setting up of TILO as a not-for-profit organisation. More widely, they have taken some of the technical insights into their commercial work on digital and interactive tools for retail environments. They have also re-evaluated the importance of research as a way to understand the effectiveness of project work beyond the usual use of google analytics and web trends, and have started offering a more formalised research component to their clients.

Pixel Inspiration

TILO has influenced Pixel's technical approach to connected retail screens and their approach with commercial clients.

The venues

Both FACT and Phoenix are committed to TILO in their venues and are investing in new content. As they have become more familiar with the system and its potential, they are keen for the screens to become an integral extension of their gallery spaces. The project has also made them re-evaluate their public spaces in light of some of the underlying TILO principles and how they can use TILO to reflect parts of the organisation normally hidden from the public.

The future of digital screens in the arts more broadly

Currently, there are no specialist systems or companies dedicated to digital screens in the cultural sector, only commercial enterprises that install screens in cultural venues as part of a wider, more commercial portfolio. Because, until very recently, screens have been used as

simple informational or advertising billboards, their location or context has had little influence.

However, there is a revolution taking place in the industry with the cost of screens constantly going down, while wider technologies are making screens smarter with greater functionality and utility. This in turn has led to a big increase in demand, especially among big brands and retailers keen to connect their customers between online and high street.

This is good news for the arts as they can benefit from these developments, but it also means that context will increase in influence. The question is, will the commercial sector see any profit in applying the new technologies specifically to an arts context?

To reiterate, the core of the project was about connecting the people and activities inside a building to the building itself. Can an arts venue create a digital and personal dialogue with a visitor over time? This concept will be more relevant to some venues than others. The best environment for this interaction will be venues that have a large social aspect and that already have a community of people who regularly visit.

Further Resources

Further project information

Website and blog

<http://www.TILO.org.uk>

Code repository

<https://github.com/TILO-DigitalSignage/API/wiki>

The screenshot shows the TILO project website. At the top left is the TILO logo. A navigation menu includes HOME, ABOUT, FEATURES, FAQ, BLOG, CONTACT, and a search icon. The main heading reads "RE-IMAGINING PUBLIC SPACES IN CULTURAL VENUES". Below this is a hero image of a woman interacting with a digital display, with a pink box containing the text "ENGAGING AUDIENCES". A subtitle below the hero image states: "At its heart, TILO is about animating the public spaces in creative venues and connecting with visitors." Below the hero image are two columns of text: "WHY TILO?" and "WHAT IS TILO?". The "WHY TILO?" section explains that research found public spaces like cafes and shops in cultural venues have little innovation, and TILO provides a digital platform to engage visitors. The "WHAT IS TILO?" section describes it as a network of venues sharing resources on a new technology platform. Below the text is a grid of content cards. The first card is the TILO logo. The second card is titled "Films" and lists: "Mud (12A) 12:40 | 15:20 | 21:00", "Shell (12A) 18:00 (SOLD OUT)", and "Star Trek into Darkness (12A) 2d 12:40 | 18:20, 2d 13:20 (SOLD OUT) | 18:30". To the right of the film list are two more images: one showing the number "42" and another showing a woman interacting with a screen.

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Figure 20: Project website

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CX sectorial literature review

Arts Council England strategy: Great Art and Culture for Everyone
October 2013

<http://www.artscouncil.org.uk/advice-and-guidance/browse-advice-and-guidance/great-art-and-culture-everyone>

BBC new strategy for the arts October 2013

<http://www.bbc.co.uk/mediacentre/speeches/2013/tony-hall-vision.html>

Nesta Digital Culture: How Arts and Cultural Organisations in England Use Technology

http://artsdigitalrnd.org.uk/wp-content/uploads/2013/11/DigitalCulture_FullReport.pdf

Over the period 10/09/13 to 10/09/14 the primary sector conferences were:

Museums Association 2013

<http://www.museumsassociation.org/conference/liverpool-2013>

Museum Ideas 2013

<http://www.museum-id.com/event-detail.asp?id=383>

Museum Next 2014

http://www.museumnext.com/museum_conference_history/museumnext-2014-museum-conference/

Museums and the web 2014

<http://mw2014.museumsandtheweb.com/>

Other examples

Bloomberg connects at Tate

<http://www.tate.org.uk/visit/tate-modern/things-to-do/bloomberg-connects-interactive-activities>



Glossary and Abbreviations

AHRC Arts and Humanities Research Council

CX Creative Exchange

FACT Foundation for Art and Creative

Technology

GPS Global Positioning System

IOCP Institute of Consumer Psychology

Scala Software program language



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Amaze

Rick Curtis

Pixel Inspiration

Nikk Smith

Chris Shenton

FACT

Ana Botela

Mark Murphy

Jen Chapman

Phoenix

Chris Tyrer

Appendices

Appendix A: TILO IOCP Questionnaire



A little about yourself

What is your gender?

Female Male

What is your age?

Under 16 16-24 25-34 35-44 45-64 65+

Do you regularly visit art galleries?

Yes No

Have you visited FACT before?

No Once 2-5 times 6-10 times 11-20 times 20+ times

What was the primary purpose of your visit to FACT today?

Cafe: Cinema: Art Gallery:

Where did you travel from to get here?

Under 5 miles 5-10 miles 11-20 miles 21-40 miles 30+ Miles

Your views about the Foundation for Art & Creative Technology (FACT)

	Strongly Disagree	Disagree	Neither Agree or disagree	Agree	Strongly Agree
I enjoy visiting FACT					
I appreciate FACT					
I do not care about the FACT brand.					
FACT is a good brand					
I feel a very high degree of personal ownership for the FACT brand					
I feel like I can relate to FACT.					
I like FACT.					
I take pride in the achievements of FACT.					
The Fact brand matters to me.					
I experience positive emotions when I think about FACT					

Institute for Organizational and Consumer Psychology:

Your views about the Foundation for Art & Creative Technology (FACT)

I would describe the FACT brand as

	Strongly Disagree	Disagree	Neither Agree or disagree	Agree	Strongly Agree
Cool					
Smooth					
Honest					
Family orientated					
Real					
Reliable					
Unique					
Technical					
Glamorous					
Down-to earth					
Tough					
Exciting					
Hard working					
Daring					
Intelligent					
Rugged					
Outdoorsy					
Masculine					
Upper class					
Charming					

Thank you for your time

Dr. Gareth J. Harvey

Figure 21: Questionnaire about FACT

Appendix B: TILO CX Questionnaire Analysis Report

Descriptive statistics

The age range of the interviewees showed a normal distribution, though there was a slight skew towards those in the 45–65 age range.

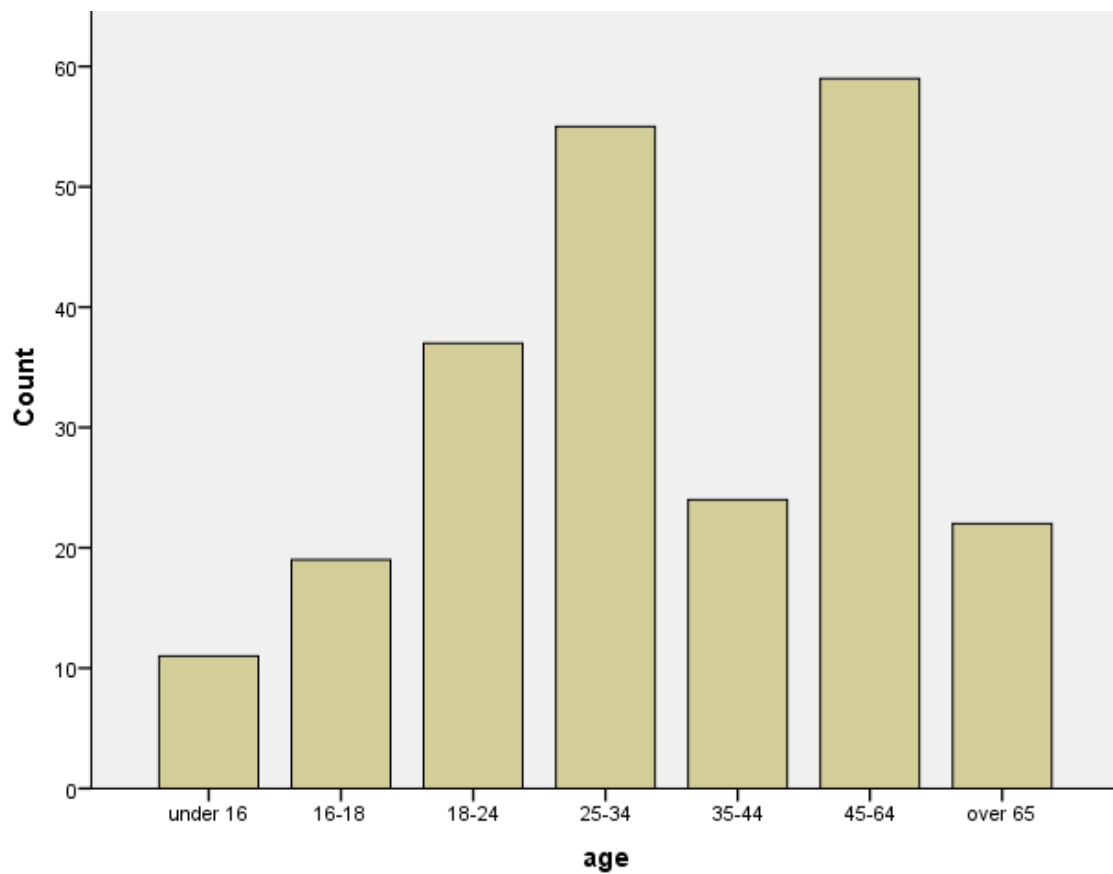


Table 9 Age range of interviewees:

Of the 227 people who gave an answer, it was almost an exact split between those who visited the galleries and those who did not – 112 and 115 respectively.

Similarly, there were even splits between those who were questioned when the screens were and were not present (112, 115), and between the first and second position of the screen (115, 112).

Awareness of the screens

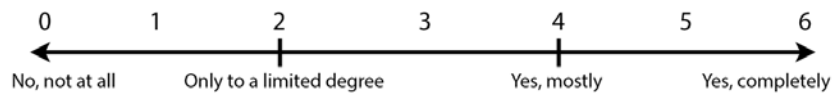
No significant difference was found between how people thought of the conditions with or without the screens.

No significant difference was found between the two screen positions, though there was a slightly higher mean for the second position.

Social media

No relationship was found between the number of social-media accounts people use and any of the three questions asked about awareness of the space and its engagement with them and their data.

Figure 22: Questionnaire for Time 1



f your visit to FACT today? Why?

Thank you for your time,
Lancaster University



Citation: A., Eilbeck, S., Hannah., N., Jacobs., A., Quick, L., Salinas, J., Porter, G., Harvey ,(2015) 'Meyouandus: Interactive in-venue displays - Research and Development Report' London: Nesta

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