Mixed-reality Interactive Journey design *for* Technology theme Exhibition

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Master thesis
Design for Interaction
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Master thesis

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In collaboration with Museum Future Lab and Accenture Liquid Studio the Netherlands

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EXECUTIVE SUMMARY

Accenture Liquid Studio (LS) as a technological innovation consultant company presents their technical capabilities by demo showcases for promoting business opportunities. Demo Theme Park is the collection of all their demo showcases. It locates in LS Utrecht office as a company in-house technical exhibition. A mobile app, Liquid Studio Passport is proposed throughout this project for enhancing the Them Park exhibition on visitor experience by augmented reality technology. The passport visit plan conducts a holistic experience for visitors that it facilitates preparation before arriving, enriches interactions along visiting, and values takeaways to promote further communications between visitor and Liquid Studio by the ending. The project is initiated as:

Creating interactive smart visit experience for inspiring studio visitors among multiple technology showcases around Demo Theme Park in order to promote new business possibilities.

Analysis

To build a tangible basis for further design processes, a research phase was initiated for gathering valuable insights around the Theme Park exhibition visiting context. It includes analysis on both internal and external perspectives for conducting design challenge statements with its context scope.

Externally, keywords for desk research and case studies were selected to be technologies, museums, exhibitions, and interactions. In conclude, applications of technology in museum exhibitions on interactive and experiential purposes are revealing values increasingly. They achieve greater degrees for visitors on participation, autonomy, and personalization. This encourages positive relations for both sides.

Internally, research included internal case studyon Liquid Stuido Singapore demo showcase exhibition, field research in Utrecht LS office, interviews with demo and tech developers, survey around relevant information platforms, and meanwhile researched along fast prototyping on parts of the Theme Park as a member of the development team. In general, it is the common goal to seek for values among technology services from the exhibition by both LS as information presenter and their visitors as information receiver. The Theme Park here plays the role as a bridge to transport info from Liquid Studio to visitors. In this case as the current situation, the exhibition initiative tend to come from presenter perspective, where visitors are receiving anything be given from Liquid Studio.

This leads to a discussion on changing roles of Liquid Studio and the exhibition visitors around the journey. It generally results as a perspective transformation of information transfer from presenter initiative, where possibilities are proposed, more towards receiver initiative, where there are needs. To redefine the roles, the Theme Park should be considered as a map to be explored rather than a bridge to be crossed. Via the exhibition, both presenter and receiver are explorers that they are seeking for a match between what are provided and what are expected that achieves each other. Hence, it reasoned out that it is the opportunity to realize this co-exploration for both sides. For visitors, a self-directed exploration-oriented journey could be the direction. Though it seems focused more on individual perspective experience and tends to aim for achieving independent visits, this is not to completely replace the conventional methods that most people are accustomed to, such as manual guide or group tours. It is to explore alternatives on such a basis, for new opportunities that can add value to them.

Conceptualization

Base on insights from analysis phase, a design goal is proposed as “Design an explorative, collaborative, and discoverable mixed-reality journey for Liquid Studio in-house visitors to enhance the sense of consistency during visiting tech demo exhibition”. Ideation, Conceptualization and Design activities were conducted accordingly.

The ideation was also considered as a reflection for better preparation on later processes where the scope of the design was setted as to design a overall journey experience. A number of sub-concepts were generated which was then modularized into functional features and consisted into a 9 step journey flow. The flow was then used for validate whether the modules are useful along the journey or whether any part is missing. Storyboard was made for concept evaluation sessions for participants to walk through the journey along the storytelling. The sessions were executed for insight gathering that finally to conduct a journey solution that fulfils the design goal.

Final Design

According to the finding from analysis and conceptualization, the final design was conveyed with a concept overview, a journey flow and a journey map. To validate whether the design could match with the design gaol, two prototypes were made for user/visitor tests separately for the journey carrier, which is an AR (augmented reality) mobile application, and the using scenario as the participants are not able to visit the exhibition on-site under the corona situation. The final evaluation was addressed, and as a result, the design fulfilled the properties as desired quite well in general.

As the project is part of the long term development of the Theme Park for Accenture Liquid Studio, recommendations were made for later developments. As currently it is processed and proposed theoretically, it will need more insights from in field context researches.

The figure 1 in next page show an overview of the project process.

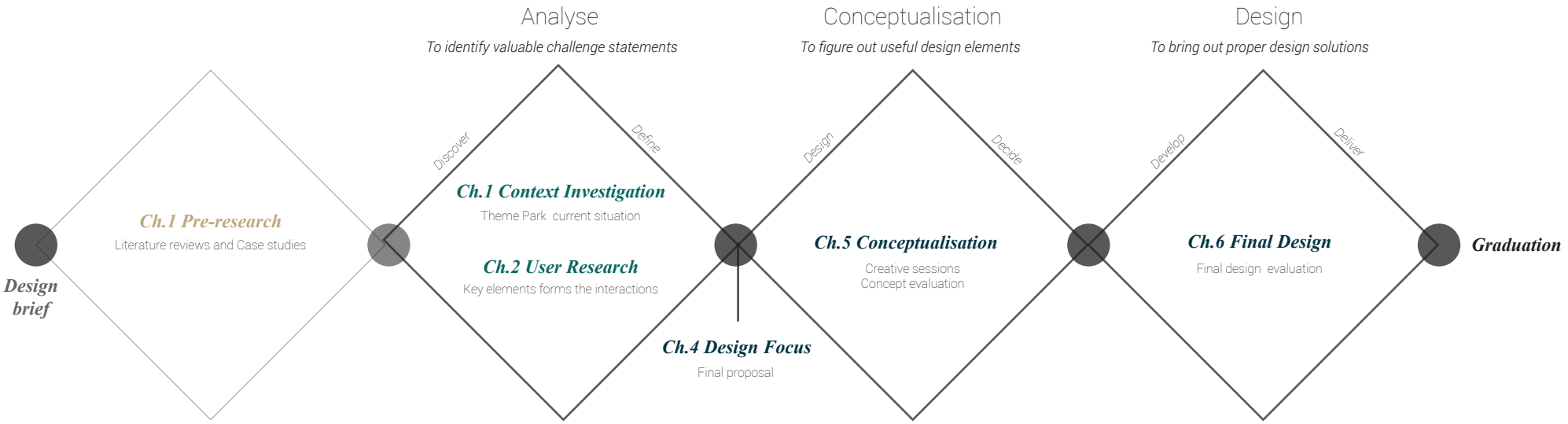

Figure 1: *Overview of the project*

TERMS & ABBREVIATIONS

AR	Augmented Reality
VR	Virtual Reality
MR	Mixed Reality
BCI	Brain-Computer Interface
SUS	System Usability Scale
UI	User Interface
RQ	Research Question
LS	Accenture Liquid Studio
LS NL	Accenture Liquid Studio the Netherlands
LS SG	Accenture Liquid Studio Singapore

INTRODUCTION

This report presents research and design process and outcomes at Accenture Liquid Studio, from March till August 2020, for the graduation project in TU Delft, Master for Design for Interaction.

Accenture Liquid Studio

Accenture Liquid studio, as an important part of Accenture's global innovation architecture, is a transnational technology based innovation consulting company operates across Europe, Asia, Africa, and North America as shown in figure 3 (Accenture, 2020a). Through product and service innovation planning and rapid prototyping of emerging technologies, they help companies quickly achieve 0 to 1 and build sustainable innovation capabilities (Liquid Studio the Netherlands, 2020a).

Project brief

This project is created and supported by Liquid Studio the Netherlands (NL), which is located in Utrecht, highlighted in figure 3 (Accenture, 2020a). Multiple technological fields with high innovation value are under exploring within Liquid Studio, which includes Brain-computer interface, IoT, Block chain, Cloud computing, Virtual reality, Augmented reality, Holographic, DevOps, etc.

Liquid Studio keep these emerging technologies under development, so that Liquid Studio will be able to provide solutions for their clients when facing new challenges.

However, on the other hand, technologies, especially when go into more technical depth, where it starts to be even more obscure that their complexity creates a barrier to communication between potential users and valuable technologies. This stops understanding and inhibits getting inspired, which blocks creativities, so that to break this barrier and build the bridge is the challenge.

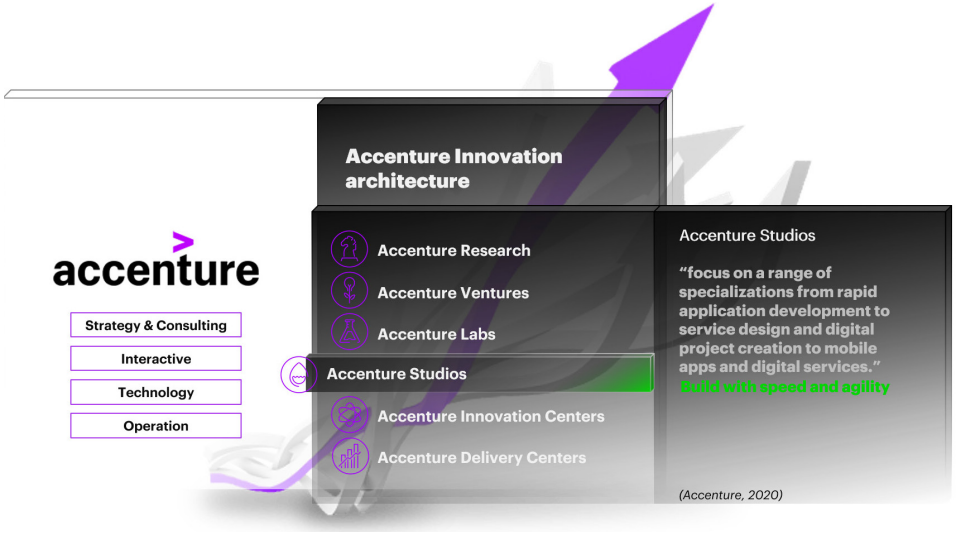

Figure 2: *Liquid Studio as a part of Accenture's global innovation architecture*

Figure 3: *31 Liquid Studios are operating in 31 different countries and regions around the world (Accenture, 2020a)*

To face this, Liquid Studio started the AR City Quest project to connect a number of demos under a virtual city context in an AR (augmented-reality) application under a game format. Therefore, user can be guided through a storyline for achieving an experiential solution. It is an opportunity to promote their internal technological capabilities through a smart environment within their office space from an immersive and informative experiences.

The current demos including Blocktrain, DevOps, Magic mirror, smart plant, and so on. They together presents as the demo Theme Park, where there is a potential for improvment that there is no clear narrative or overall user experience system for either the theme park or the City quest yet.

To achieve this overall experience, it should consist of two things, which are the group of physical demos and the AR application. The physical demos together as a carrier for the technology showcase, and meanwhile, AR application is also a carrier for the showcase but is in a game form.

By combining both parts, they should create a holistic experience, while at the same time, it should be possible for them to showcase the technologies separately.

To challenge this barrier, three stages of problems are facing in this project:

1. A journey need to be created fluidly that covering and linking through out the multiple technologies in order to smoothly get the audience involved into the blueprint of the studio's capability. Importantly, by creating such a journey, it should to be able to point out the key elements that are valuable to the audience.

2. It is important to reduce complexity of information delivery from obscure languages. Keep the communication informative, but in a user

friendly and effective manner as a memorable experience.

3. How to create the journey parallel through out both carriers (physical demos, and AR application) that are complete when they are experienced separately, and on the other hand, they should be able to be combined into one holistic experience.

Potentially, by facing the situation that the visitors usually come in groups, it could be interesting to explore how in the future the AR application can also be used as part of a group visit.

Therefore, the design challenge to be faced in this thesis project is :

Creating interactive smart exhibition in the liquid studio to provide immersive walking through experience for inspiring studio visitors around multiple technologies in order to promote new business possibilities.

About the development team

As an iterative development project, theme park is in the initial stage. A number of demos are there to be organized, and the AR city self-guided tour concept with its mini-AR-games corresponding to each demo in the concept have not yet been designed and developed. At this time, my joining aims to enrich and meet the needs of visitors through the relevant design of user experience, and thus assist in improving the demo and AR city self-guided experience.
To get this whole project keep being implemented for finally realizing the design practically from the company side, and also as inputs for designing the overall user visit journey, the AR quests for each demo as sub-projects are developing in parallel.

To face this situation, I am working with a team of 4 with clear task divisions that each of us developing the theme park from different perspectives (figure 4). We work as a team, but responds separately on quest designing, code implementing, 3D modelling, and me on overall journey researching and designing.

For each demo's quest, as a team, we first do brainstorm sessions around possibilities on how the physical demo can be used for the quest and how the AR layer can help. After having the outcomes, we refine them into a quest design concept, and work for implementations dependently as the first iteration regarding Theme Park project as a long-term topic.

Project approach

In order to work out the design challenge, a triple diamond design process is approached as shown as introduced in figure 1 as the overview of this project while figure 5 on the right presents the overview of the research scope where frame the foundation where conducts the final design.

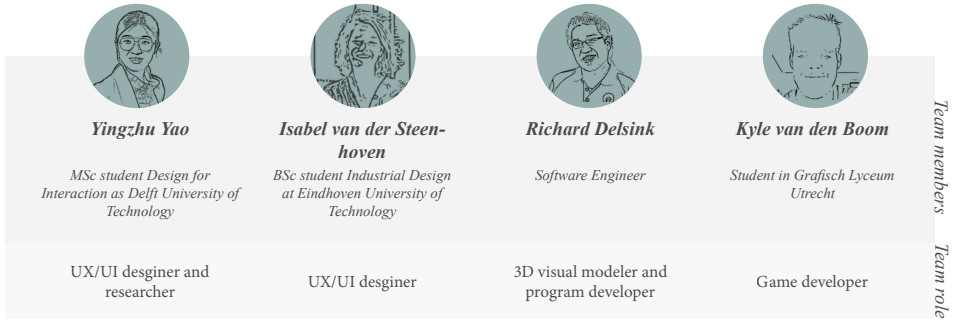

Figure 4: *the development team in Liquid Sdutio*

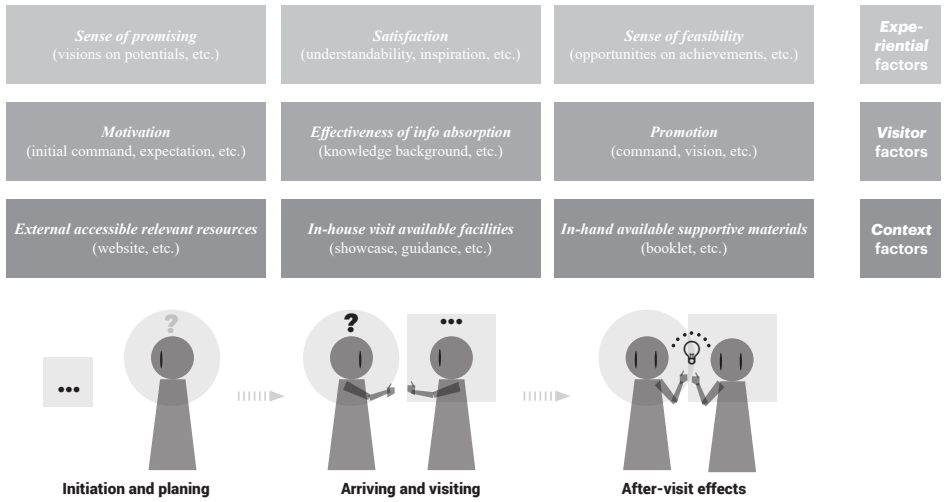

Figure 5: *Overview of research scope*

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01

PRE-RESEARCH

STUDY ON APPLIED TECHNOLOGIES IN MUSEUMS

This chapter reports a study on interactive technologies that applied to museums through literature reviews and case studies. It works for the project as a background research from a more generic context.

Chapter Overview

1.1 Interactive in museums by tech applications
1.2 Key takeaways

Background image by Nada Sertic

OVERVIEW

The following figure as below shows an overview of the study which as a reference for the project.

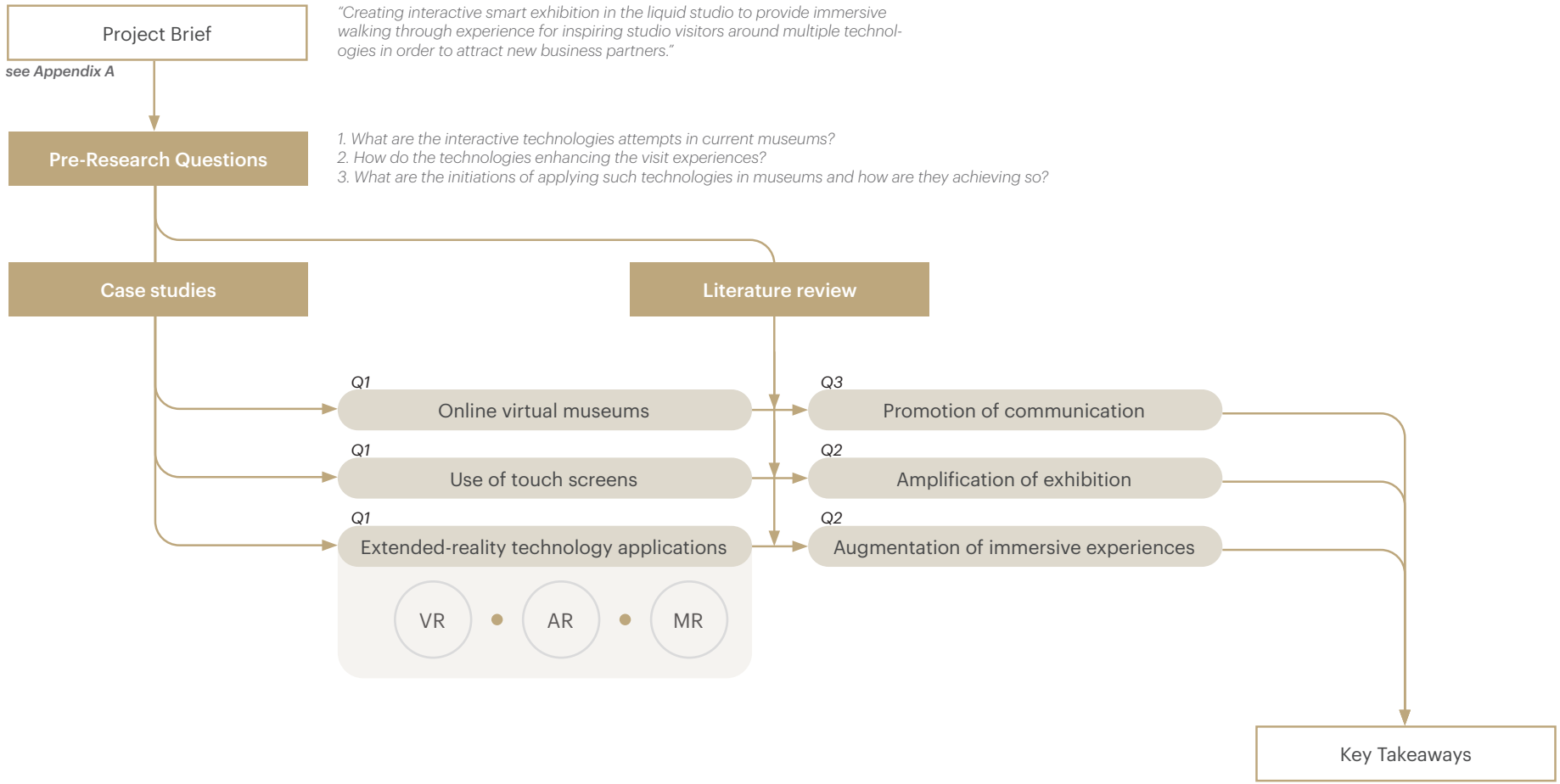


Figure 1.1: *Overview of chapter 1*

1.1 INTERACTIVE IN MUSEUMS BY TECH APPLICATIONS

The rapid development of technology leads to an enrichment of interactions. For museums, attempts and explorations in this trend are changing the relationship between museums and visitors (Vaz, Fernandes, & Veiga, 2018).

1.1.1 Online virtual museums: Promotion of communication

Museums develop various of online or digital versions of virtual museums to provide services enriching visitor's experience on communication, interaction, and sharing, to become responsive, engaging, and participatory for their visitors (Holdgaard, 2011). As Holdgaard said, the main purpose of such attempts is to help the museum attract new visitor groups (2011). Compared with physical located museums, online tools such as social media and website platforms are more flexible in form and content. They have greater opportunities to reach people's daily lives. In other words, invisible potential visitors will have the opportunity to be discovered and communicated through the virtual online platform (Vaz, Fernandes, & Veiga, 2018).

There has been controversy about whether virtual museums will replace physical museums, but like the relationship between photography and painting, it is suggested as a new chance in form to add value rather than replacement. The value of a museum is not only the collections and the rich knowledge inside them, but also the irreplaceability of the physical matters at the experience level. On the contrary, the virtual form may be the facilitator of physical visits. By bringing the knowledge that will be acquired in reality to the visitors before their actual visit, the virtual museum becoming a bridge of communication.

Case study: Google Arts and Culture

Google Arts and Culture can be an example, though external from any museums, as an online platform provides virtual visits to a large number of museums. It allows public virtually visit collections from more than 2000 partner institutions. The feature Virtual Gallery Tour implements the same technology as Google

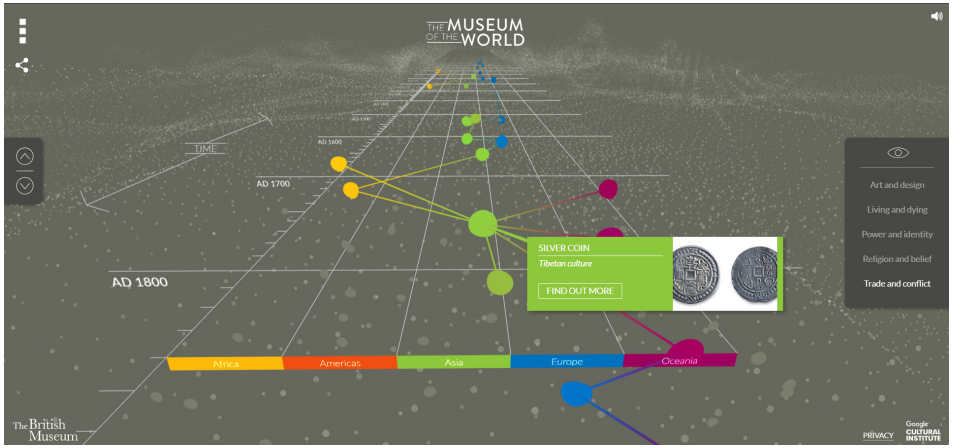


Figure 1.2: *An item is selected in 'the Museum of the World' (British Museum, 2020a)*

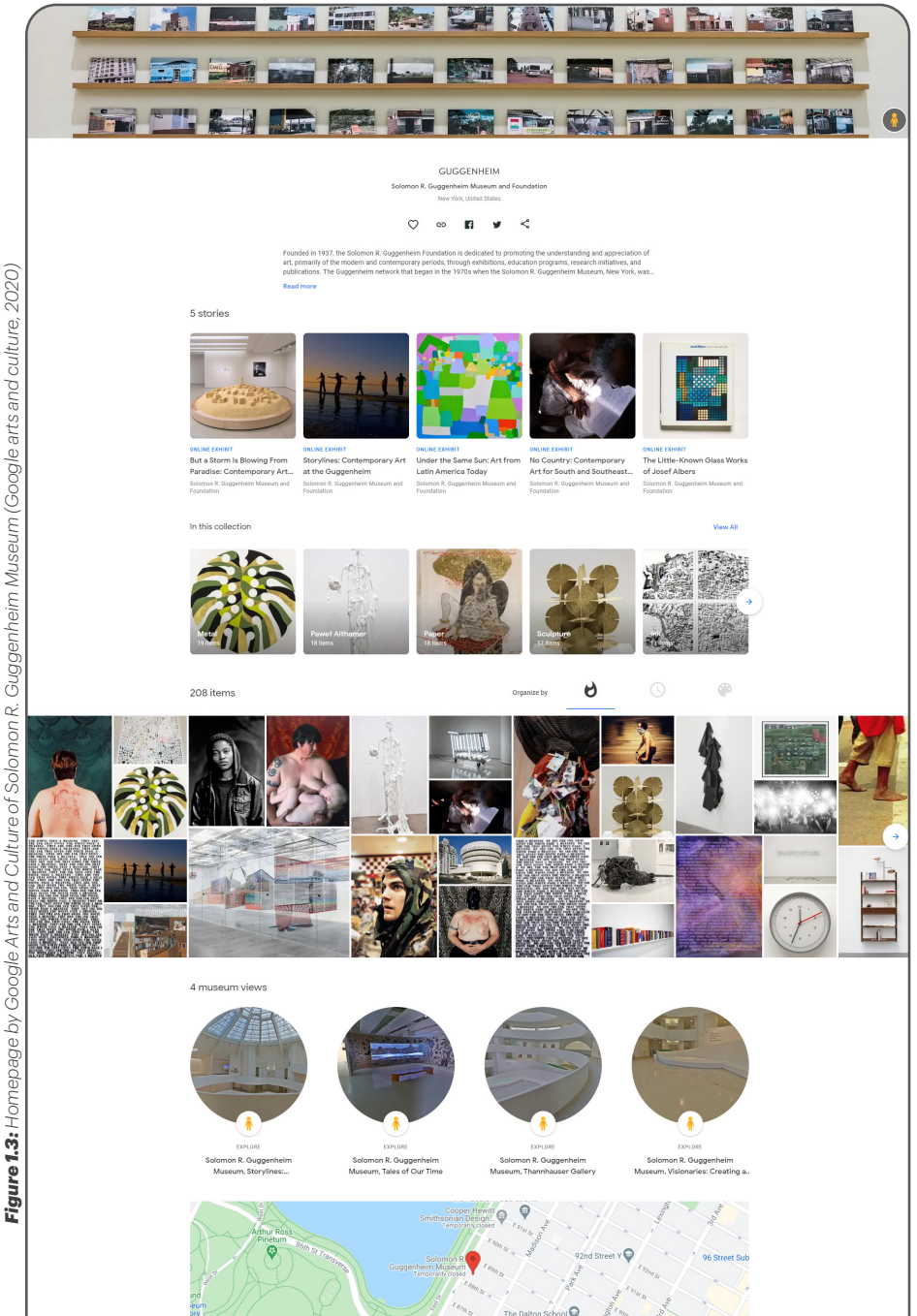


Figure 1.3: *Homepage by Google Arts and Culture of Solomon R. Guggenheim Museum (Google arts and culture, 2020)*

street viewer that walk through the environment by clicking on the virtual floor. Artwork viewer provides more than 32,000 high-resolution images with info on their physical properties such as size and material. Information on the main page of each museum includes stories, collections, views, current activities, museum general info, etc (Figure 1.3). In addition, for Google users' personal arts and culture homepages, there are various recommendations to explore, such as art items, culture topics, activities, games, etc. These functions effectively integrate resources into the platform, extend the distanced accessibility, and value the knowledge dissemination throughout information communications.

Case study: the Museum of the World

There is also potential for virtual museums to amplify their visitor's desire of reality that promote on-site visits to a greater extent. The project by the British Museum and Google Cultural Institution featuring a virtual website even more experiential and engaging interactively (British Museum, 2020b). it starts from a virtual tour with a conceptual motion effect. The dots of various colours covering the entire screen are gradually connected which implying the interconnection between the selected objects along the history. The end of the animation is that all points are sorted by colour on five tracks (Africa, America, Asia, Oceania and Europe), distributed along a time axis that can scroll back and forth (figure 1.2), from prehistory till now.

When scroll the mouse to move along the time axis forward and backward, some random and brief melody will be formed that sounds are triggered by the passing the points. Clicking on a certain points will trigger the correspond introduction of the item it represents. The hidden link between collection items that are related across time and space will be linked along the time axis across cultural divers. This engage people to explore more along the links from the interactive abstractions to the exhibits they represent. The irrelevant items will turn into invisible colour that the same as the background for less visual interruption.

1.1.2 Use of touch screens: Amplification of exhibition

In museums, the application of touch screen provides more demonstration opportunities for exhibits. With the gradual maturity of technology, the freedom of content display and the relatively low development cost on both time and money, are promoting its diverse development in application scenarios.

As shown in the figure below (figure 1.4), it displays three using cases with interactive touch screen technologies. By implementing Multi-touch control with multiuser software, it encourages collaborative communication among the content it displays. The operability of multi-person control, object recognition, multimedia presentation, and gamification interaction makes this technology more flexible and attractive, and continues to expand the exploration boundary of its application.

Figure 1.4: *Various forms of touch screen in usage scenarios (eyefactive, 2020)*

While touchscreen increases the richness of content and interaction, it can effectively reduce the need for exhibition space. As a technical display method, it is relatively distinct in form from other traditional displays, and it potentially embodies the particularity in content. This will arouse visitors' curiosity about what it displays (Lovelace, 2016). On the other hand, the development potential of rich content and interactive forms may bring more possibilities for inclusive design in museums.

1.1.3 Extended-reality technology applications: Augmentation of immersive experiences

By mentioning extended-reality technology, it is mainly regarding AR (Augmented reality) and VR (Virtual reality) which are getting more and more familiar and popular to public nowadays. Technology innovations are extremely influencing reality-virtuality interactions to the world, as it was stated by researchers previously (Norros, Kaasinen, Plomp & Rämä, 2003). These technologies brings people to cognitively integration of the physical and virtual parts of the environment to varying degrees (Flavián, Ibáñez-Sánchez & Orús, 2019). The application of interactive technologies gives people more opportunities to harvest empirical memories, those based on observation and experience rather than theory that it empower greater opportunities through possibilities on innovative narratives (Rubio-Tamayo, Gertrudix Barrio & García García, 2017). This gives the communication of theoretical knowledge an opportunity to be added with practical value, which leads to valuable influence on modern museum experiences (Coates, 2020).

VR Case: Designmuseo virtual tour

Designmuseo provides this online virtual visit for their public visitors from their website which is available to experience under VR mode with personal VR devices. As shown in figure 1.5, it is a 3D version of the main exhibition with

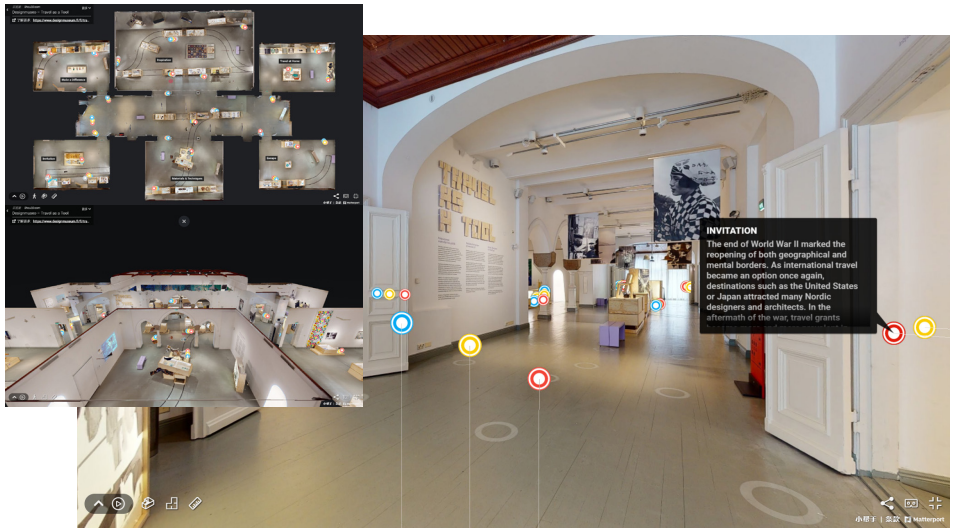


Figure 1.5: *Virtual tour of the Travel as a Tool exhibition (Designmuseo, 2020)*

contents displayed virtually the same as reality (Designmuseo, 2020). bubbles in the scene are interactive to read related information such as projects and authors introduction. The white light circle on the floor is for navigation with in the virtual environment. Visitors can also switch the view from navigating to 3D or 2D map view, even do certain measurements for more specific spatial insight (figure 1.6).

In general, this attempt brings the context from its original to digital, a 3D version that adaptable for virtual-reality experience in other places. As mentioned before, these online tools breaks down distance limits and makes more availabilities for more invisible visitors.

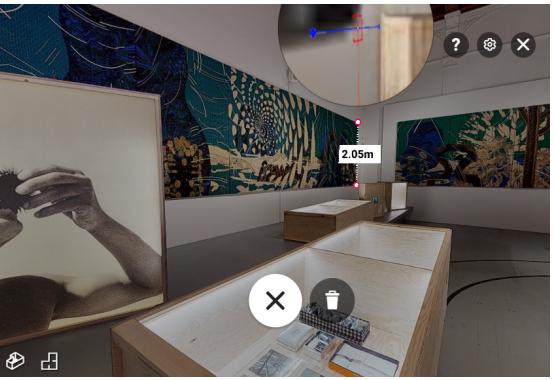


Figure 1.6: *Virtually measuring the paint on the wall shows it is 2.05 meter tall (Designmuseo, 2020)*

VR Case: 'Mona Lisa: Beyound the Glass' at Louvre Museum

This VR experience was part of the landmark Leonardo da Vinci exhibition by Musée du Louvre. Animations and sounds interactively present to visitors around the paint in detail attractively, such as a seeing through of the pain in layers till the wood panel with cracked marks and wood textures (figure 1.7). Along a 500 year history of the paint, the VR displays the changes the time passage brings due to humidity and light exposure.

Narrative elements along the VR experience around da Vinci and the paint keep enhancing the engagement for visitors with storytelling. This is the complement of experience beyond what can be seen through visitors eye of the piece of art (VIVE Art, 2020).

This VR experience project is an attempt on new ways to reach their audiences both inside and outside the museum (VIVE Art, 2020). There is also a home version for their global audience which offers a pre-visit before they could actually attend. They can virtually enter the museum through h the Pyramid entrance and see Louvre's collections.

Figure 1.7: *A visitor see through layer of the paint of 'Mona Lisa' in virtual-reality (VIVE Art, 2020)*

VR Case: a VR exhibit in the National Museum of Finland

The Narrative by storytelling forms personal connections between the user and exhibited content that information could be conveyed engagingly effective (Bedford, 2001). The VR exhibit presented by the National Museum of Finland offers their visitors an experience back to 1863 inside the painting 'The Opening of the Diet 1863 by Alexander II' by R. W. Ekman (Coates, 2020).

Wearing the headset, visitors could feel the scene as if they are inside it and stepping in the paint. It displays in 3D perspective interactively that allows people to look around and speak with characters inside the Hall of Mirrors (Hills-Duty, 2018).

Figure 1.8: *Visitor 3D perspective step inside the painting 'The Opening of the Diet 1863 by Alexander II' in virtual-reality (Hills-Duty, 2018)*

Augmented reality technical possibilities in museums

Audio Augmented reality

It is currently base on the three-dimensional audio technology for creating an environmental audio experience, as illustrates in figure 1.9. Depict a spatial environment composed of sound information by simulating the location of sound that the user can immersively feel the sound framing an audio layer to the physical space.

Figure 1.9: *An illustration of the spatial relationship between a three-dimensional audio and the listener (RIDT, 2016)*

To simulate the sound environment for museum visitors, data it need can be collected from sensory device that visitor will carry around for information of visitor's location, facing direction, and movement speed (Morozova, 2019). After this device inputs these required information to a connected smart headset, the headset can then generate such a sound immersive experience, which can be considered as an augmentation to the reality via audio.

AR spatial navigation

As shown in figure 1.10, it is an example shows the possibility to use augmented reality base on spatial conditions in order to generated effective guidance on navigating in environment. This may rely technologies such as WiFi, sensors, iBeacon, and GPS, which can be expensive and cumbersome solutions (Corine, 2016).

Google Tango allows smarter opportunities that operate the application in the same vision independently from those infrastructures (Corine, 2016). "The tablet is loaded with sensors that detect motion, volume, and depth. A 3D map of the interior of the museum is created in advance by scanning the walls, partitions, installations, etc. The tablet later recognizes these elements and makes it possible for the visitor to remain continuously localized, with no need to connect to any signal", explained by David Lerman, CEO of GuidiGO (Corine, 2016). GuidiGo is the company that explored out this new path.

Figure 1.10: *3D indoor geolocation project application using at Museu Nacional d'Art de Catalunya (Corine, 2016)*

AR Markers

AR Markers (Augmented reality marker) works as triggers for camera to recognise that trigger virtual information displays from AR applications (Any Motion GmbH, 2020). It can be various in formats such as image, visual icon, GPS position, object, sound, human, even multiple objects together (Any Motion GmbH, 2020). This greatly expands the possibilities of AR interaction. Among them, image and GPS position (Pokémon Go) as AR Markers could be more common in use. As shown in figure 1.11, the exhibit as an object is the AR Marker that triggers out the virtual information layer from the user's screen.

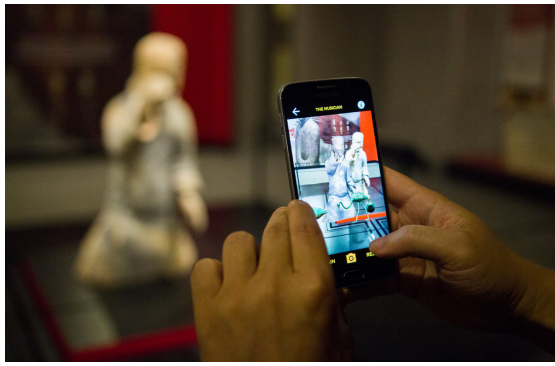


Figure 1.11: *The exhibit used as an AR mark to be augmented from the screen via the mobile AR application (Pew center for arts and heritage, 2017)*

AR case: ReBlink in The Art Gallery of Ontario
The Art Gallery of Ontario together with the digital artist Alex Mayhew developed this AR exhibition include 9 paintings with their AR version. As shown in figure 1.12, the original painting work as the AR Marker triggers the display from visitor's screen of a new visual layer covered over the original. The character in AR layer is taking a selfie from the frame while the original states static in reality. "ReBlink provides a modern day recasting of the past" (Mayhew, 2017).

Figure 1.12: *Re-imagination of the original paint is displayed via the augmented reality application (Mayhew, 2017)*

The digital intervention on gallery visit refreshes its conventional pattern. As shown in figure 1.15, the virtual layer together with the reality surrounding are mixed together when see through the screen. The virtual character extends the context inside the paint towards the reality.

The re-imagination of Alex Mayhew together with the AR technology are bringing the paints to life in a new light (Mayhew, 2017)

AR case: 'Skin and Bone' AR application in the Smithsonian National Museum
There are 13 of the skeletons showcasing in the hall that can imagery bring to life in 3D from the AR mobile application (National Museum of Natural History, 2015). It is for visitors to see how would the animal look like when having skin and muscle over bones in life, as well as how those skeletons would work when moving. (figure 1.14))

"This app is all about sharing some of the untold stories behind one of the museum's most iconic collections," said Robert Costello, the producer of this app, who is also the museum's national outreach program manager (National Museum of Natural History, 2015).

In this case, the augmented reality brings history to life that allows visitors see through the screen towards rich understandings.

Insight on Mixed reality possibilties
Mixed-reality (MR) is generally be defined by differentiating with the augmented reality (AR) that when adding digital layer to the reality, AR interacts with the digital layer, where MR interacts with both as the co-existion as the new environment (Christensson, 2019; Microsoft, 2020). It is the physical interactions that the MR more than AR. As for VR, it tends to provide the feeling of a full immersive digital world in a sense that without noticing the physical environment around. When put AR, MR, and VR (virtual reality) on the same scale, the mixed reality presents in-between as it combines aspects of both but not fully of them as in figure 1.13 (Microsoft, 2020).

Refer to Dan Ayob, the General Manager of mixed reality education at Microsoft, the mixed reality is defined as a mixture of physical reality and digital reality (2019). To decide on the technology or the device to realize such an application, it should first be considered that to what extend the experience is being mixed along the MR spectrum (Microsoft, 2020). Along the same scale as the MR spectrum (figure x) there are mainly two types of devices that the Holographic devices, such as Microsoft HoloLens, are more towards physical reality ,while immersive devises such as Samsung HMD Odyssey+ dives more into digital experiences.
MR could bring educational communication to new scenarios as it creates inclusive conditions, breaks limits from physics, and across the distances according to Ayob (2019). These are valuable potentials for museums that new opportunities may occur for even greater experience where the exhibits are already great in themselves (ARM23 technology blog, 2019).

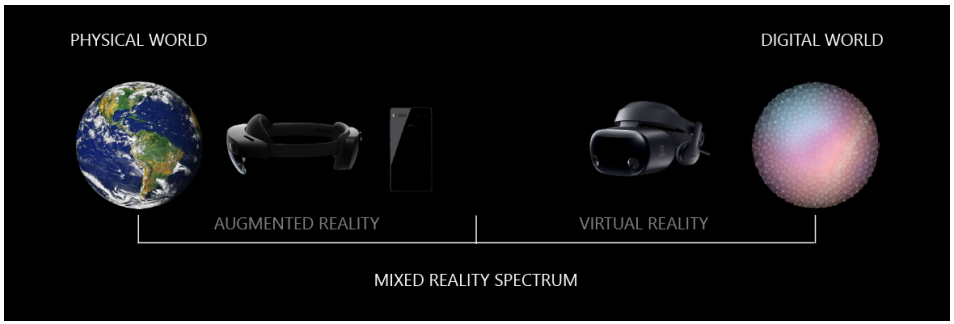


Figure 1.13: *The mixed reality spectrum and how the current devices serve the experiences (Microsoft, 2020)*

Figure 1.14: *The animal skeleton feature in physical showcased is reconstructed by superimposing images in an augmented reality application (Smithsonian's National Museum of Natural History, 2015)*

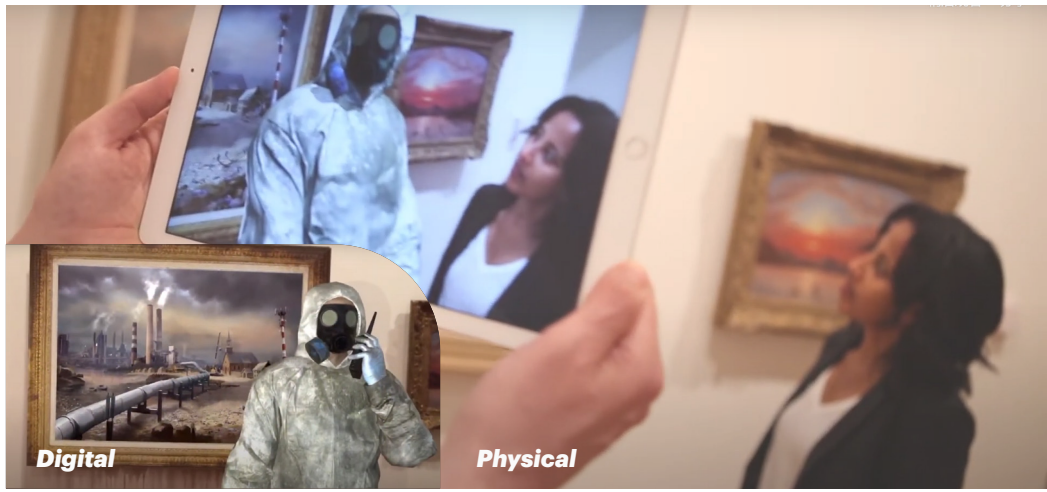


Figure 1.15: *The context of the reality environment is combined with both physical and virtual elements when seeing through the screen (Mayhew, 2017)*

1.2 KEY TAKEAWAYS

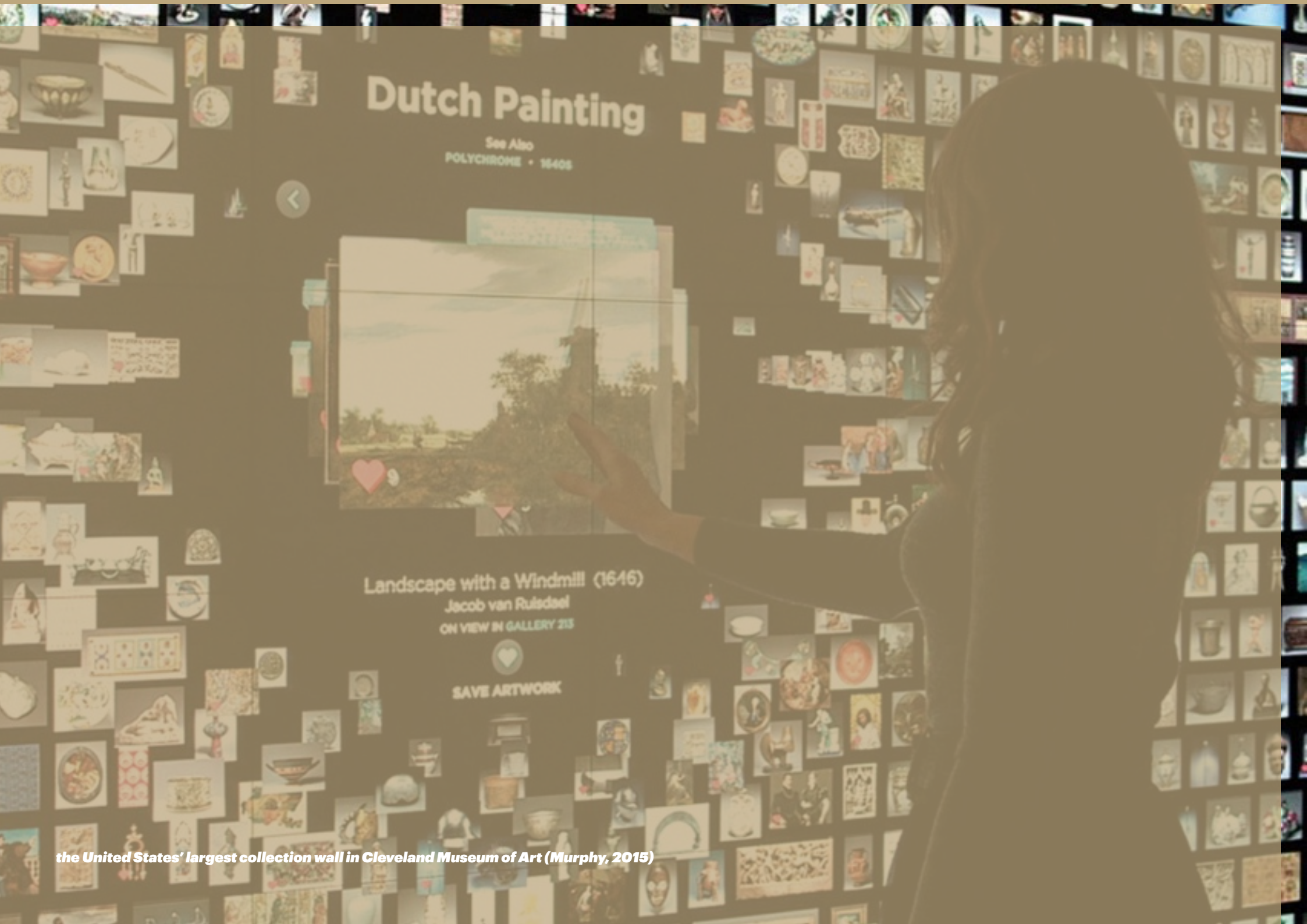
Interactive technologies were discussed refer to their affects to museum experiences on around online virtual museums, use of touch screens, and extended-reality technology applications. This section explains the key insights from the pre-reseach chapter around the research questions.

Interactive technical attempts in museum
Technologies for museums are meaningful as these frames new languages for them to reach out in new ways and to meet new audiences. Mainly, to the fundamental need, it is the educational communication promotion that other values comes along subsequently once the museum could effectively bring out their knowledge to visitors. The museums see the significance of interactive technologies that they inspire knowledge from statics to life which attract audience to become visitors and keep them engaged around.

Influences to visit experiences
Technologies bring new sights for museums and visitors that as mentioned, new ways of communications between museums and their visitors via technologies is gradually existing to less limitation but more opportunities. To some extend, the technology is the new language that workable among museum, visitor, arts, and history, to link them effectively and engagingly all together. Therefore, for visitors, it enhances the value and significance of the visit by achieving simple communication, in-depth understanding, deep memory, and rich experience. Promotes visitors to achieve effective learning of the information and knowledge conveyed by the museum during the visit.

Possibilities by Mixed-reality
To design for an immersive tech theme visiting experience that conveys knowledge around multiple technologies, it is basically the task for the technologies together find a way to explain themselves. Regarding the insights around Mixed-reality as both physical and digital interactions are involved in the project scope, it should be firstly facing the challenge of framing the desired experience that then to be chose and designed the supportive application on appropriate devices correspondingly.

In conclude, it is by activate more and more from the power of the context, which is the surrounding that influences people to be able to bring out the experience as desired. To achieve this, it is important to understand the context where the experience is happening around. In this case, the research phase for this project shall be focused on context investigation.



the United States' largest collection wall in Cleveland Museum of Art (Murphy, 2015)

02

INVESTIGATE THE CONTEXT
WHILE WORKING IN DEVELOPMENT TEAM

This chapter is reporting findings of context investigations. An illustration is shown as figure x for overview of this phase. It shows a basic flow of where the data come from and how the results are being used in general.

Chapter Overview

OVERVIEW

The following figure as below shows the overview of the context investigation phase.

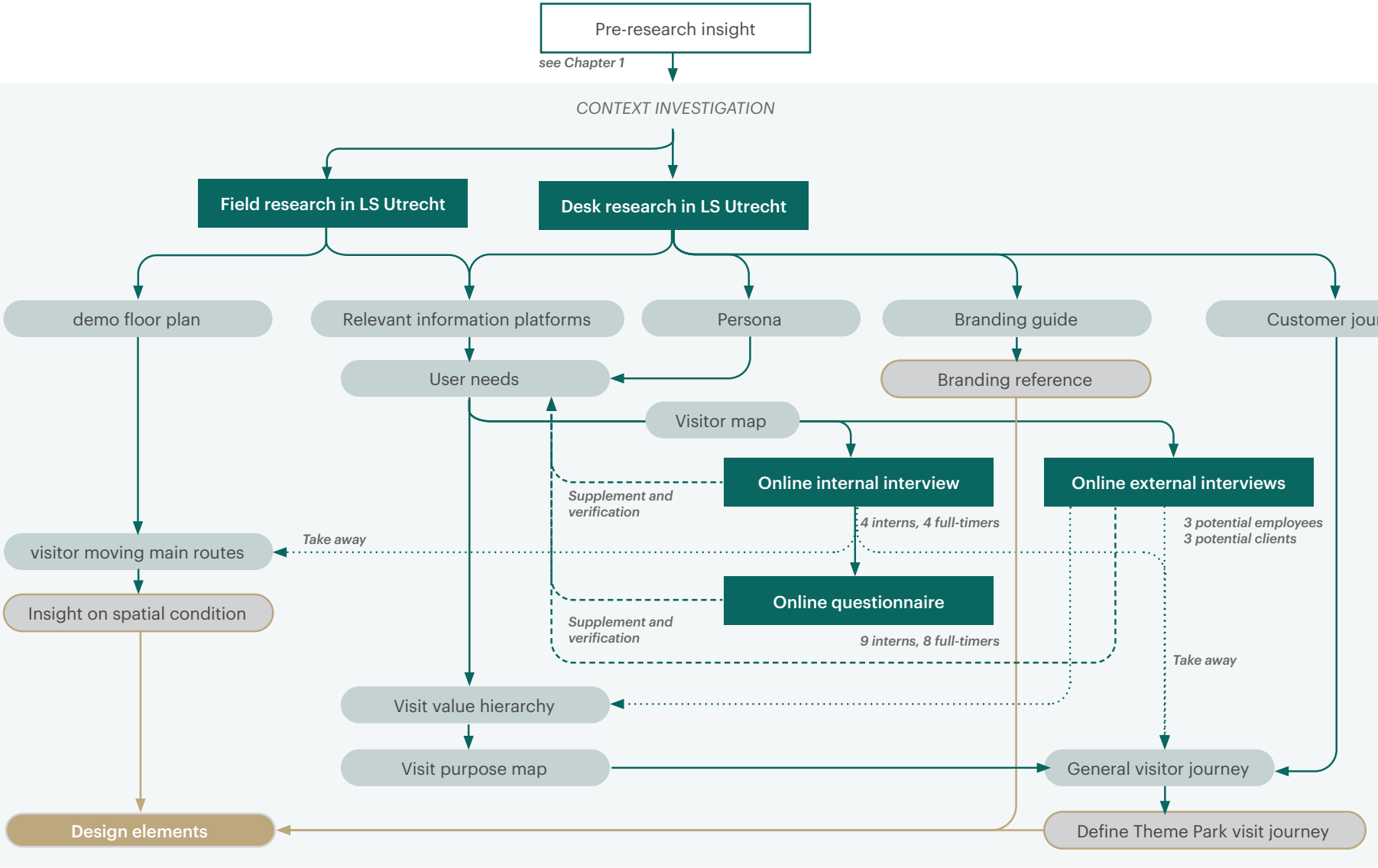


Figure 2.1: *Overview of chapter 2*

2.1 RESEARCH AROUND DEMO THEME PARK

By mentioning demo Theme Park as a project, it covers relevant developments that enhancing the Utrecht office showcases for communicating their technical innovation capabilities. Around the current demo Theme Park, it is the focus of context investigation. This chapter is presenting current conditions that are relevant to demo Theme Park developments.

2.1.1 As part of the brand carrier

The theme park visit contains rich and diverse touch points, which is rather important for the company to be able to convey the corresponding brand identity and imagery. As a subsidiary in Accenture's management consulting construction under technology innovation architect, Liquid Studio is extending its brand culture in conjunction with its parent company's brand context. While being dependent on the Accenture branding, Liquid Studio is trying to identify their own personalities. Though the brand design has not yet been completed, some have been put into use. After collecting insights from both the brand guideline and innovation booklet, and communicating with the marketing and interaction leads, branding information are collected as shows in figure 2.2. Relevant pages of the design guide can be found In appendix G where gives more detailed explanations on mission & vision and core value of Liquid Studio.

Figure 2.2: *Branding references from Liquid Studio brand guideline*

2.1.2 Location condition in general

Demo are located inside Utrecht Accenture office as mentioned in the beginning. Spatially, anywhere installed any demo can be considered as part of the demo Theme Park, and conceptually considering all demo showcases together as an internal technology theme museum as the park.

Most of the showcases with booth set-ups are placed at the beginning of office hallway, opposite the entrance, indicated as green circles in figure 2.3 Although the entire office is open-planned, the place where most of the demo are displayed is functionally a social relaxation area. Some other demos separate in other rooms or areas as shown. Areas in office are further explained in Appendix H.

As the spatial condition is not regular as can be seen in figures which is overall an ellipse shape, a discussion was conducted for floor planning suggestion with 2 other design students having architecture design background. The two main insights are as following:

- The space conditions is not regular, where shall first determine the ideal exhibition experience, and then compromise with the space

- Crowds may gather or disperse, and the location should be relatively concentrated to maintain a certain order for the office environment.

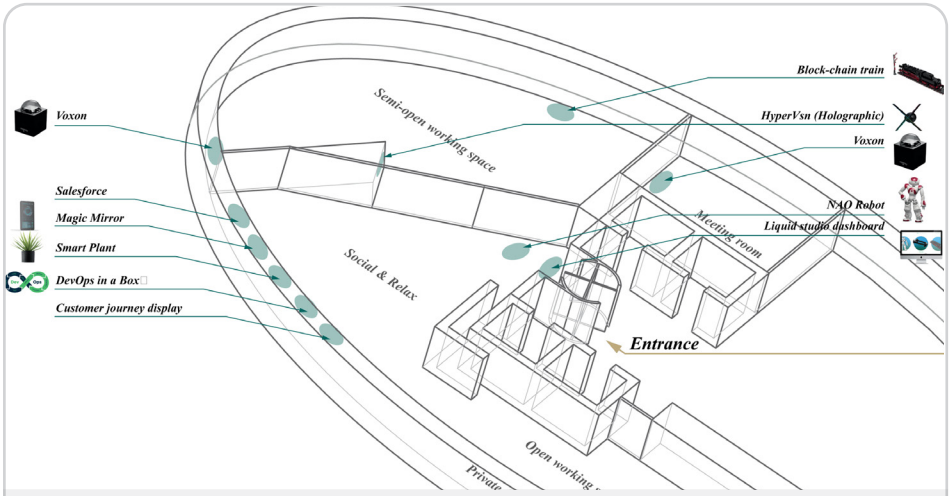


Figure 2.3: *green spots reveals placement of most current showcases around the office demo showcase*

In conclude, compare with other areas, social relaxation area is the suitable choice with following advantages:

Flexible for internal activities
Internally, people chat and rest in this area, or the company holds small internal events. Demo showcases will randomly become material for people to pass the time or chat around that they are in the place within reach.

Notable for people around the office
This is a part of the furnishings that people first see after entering the company, where also visually accessible from most places in the office. This works as a communication advantage in terms of location. Image x presents the perspective as if a person just went through office entrance.

Main movement routes
As indicated with grey arrows in figure 2.4, people are free to gather or separate here, and will not affect much to work activities happening in other areas. Therefore, though the visit flow may potentially cause busy situations at the area, it provides enough flexibility for being manageable.

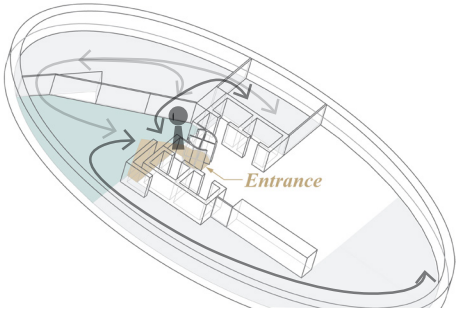


Figure 2.4: *main moving routes in the office area*

As mentioned before, there are multiple innovative technologies being demonstrated via separate set-ups. Figure 2.5 gives an overview of their current locations around the office. More info about each of them are listed in Appendix H.

Figure 2.5: *Part of demo Theme Park can be seen when first access office entrance*

2.1.3 Augmented-reality self-guiding program for demo Theme Park

As mentioned in the beginning, an augmented-reality program is proposed to be developed as a self-service tour guide for visitors throughout the visit in demo Theme Park exhibition. At the current stage, the initial idea is in game format where brings player into a story that the player as the mayor need to get a low tech equipped city upgraded by completing quests around the demo showcases.

Conceptually, each building or area in the virtual city needs a specific technology to get upgraded which corresponds to a certain showcased demo setup in demo Theme Park. By selecting each building in the virtual city, the payer will be led to a demo to activate a game quest that explains the demo. By completing a quest, the player shall be educated along to understand the technology the demo demonstrates. Afterwards, as a reward, the building will be visually upgraded into a new version. It is currently considering as an individual game program, which may be further developed to support group using contexts.

The development is initiated as a mobile application which means, in using scenario, it requires visitor to download and install the app to their own device for accessing to functions if needed. Augmented-reality interactions would be realized by camera recognition that it use camera for identifying or verifying certain visual in the environment for activating linked interfaces in the screen. It visually displays as a layer of added information to the environment of reality.

Discussion - the function carrier

From experiential perspective, the mobile application on personal device may not be the best solution as the carrier to support the functions. However, considering the investment on time and cost for current development which is at the first stage, this shall be a proper choice to get the project be initiated for first stage iterations. There can then be potentials for get the interactions be extended on other carriers, such as AR glasses. A relevant research will be reported in Chapter 4 for further discussions.

2.1.4 Demo Theme Park as an information platform

Liquid Studio as the information source need to spread their knowledge effectively to their audiences. In general, the Demo Theme Park can be considered as one of the platforms that explaining themselves to be understandable that it present to bring out prepared information. By showcasing the exhibition, it is more emphasized on technical innovations that the technologies are showcased for introducing the technical services behind them. Demos are not presenting as products, but as carriers for showcasing Liquid Studio technical innovation capability on each corresponding technology topic.

Expert engineers continuously be responsible for demo development and iterations. Internally, most relevant research and development works are being done by interns, while full time employees respond more on client projects. In this case, updated information on new discoveries and innovations from interns can be expected internally once a while by doing internal presentations. Externally, information spreads mainly realize through Internet channels. Information synchronizes on Liquid Studio official website and social media accounts to be available for their public audiences that as an effect to let Liquid Studio be timely accessible.

2.1.5 Relevant information platforms

The company promotes interdependence between internal and external information platforms where potentially forming an information transmission network among each other. For example, as mentioned, demo theme park information is planned to be adaptively synchronizing to the Liquid Studio official website corresponding pages. Therefore, though demo showcases can only be exhibited internally and located physically inside office, useful information could still be partly brought out to external audiences.

The demo exhibition as the focus, for relevant comparisons and discussions, an investigation among Liquid Studio information platforms was executed. Among a number of channels, another two platforms which are more relevant to demo Them Park were selected:

Liquid Studio (NL) official website
The official website serves as the company's external window, it is accessible for everyone from most mobile devices. It is adaptable for mobile phones, iPad, or computers. It provides general information and communication channels, including pages of homepage, service, demo Theme Park, about us, and contact (Liquid Studio, 2020).

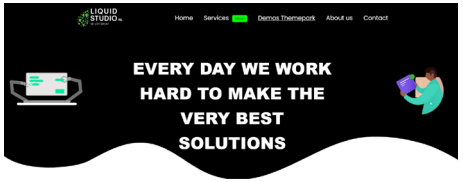


Figure 2.6: *Demos Themepark page in official website (Liquid Studio the Netherlands, 2020c)*

In demo Theme Park page, it can be expected as an overview where lists available demo that are showcasing inside the Accenture Liquid Studio Utrecht office. It is currently officially operating, but still under development to be redesigned into a more interactive version for website visitors. Figure 2.6 is a screenshot of the current page for demo Theme Park. A full page of the current version and Hololens page as an example can be found in appendix F.

Liquid Studio (NL) dashboard website
Dashboard website, as one of Liquid Studio's information platforms, it displays technology topics and projects that are within the scope of Liquid Studio technical explorations. The website is for internal use only. For non-Accenture internal employees, it will only be available to get access during their in-house visit, through the large touch screen presents inside the office.

As the current situation, It is currently still under development as a prototype which is not fully online. There are five main pages which are showcases, projects, ideaboard, badges, and leaderboard. It serves as a dashboard that displays and evokes internal innovations and communications for Liquid Studio (NL).

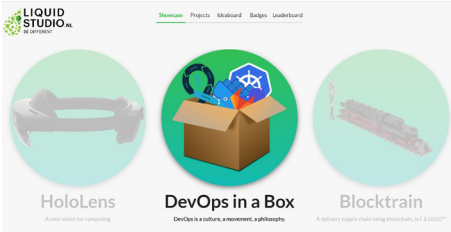


Figure 2.7: *Showcase page in Dashboard website (Liquid Studio the Netherlands, 2020b)*

Refer to website content, where makes it rather relevant to demo Theme Park is that it showcases technologies in parallel. While demo Theme Park provides the physical demonstrations to get technical information more tangible communicated, the dashboard explains showcases as projects which can be a more informative way by explanatory paragraphs and relevant info elements such as development team members and project status. Projects may also be sync to Liquid Studio official website corresponding pages (Appendix F). Additionally, when there is a correspondence between a certain project to a physical showcase in demo Theme Park, it informs the visitor from interface and provide the in-house navigating instruction to suggest a visit.

2.1.6 Internal and external visitors

To direct further research and design activities, insights around stakeholders plays important role. By desk research and interviews, an internal research was executed to identify if there are certain audience groups that are more targeted among the public from Liquid Studio's perspective on serving those information platforms which includes the demo Theme Park as the focus of this project.

Visitors, visitor groups, and organizations of visitors as stakeholders

Stakeholders can be individuals, groups, or organizations. For certain project, they can be recognized as if the outcome of the project would be impactful to them or not. As the journey around the exhibition as the product to be developed in this project, visitors, visitor groups, or the organizations behind the visitors can be considered as stakeholders. As visitors, they experience the journey in the first place, and afterwards themselves become influential that the groups or organizations behind them are being impacted indirectly.

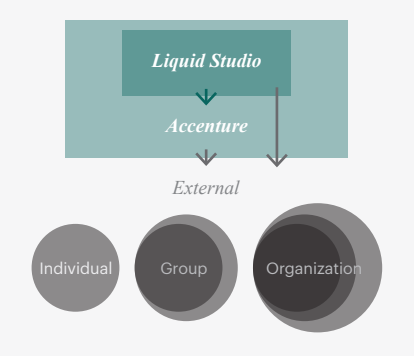


Figure 2.8: *Possible impact flows when consider Liquid Studio as the analysis basis*

Multiple people are impactful involved, and they may present various identities in different social contexts. When consider Liquid Studio as the focus to analyse these stakeholders, they can be summarized as in figure 2.9 while figure 2.8 reveals basic impact flow possibilities. People may come and visit individually or in group, but as individuals, they are also representing the groups or their organizations.

Internal visitors

Internal visitor is mentioned as all employees from Accenture who are potentially the visitors to Liquid Studio for the exhibition visit, includes employees of not only Liquid Studio, but also other departments in Accenture. In this case, information platforms contribute to internal knowledge alignment and exchanges.

For internal Liquid Studio, via information platforms under a technical innovative environment, technology experts present out their own findings to their colleagues. On the other hand, they also learn and get inspired from various technical fields that are other than their own topics to absorb new knowledge.

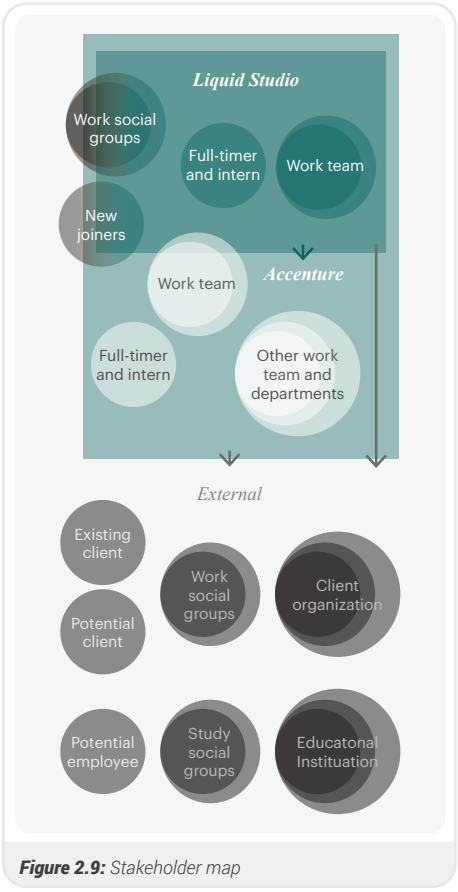


Figure 2.9: *Stakeholder map*

Additionally, as a part of Accenture, it is also for other departments and subsidiaries colleagues to learn about Liquid Studio. To some extent, they can be considered as internal potential clients and employees that external Liquid Studio and internal Accenture, there are collaborations or work adjustments among departments.

External visitors

Externally, there are basically two big categories base on their visit initiations. One for seeking business collaboration success with Liquid Studio, and the other for getting their career be started in Liquid Studio. These visitors as external visitors have their main communication base outside Liquid Studio which means, as mentioned at the beginning of this chapter, there is the potential that the visitors carries the information afterward and brings the impact further to their own context.

Personas: Scoping for more in-depth study

As part of the initiation of the project, five personas were made by Liquid Studio. They can be found in appendix E. The following paragraphs describes how they are suggesting targeted visitor groups in brief:

For those potential visitors as potential new joined employees and employee candidates, they shall be aiming for get their career better initiated or further developed by understanding deeper to Liquid Studio. Among the personas, Paul is representative as a 20-year-old new joined intern in Accenture Liquid Studio.

The two personas represent internal visitors from other Accenture departments are Melissa and Abraham. They base in different offices of Accenture the Netherlands, and with different profession backgrounds. Abraham is more technical as he works as a developer in Accenture technology division base in Utrecht where located the demo Theme Park, while Melissa has a rather weak knowledge basis in the field of technology as she is in the department of strategy base in Amsterdam.

As for client perspective, there are also two personas, Stephanie, and John. The main difference between the two is their expectations on depth of information the exhibition delivers. John as an architect in his own company that he expects more in-depth understood to be relied on by his own colleagues. Stephanie as a manager aim for finding any possibilities in Liquid Studio that are meaningful to her own company. For technical concerns, she relies on her colleague who is more in the field to join the visit together.

Insight - Differentiation as the key factor on visitor investigations

As the project manager mentioned during the online interview, there is no certain preference for Liquid Studio to select client companies among various industries. As introduced, "Liquid Studio helps businesses reach customers and enter new markets" (Liquid Studio the Netherlands, 2020a). As part of Accenture, their business covers 19 industries includes Aerospace & Defense, Automotive, Banking, etc. (Accenture, 2020b). They are aiming to be helpful for any company with technical innovative capabilities that supports client organizations in need, which is suggested from their costumer profile in design guide as well (Appendix X).

"Basically, we serve for all kinds of companies, not only telecommunication or high-tech industries as it seems to be. For example, it is possible that our client is a retail store that we may help them on building a more effective and customer-friendly shopping journey. To achieve this, maybe digitalizing certain part of the journey that our technologies can realise an upgrade of their previous solutions", said the project manager.

Additionally, when focus more to the exhibition, the five personas (Appendix X) as provided from Liquid studio reveals a variation on visitor ages, profession backgrounds, and visit expectations. Hence, it is a valuable factor to be considered when selecting participants for further research and analysis that the higher level of diversity among the participants, the more preferable. For deeper understandings, further researches were conducted both internal and external Liquid Studio.

INTERNAL SURVEY - Demo theme park evaluation

Evaluation on performance *of the demo Theme Park was conducted from an internal qualitative survey. Due to the worldwide corona situation, the research was fully online that executed remotely via online interviews and online questionnaires (structured as figure 2.10). The research questions were aimed to be answered from the following three aspects:*

1. to evaluate the current effectiveness of the exhibition that what do visitors expect and to what extent their expectations are fulfilled

2. to understand how the exhibition is expected by combining the AR technology as an upgrade to the overall visit experience

3. to identify the value of demo Theme Park as the information platform among the selected three (Theme Park, official website and dashboard website)

The research was started from one-on-one interviews for collecting qualitative data, and also for conducting an effective online questionnaire. The 8 interviewees include demo developers, technical engineer experts, marketing employees, demo Theme Park visit host, and dashboard website developer.

Online questionnaires were sent to all intern and full-time employees in Accenture Liquid Studio the Netherlands. 17 samples of 9 interns and 8 full-timers were collected out of 31 in total (12 interns, 19 full-timers). 13 of them visit demo showcases regularly or sometimes while others have never got an actual experience to the theme park.

Interviewees are listed in table 2.1 as below for external interviews. More details and insights will be further explained along analysis base on both internal and external investigations in the following chapters in relevance accordingly. See relevant materials, such as interview scripts and raw data, in appendix B.

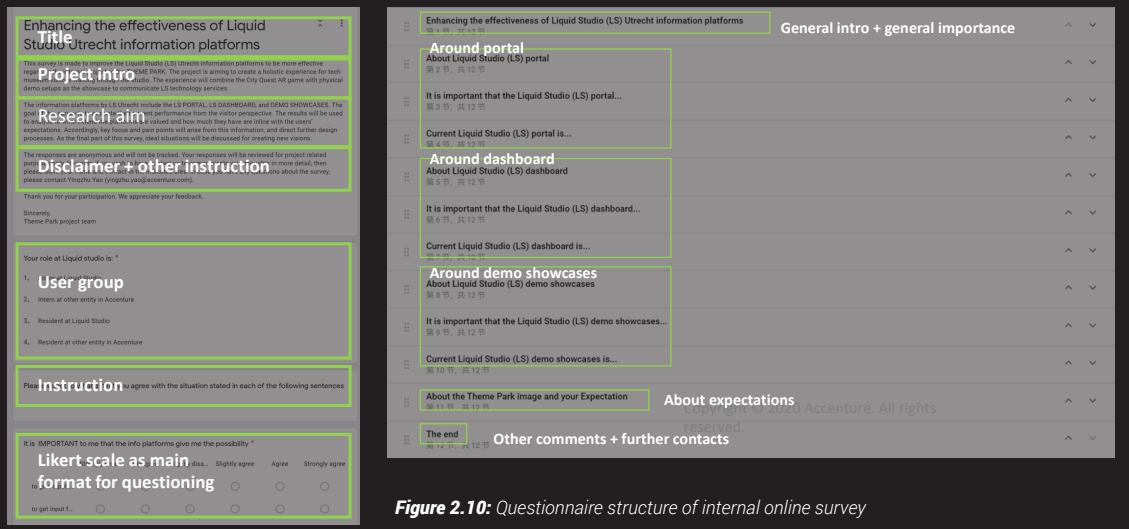


Figure 2.10: *Questionnaire structure of internal online survey*

EXTERNAL INTERVIEWS - Business in-house visits

To learn from outsider's understanding *around such a tech theme business in-house exhibition visit, interviewees as potential visitors were reached from both professional and business perspectives. Refer to their own experiences which are relevant to the project context, three research questions were attempted to be answered along one-on-one online interviews:*

1. Why would they join an in-house visit to a company?
2. What would they expect from a business visit?
3. How do they remember the visit flows in general?
4. What made the visits valuable and what could be the influential factors?

The 5 interviewees include 2 of them be considered as potential employees from career initiation perspective, and 3 as potential clients as if they attempt for any business opportunities. With consideration of the variation among participants, they are studying or working in different industries. Each of the participant have had at least one experience in joining business visits.

Interviewed potential visit participants as **potential employees**

Profession	*Computer science*	*Industrial design*	*Marketing Management*
Role in society	*Master graduate student*	*Freelance product designer*	*Master graduate student*
Location Base	*Los Angeles, USA*	*New York, USA*	*New York, USA*
Gender	*Female*	*Male*	*Female*
Age	*24*	*24*	*25*

Interviewed potential visit participants as **potential clients**

Profession	*Shoe design*	*Jewellery retail business*	*Electronics Engineering*
Role in society	*Vice president of regional operations, Footwear group*	*Chairman, Jewellery company*	*Electronics Engineer, Semi-conductor company*
Location Base	*Northeast area China*	*Jilin&Shenzhen, China*	*Colorado, USA*
Gender	*Female*	*Male*	*Male*
Age	*45*	*53*	*52*

Table 2.1: *External interview participants*

2.2 SITUATION ANALYSIS AS PART OF INFORMATION CARRIER

Within the project context scope, analysis shall be focused to the targeted aspects for useful insights. According to internal and external researches, the insightful analysis and discussions are presented in this chapter on current situations.

2.2.1 Information carrier for purpose-driven visit

Realizing knowledge transfer in context

As shown in figure 2.12, it illustrates functional relationships among exhibition stakeholders with the three relevant information platforms. The basic effect the information platform to offer is to support informational flow of Liquid Studio. They are important on getting knowledge be exchanged internally and externally. Platforms as information carriers are made to help both insiders and outsiders. In addition, as a consultancy, the company employees may also to some extend are functional as a type of information carrier, as human resource, that outsiders can expect to obtain information from them.

Supporting purpose-driven visits

For a fast-growing consulting company, the external visitors from Liquid Studio perspective are usually their potential clients, potential employees, and current clients. For these visitors, it is normally business purpose-driven that attempts that motivates them to execute the visits suggests business purposes in the end. As shown in figure 2.13, it presents relations among their purposes. Potential and existing clients are aiming for optimizing business success with Liquid Studio, as for potential employees, the business purpose may be less direct that they shall realize that through career paths.

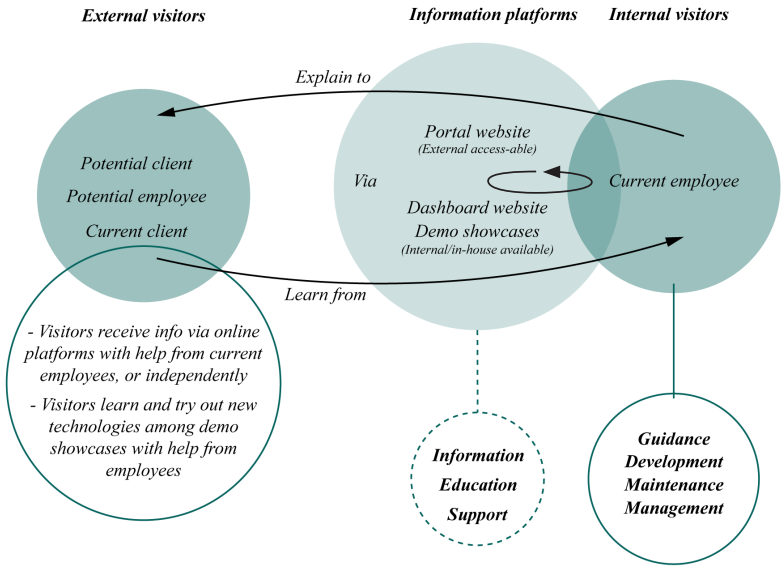


Figure 2.12: *Illustration of stakeholders mapping with information flow via platforms*

The information not only flows from internal to external for knowledge sharing, but also benefits internally by internal knowledge exchanging and aligning. The employees are the internal visitors. As internal personnel, they are more closely related to information platforms. Especially the indoor demo theme parks. Demo visits are more limited in location when compare to websites with much higher accessibility. Internal visitors in this case attends the exhibition with more frequency and randomness.

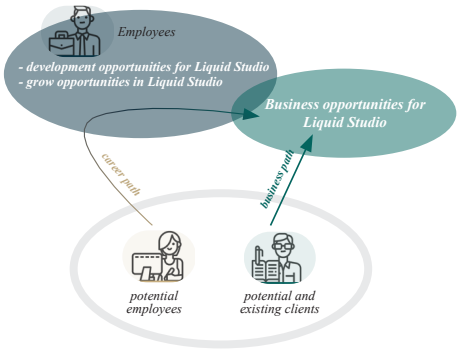


Figure 2.13: *Business-driven purposes*

In general, apart from random visits to relax or use the platforms on deliver certain information to external audiences, when there is a clear motivation to visit those, it tends to be the aim to find any new visions that can bring new business opportunities. Before involving clients, internal learnings and explorations shall happen in the first place, especially when Liquid Studio proposes new innovations. In addition to making technologies be recognizable into using cases, as the mission of Liquid Studio, internal growth is also important in meeting new business challenges. Compared to employees in other parts of Accenture, Liquid Studio technical experts present stronger visit initiations on Liquid Studio self-developments.

Comprehensive analysis among the three information platforms

As a mater of fact, since the three relevant platforms have not yet been fully developed, a comparative comprehensive evaluation has been carried out to generate stronger insights The questionnaire mentioned in the internal survey not only included the evaluation of the demo Theme Park, but also conducted the same process research on the other two related platforms to collect parallel data for horizontal comparison.

Although the development of the three platforms is not yet complete, the interviewees have some experience in using their existing versions. They can put forward corresponding evaluations and prospects based on the respective media properties, main functions, operating concepts, and interrelationships of the three platforms. This also has a certain value for reference.

As mentioned, the info to convey about demo Theme Park is mainly for technical explanation, and its significance is to promote the extension of subsequent communications that are beneficial to business achievements around technologies. Multiple platforms adapt to different environments according to their respective carrier formats, and play a role in the feasibility and effectiveness of communication. Multimedia complements each other's limitations in their respective forms and can effectively cover the corresponding demands of a wider range of information recipients. When a digital platform is used as a medium, it is highly adaptable to usage scenarios. Although physical platforms have relatively limited spatial conditions, the richness of experience information is also critical in terms of communication effects.

It can be seen that the three platforms jointly improve the description and dissemination of the R&D and application behind each technology in different aspects. As the main external window, the official website serves the relatively peripheral people. Therefore, the introduction of each technology is often more conceptualized, with clear focus and easy to understand, which makes people arouse in-depth interest. The development of Dashboard is more inclined to serve internal communication. Al-

though it is more in-depth than official website, it is designed to facilitate understanding and communication, stimulate discussion and innovation, and guide the generation of new values. For demo Theme Park, experience is a very important keyword. Technological innovation brings about changes, and the value of technological innovation is reflected through changes. For innovative cutting-edge technology, before it is implemented, it is the perception of its influence by stakeholders. From basic concepts to the emergence of possibilities, these can be regarded as a kind of foreshadowing before the realization of value. The physical model describes this change more tangibly, demonstrating the partial realization of its value. In this way, it can further promote the extension of communication to the landing of value.

Opportunity brings by physical demo as the carrier

The application of cutting-edge technology and the effective extension of practice are used for promotion purposes, and the early stage is often conceptualized communication and guidance. From the foregoing, it can be inferred that among the various forms of information carriers, physical demonstration has become a more driving force because of the experience it can bring.

Multiple interactive possibilities can evoke different levels of visiting experience. The theme park itself can be presented with a variety of interactive interfaces, such as physical, digital, augmented reality, etc. A variety of interface forms can be appropriately matched with a variety of information elements to have the opportunity to allow visitors to experience a rich learning experience. This is also a favourable platform for the practice and experimental expansion of multiple available technologies at the application level.

It is worth mentioning that the augmented reality self-guided project is being initiated and developed in Liquid Studio as an enhancement to demo Theme Park. On the basis of the real environment, augmented reality is used as a conceptual technical support. By adding a virtual information layer and combining virtual and real information elements, the means of conveying information can be enriched in the form of mixed reality. This attempt will have the opportunity to magnify and activate the physical demonstration space to a greater extent as a technology information carrier.

Although the official website and Dashboard are digital information platforms that simultaneously share the information of the demo Theme Park and break the space restrictions for some information recipients, the experiential information originally brought by the tangible space will inevitably be lost. For more insights on the other two platforms, appendix F presents the summary of a triple SWOT analysis among the three mentioned platforms.

Promoting valuable communications

As mentioned earlier, although the various motivations from the company and various visitors are discussed separately, in general, their fundamental need is to promote an effective flow of information, though serving their business goals respectively.

As described in the context map (Figure 2.14), the value of technical resources and materials for the company is waiting to be discovered. They can guide visitors to accept the information and activate the value through proper display. On the other side, as visitors, they intend to absorb beneficial resources in the process of understanding Liquid Studio. When a certain consensus is reached between the two parties, it marks the effective advancement of the goals of both parties and is conducive to the realization of subsequent joint development. It provides assistance for this, as a platform for the presentation of the information content being discussed and communicated.

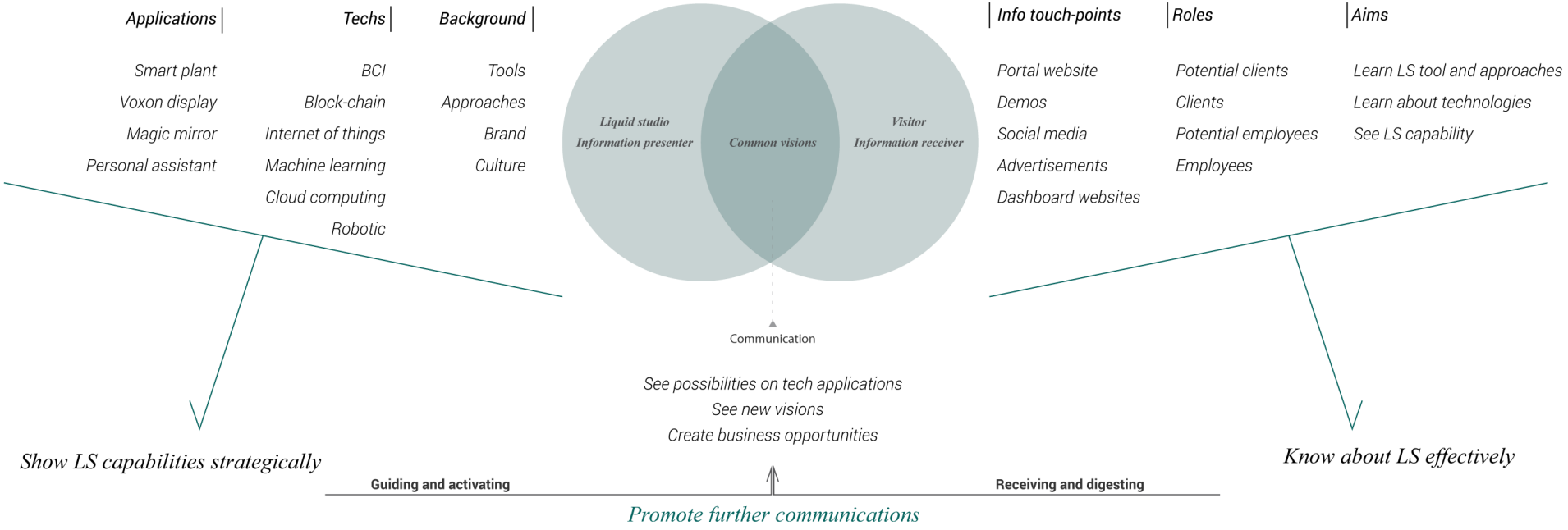


Figure 2.14: *Illustration of context mapping refer to purpose-driven visits*

2.2.2 Analysis on information value

23 specific needs of visitors are collected as a base to analyse according to personas (appendix E). Verified and supplemented together with interviews, the 23 user needs are categorized into 6 motivations which are matchable along the value hierarchy (generated base on DIKW information hierarchy) as shown in figure 2.15. DIKW stand for the four layers of the information hierarchy of data, information, knowledge, and wisdom according to Rowley (2007). The analysis process can be found in appendix C.

The visit value is derived from the four levels from bottom to top: collecting materials, establishing associations, organizing information, and applying knowledge. consider to the context, the four levels reveals a potential that the higher the level, it suggests more value in business perspective, while a study value comes up more from the lower levels.

Business value and learning value

According to the 23 needs in specific, the upper layer reflects realizable visions and applicable values of the technologies or knowledge. In terms of the low layers, the needs are more at a practical level which values along the process rather than a result. This suggests a learning or study value.

More in specific on business value, it comes from the discovery, extension and implementation around technical research and development. This generally includes new tech application visions, new service opportunities for clients, new attraction point to customer groups, new discoveries that inspires Liquid Studio research and development capabilities, etc. Visitors such as clients and employees from other departments tend to visit for these needs. This reflects an initial visit value expectation on a higher level according to the value hierarchy.

From a certain perspective, learning value can be regarded as the basis of business value, which can also be reflected in the value hierarchy. The lower the value level, the weaker the sense of commercial value it suggests, while they gradually advances the upper-level layer by layer. Bottom-up demand often comes from new employees or interns. They are more flexible and willing to absorb a larger range of knowledge. At the moment, their sense of purpose in business is relatively weak. "I'm doing research on brain-computer interfaces application for coffee machines. I don't really know whether it is valuable, but this is what I can try for now. After all, I'm still learning," said an intern of BCI (brain-computer interface) technology research and development in an interview.

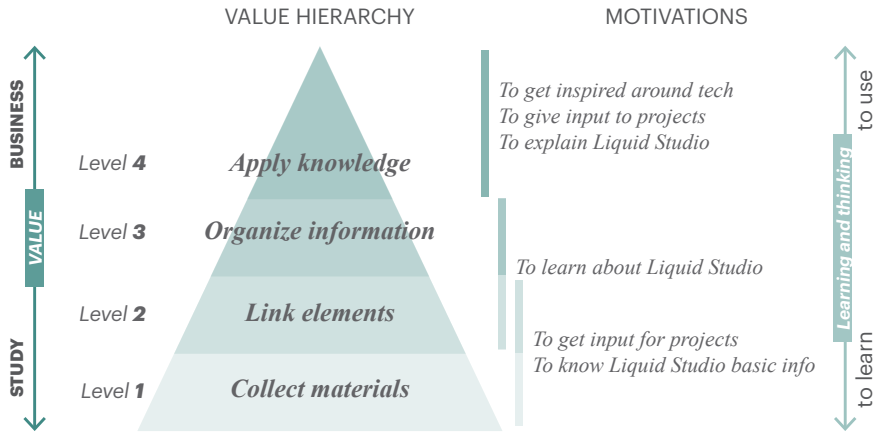


Figure 2.15: *Visit value hierarchy from information perspective*

Bottom-top for making info useful

The bottom layer is for understanding the basic situation around Liquid Studio, which is shallow but from various aspects, such as which projects and technologies are under development, which methods and tools are commonly used. These as info pieces will form an interconnected within visitors thoughts together with their own knowledge backgrounds. The context may be influential on how the interconnections would be linked, and whether the links could become useful in terms of the visit purpose.

Top-bottom for making info supportive

The top layer is about the application and feasibility of technologies. Base on the info in sight, it requires a extension that the value are obtained beyond the original information. In this case, this require the knowledge basis be supportive enough. When a higher level value as the requirement, but certain supportive elements is missing for get the value become feasible, it then need lower level values be fulfilled accordingly which reveals as a top-bottom pattern:

Migration of value during visits

For example, Stephanie, the client visitor saw the using case presents aside the smart plant showcase very attractive to her in a desired vision that she always complain on the paying for the labour cost on taking care of those plants inside her company offices which are almost invisible for her. She wants to get it immediately, however, it is so easy for her to have the desired vision framed in her mind, but not a specific clue for whether it is feasible to happen practically as how she imagined. How much is the technology? How much time is needed till the plants can be completely installed? To what extend the pot is smart that how much labour she can save from having this? Within this scenario, a top-bottom migration along the value hierarchy shall happen along Stephanie's visit around the smart plant technology to get those questions answered for herself.

The example above is framed based on the 3 one-on-one interviews with participants who are considered as potential client visitors. The focus was mainly on in-house visits or on-site exhibitions rather then online visits. During the interviews, they were asked to describe their previous business journey experiences, and then the key things that they were searching for along the tours. In conclude, it is to find the match point from what others can offer with what they needed. "It is the same logic as buying stuff to your house. If I think a wall is too empty, therefore I wish to buy a paint for it. and once I saw a suit one, it will immediately appear on that wall in my mind. Though still have concerns, but then is how to deal with those to make it work rather than turn away to other options" said the second interviewee.

In conclude, value migrations are possible to happen along the journey and not always bottom-top but may also top-bottom requires. However, to finally get the highest value be realizable, it should be supportive from bottom to top, though not necessary start from a lowest layer. In figure 2.16, it illustrates the common path of a overall value hierarchy into steps. As promoting business is the common goal as analysed, it is based on a bottom-top migration where the highest level as the end of the path.

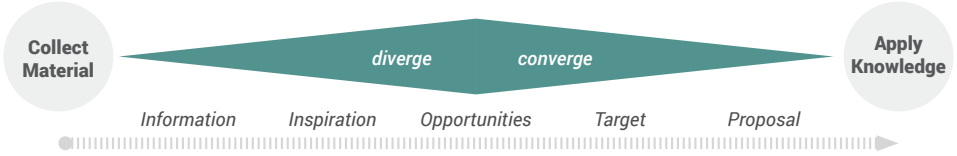
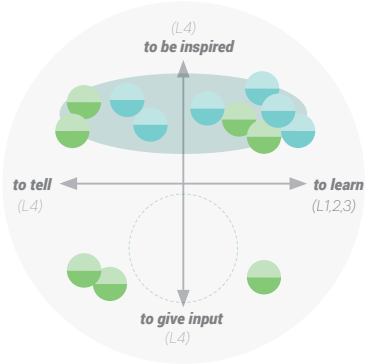


Figure 2.16: *Information bottom-top migration path in steps*

2.2.3 Further analysis on visitor motivations and purposes

Motivation analysis

From analysis, visitor motivations can be concluded into four categories around Liquid Studio context which are *to learn, to tell, to give input, to be inspired* in general. A simplified version is shown in figure 2.17 where green bubbles are internal groups of visitors and blue ones are externals (appendix C in detail and analysis in process). It reveals a lower demand from visitors on using such an info platform for giving inputs among the four.



*L=Value level in value hierarchy

Figure 2.17: *Types of visitors map with motivations*

It can be seen that the green bubbles separately show up in all four phases where blue bubbles covers only the upper two. This suggests a difference between their motivations due to their identities where they are there as a insider or not.

In short, internal visitors need the platform support both their learnings and expression that they bring themselves from an audience to a host. This is beneficial for both their purposes on external business and internal development opportunities. They can then be inspired to give input for their serving clients and developing project.

On the other hand, for external groups, they are at the exhibition mainly to learn and to get inspired to obtain enough information in the first place. They tend to act as pure audience that their knowledge base around Liquid Studio has not being built supportive enough for reaching their purposes. Additionally, some of them may also have a need as a presenter after their learning, such as John (persona John, appendix E). He has an external identity as an architect in Liquid Studio client company. His colleagues will rely on his professional background as their internal host in a sense for his stakeholders.

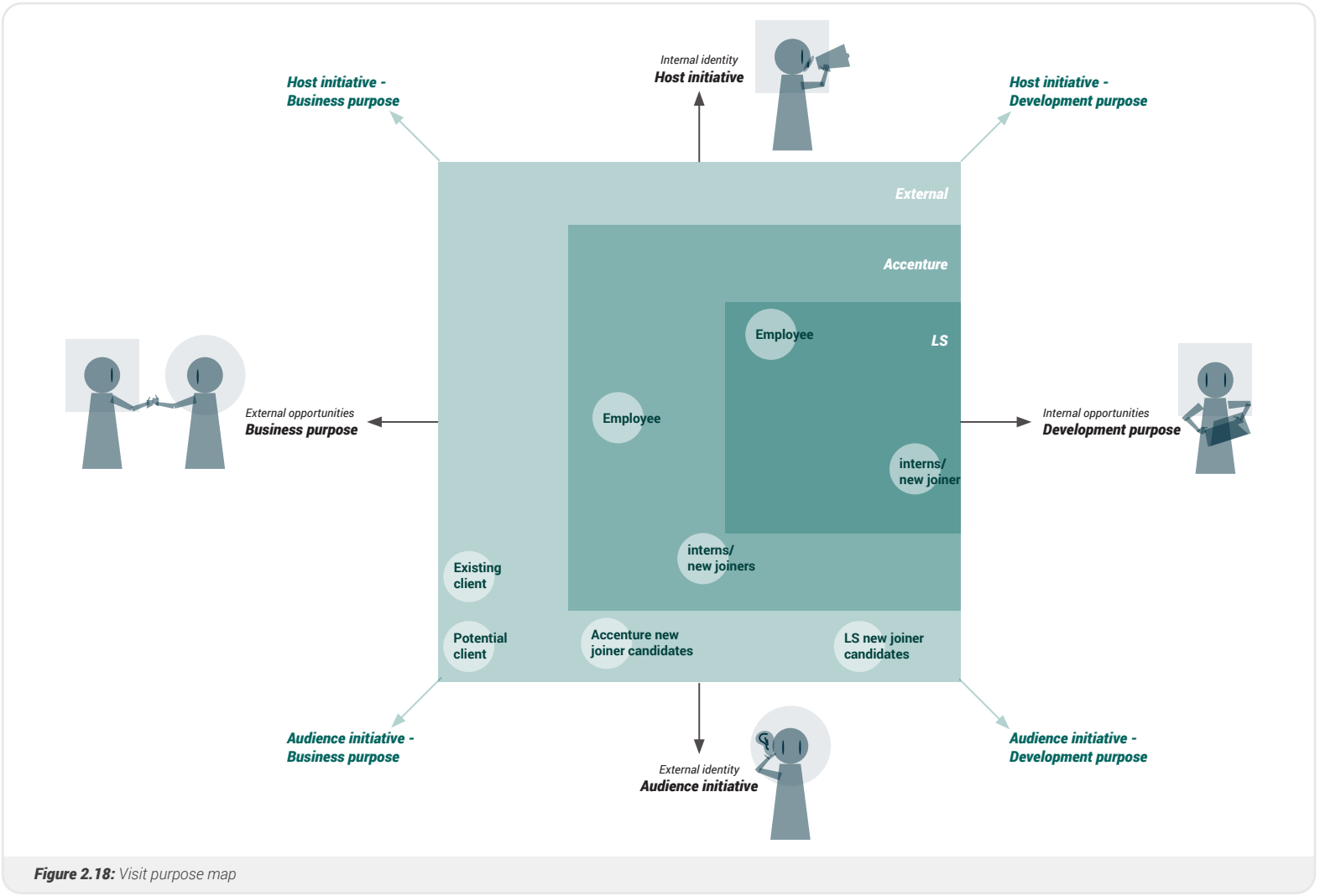


Figure 2.18: *Visit purpose map*

Purpose analysis

This lead to a further analysis on their purpose where conducted into a visit purpose map by visit purposes and visit initiations (figure 2.18). Visit purposes on the scale are defined as external business and internal development opportunities. The other scaled for visit initiation as a host or an audience. Insights are gathered as shown in the next chapter.

2.2.4 Key insights

According to the purpose map, insight were carried out as shown in the following table, regarding the direction of information flow (figurer 2.19), the perspective of communication (figure 2.20) and the intention of visiting (figure 2.21). In the table below, the original map is simplified. Generally, the parts in green are emphasized.

Opportunity on knowledge feedback
Thick grey lines divide the map in figuer 2.19 into three columns along the purpose axis were from left to right, where visitor groups gradually differentiating their visiting purpose from business to development opportunities. The white solid arrow indicates the direction of information flow that already exists, while the green dashed indicates the flow currently missing.

Here the arrows reveal the analysis across the divided groups where information flows inside out from both Liquid Studio and Accenture till finally reach to external people. However, information from external groups flow outside in which is currently missing are also valuable as discussed in previous chapters. Here in this case, it present as an opportunity.

No knowledge transfer from same perspective for client visit groups
The two grey lines kept the same for dividing them into purpose different larger groups but the arrows in this graph indicates the information flow direction within the groups in figure 2.20. Regarding the smaller visitor groups which the white bubbles indicates, information along the vertical axis reflects communicative perspectives within each larger groups.

In therms of the middle column, when bring in the context, the white arrow stands for the knowledge transfer from internal Accenture employees to Accenture new joiners candidates. The communication in this case is considered as an information flow from a high level of relevant experience to a lower level which is on the same perspective for joining the company For Liquid Studio context, the story is similar. However, on the other hand, for client group in the left column, this type of communication is missing for now.

Audience initiative visits more
In this graphic (figure 2.21), the division line separate the map horizontally along the visit initiative axis. Compare the number of visitor groups with in and out the green box, it reveals as a result that more visitor groups are there initiated to visit as an audience rather than the host. Therefore, it is important to consider more on matching requirements from audience perspective as an enhancement of the exhibition effectiveness.

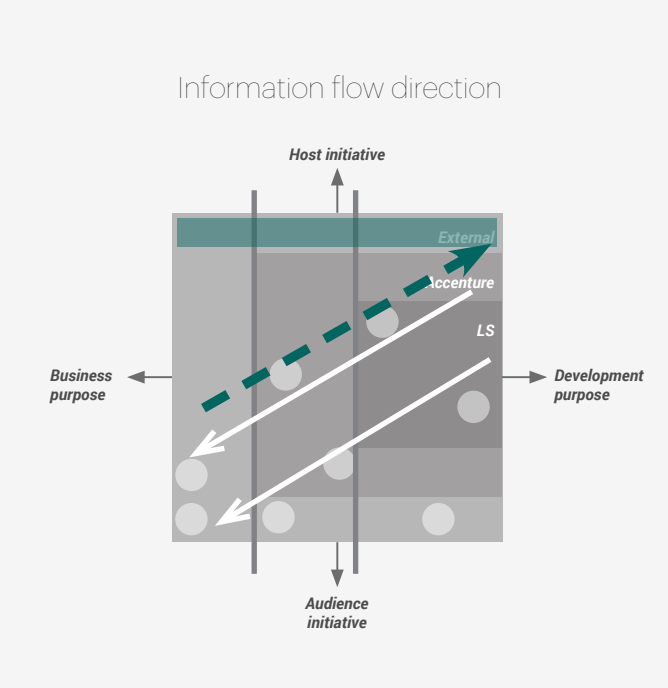


Figure 2.19: *Opportunity on knowledge feedback*

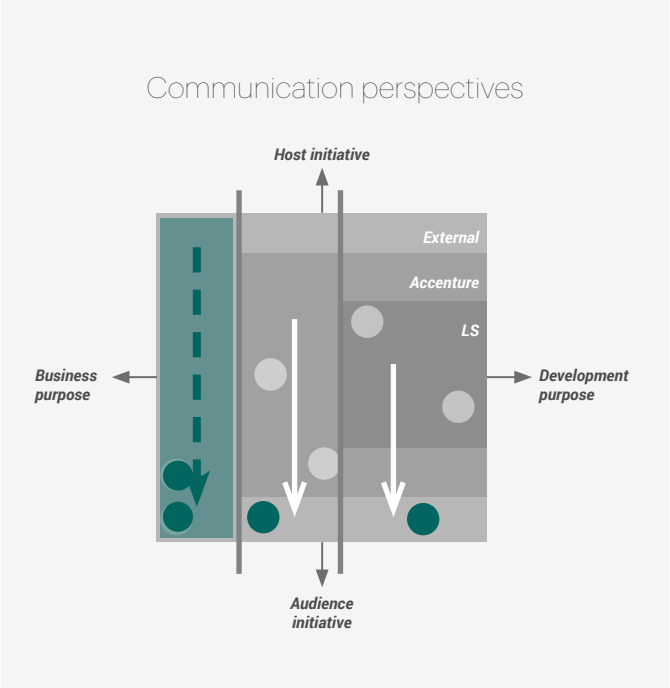


Figure 2.20: *No knowledge transfer from same perspective for client visit groups*

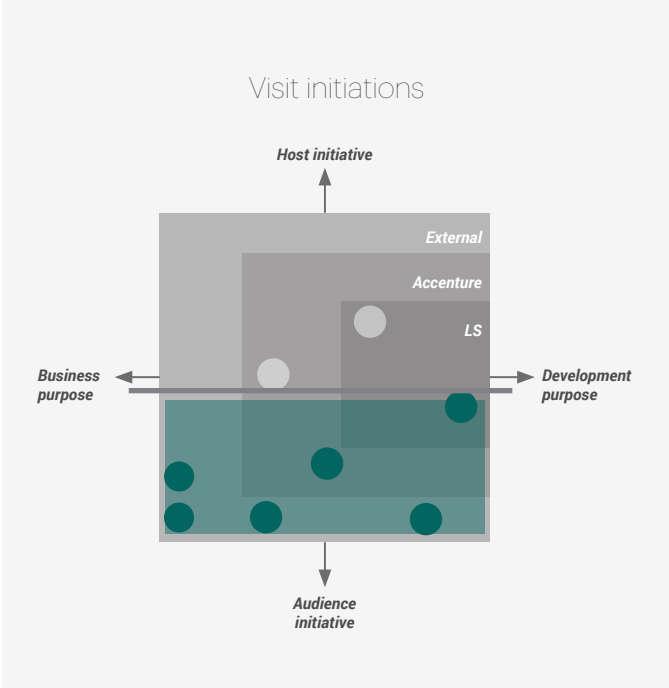


Figure 2.21: *Audience initiative visits more*

2.2.5 Current effectiveness and performance

In order to evaluate how the current platform performs, the research activities is executed as mentioned in the last chapter. It was the internal survey that external users have no experience none accessibility to the set-ups, especially under corona situation. The evaluation result presents in this section is all around current demo showcases.

There were 17 responses from online questionnaires in which 13 of them (6 interns, 7 full timers) visit the demo showcases sometimes or regularly, while the others had no much experience about the Theme Park at all the the data were not processed.

The questionnaire was made base on Likert scaling method (Mcleod, 2019). The 23 visitor needs in specific. Each user demand point is written into statement for testers to evaluate to what extend they agree with the statement on a scale of 6 from strongly disagree to strongly agree. The sample size is rather small, so choose 6, instead of 5, to avoid neutrality for conducting qualitative insights more effectively.

Sentences were stated as: "*It is **important** to me that the info platforms give me the possibility to...* " for demand levelling, and for effectiveness, it was stated as "*The info platform **allows** me...* " for readability to the questions.

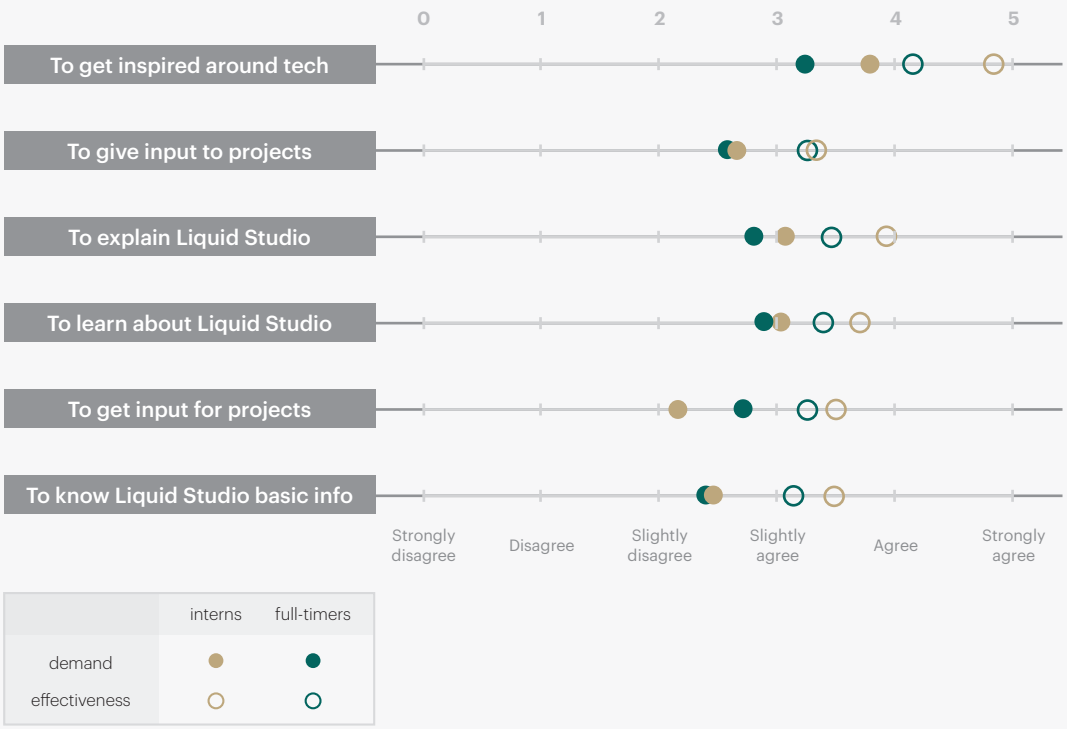
To precess the data, the scale was transformed from attitudes to numbers from 0 to 5 where 0 stands for a strongly disagree. To result in the 6 motivation categories, an average number was calculated from the corresponding groups of needs in specific.

As the platforms are keep changing from interns developments, full timers were not fully familiar with new versions of the platforms all the moments as mentioned in chapter 2.1.4. Therefore, their evaluations are considered as audience perspective rather then experts at this stage of researching. The difference between interns and full-timers is considered before data processing so that the final result reveals as chart in figure 2.22.

Base on the result, insights are analysed for qualitative analysis base on quantitative data collected. In conclude:

1. Interns rely more on info platforms for doing explanations than full-timers
2. Overall demand of technical detail is at relatively low level
3. Interns presents higher demand in general to demo then full-timers
4. Effectiveness in general not match with demand level
5. Previous and current clients, colleague specialises, and technical depth, are not much expected from demos, but still see large room to improve from current status. (see scores of each specific user need in appendix X)

In general, combine with data collected from internal interviews (insight listed as below), the current situation is sufficient but not desired that still large room to be improved which is valuable as it is important in many cases.



Insightful quotes from internal interviews:

Descriptions to the reflected current situation from visitor perspective

1. *"Because of their locations where people pass by frequently, changes can normally be noticed in short time"*
2. *"When new changes appear, I will walk over to see what happened"*

[Attractive enough by its location]

3. *"people are confusing when issues come up when try out demos, which happens quite often currently. "*
4. *"demos are not working properly for long time that people are not expecting much from them"*

[Expectation to visit is low due to untimely maintenance]

[Demo projects need further developments]

5. *"there has to be some time invest into those projects...they are completely working on their own"*
6. *"Currently, the demos need people to showcasing for conveying the information, how do they work, what do they represent, what are the backgrounds? "*

[It is expected to be self-explainable which is not yet realizable]

7. *"minor events, or just our passing by the demos, they can have a look at it, and be able to understand, what the demo is about, by themselves"*
8. *"when hold the events, they help to build the relationship between the client and us, by allowing us to explain what the demo is, how it works, what is it about"*
9. *"people need a certain topic for waiting in the queue for coffee, as well as to relax during the break"*

[The existence of demo Them Park plays an important role in various communication]

Figure 2.22: *Internal questionnaire analysis result on Them Park showcases on current level of demands and effectiveness of each motivation groups*

2.3 VISIT JOURNEY ANALYSIS ON CURRENT SITUATION

To further analyse the Theme Park at a journey level, this chapter report the analysis firstly from a larger scale for narrow down to the targeted scope. A full journey applies for all visitors is firstly defined base on research results both internal and externally.

2.3.1 Define the full business/employment journey

Refered to Liquid Studio customer journey (appendix I), considering both internal and external groups of people, adapted from customer journey mapping method (Rompuy, 2020), a visitor full journey, from the visitor get to know Liquid Studio till the end of the visitor work with Liquid Studio, is stated as in figure 2.23 (full map in appendix J).

To analysis how the infomation platform related to its context, 2 maps were conducted from research results to answer the two research questions:

***1. when** medias be functional valuable for business journey?*
***2. what** are visitors emotianl fundamental need?*

Regarding the role the Theme Park visit plays along this journey, it is important that the visitors tend to be able to decide on whether to work together with Lqiuid Studio afterwards (the end of Consideration phase). No matter as a business or employment journey, they walk through same platforms, though seeking for material feeding various motivations. Insights are summarized as illustrated below the journey (full version in appendix J).

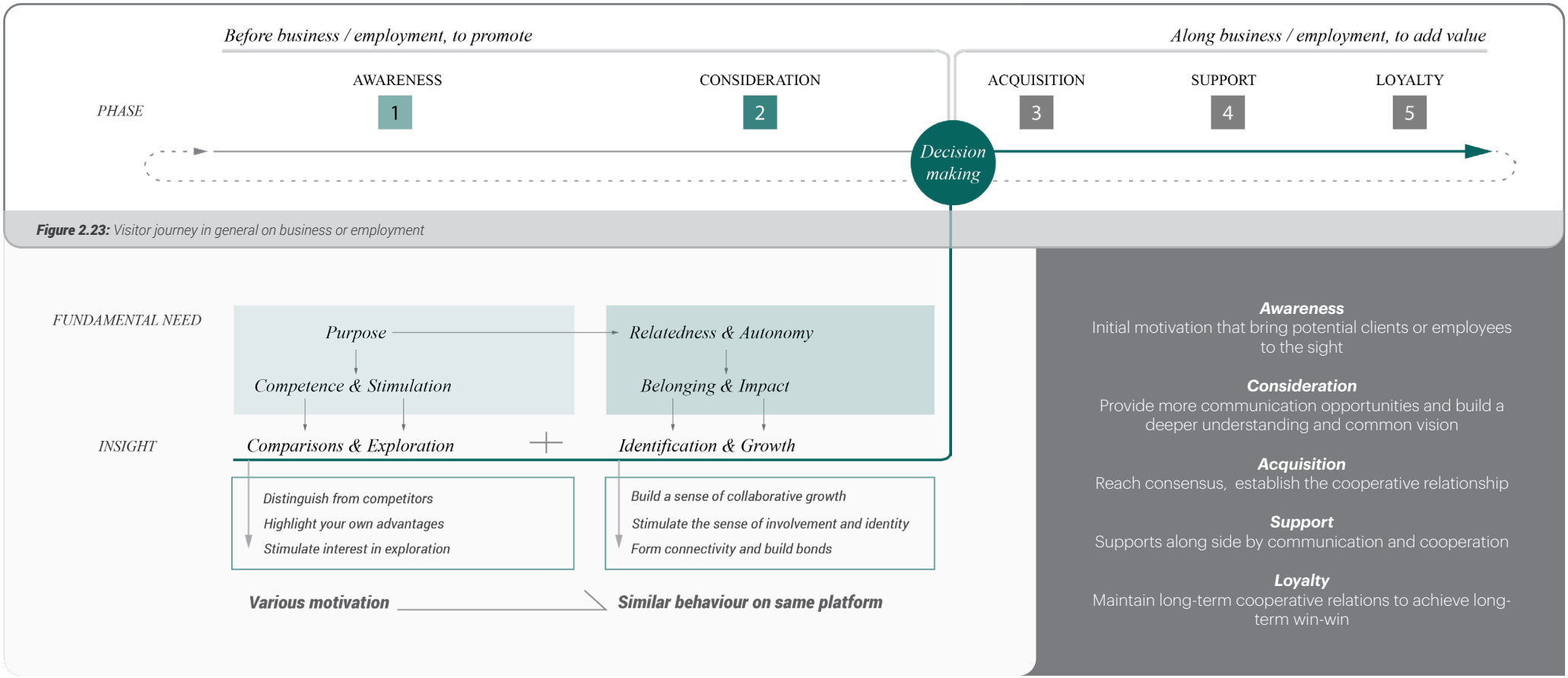


***Figure 2.23:** Visitor journey in general on business or employment*

2.3.2 Analysis on Value added by demo Theme Park

As revealed in figure 2.24 on the right, it maps info elements and info carriers to a coordinate model with three value dimensions of breadth, depth, and height which three results to the achievement value. Regarding the context, the dimentions are explained as following:

Breadth
Generally familiar, but the understanding stays at a shallow level that information are not being extended

Depth
The integration of information, systematically stimulates information receivers to be able to deconstruct information in some areas that deserves more attention

Height
Various technology demonstrations are exhibited, and the gathering of developers of multiple technologies can edify visitors and enhance his ability to integrate information and think them further

Achievements
Make use of creative innovation, take advantage of the benefits of network information platforms and physical exhibition areas, and realize value

As the dashed arrows indicates, though these values adds together for brigning out the achievements, it actully happens gradually where one base on another that experienctially through a certain value growing path. Visitors, especially external groups, the initiations of their visits normally with less infomation as needed but a relatively clear purpose in mind. In this case, the initiation is valuable as a base to be feeded where the rest of the path is aiming for achieving so. In therms of the physical Theme Park visit, it mainly contributes to Depth and Height.

As shown in figure 2.25 on the right, the full vision of values along the path is defined into 5 stages. Along the visit, the three step for achieving the goal start with information gathering, then value identifying, and finally goal achieving (decision making).

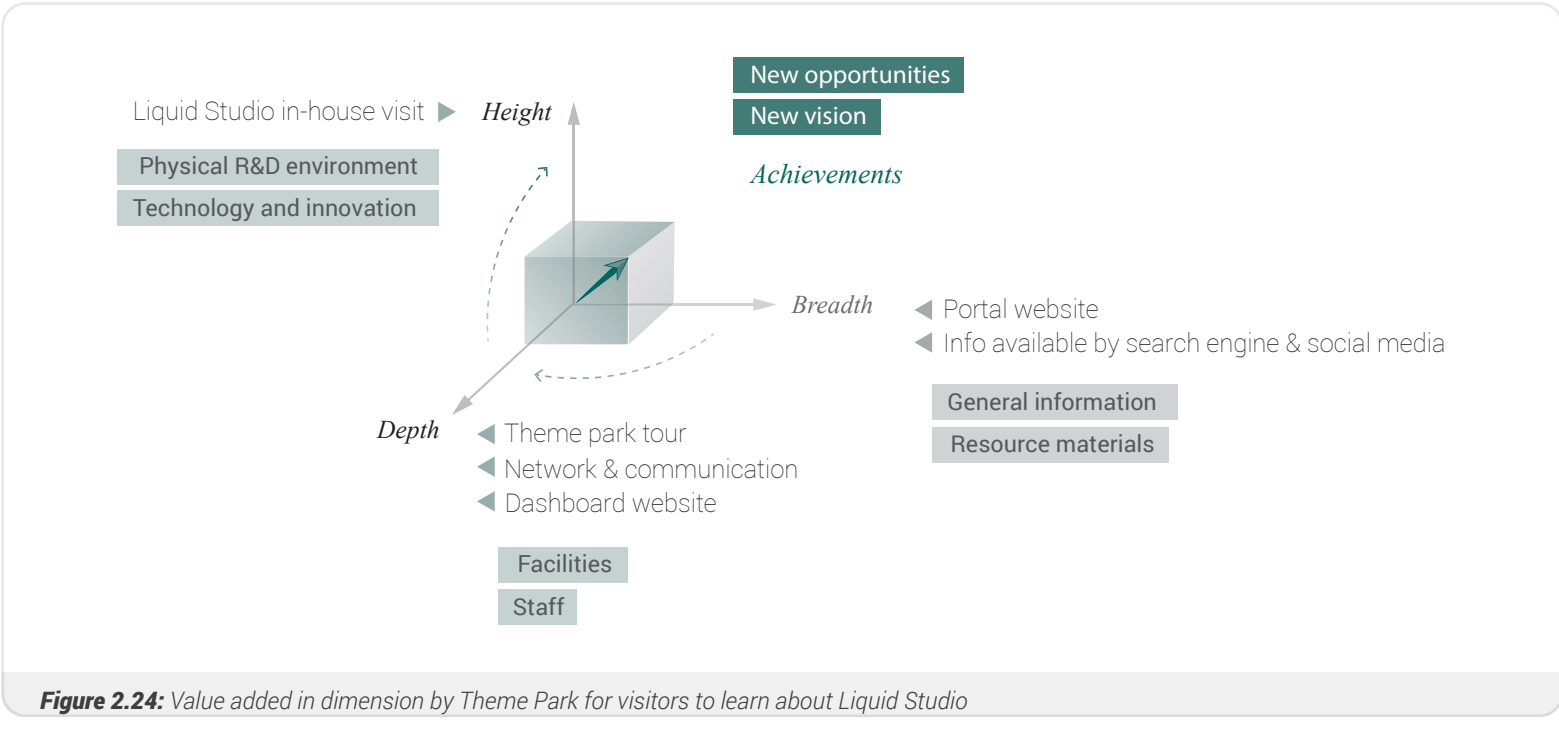


Figure 2.24: *Value added in dimension by Theme Park for visitors to learn about Liquid Studio*

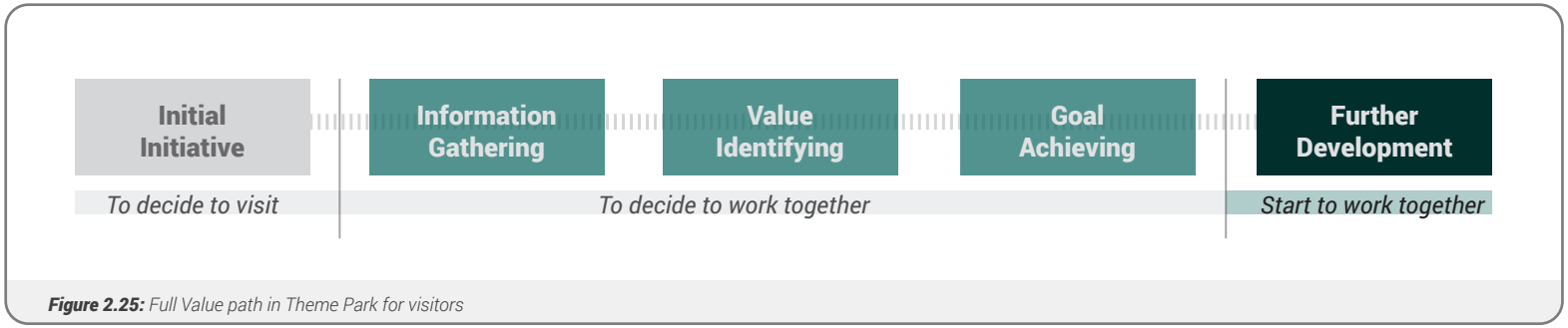


Figure 2.25: *Full Value path in Theme Park for visitors*

2.3.4 Journey analysis on demo Theme Park visit

A full journey around the demo Theme Park visit is defined in 5 phases as shown in figure 2.26. (Before and after visit, visit start and end point, and during the visit)

The demo Theme Park cognitive journey map is defined as in figure 2.27. The four layers It used is based on the adaptation of the cognitive model as shown in figure 2.28. It presents how the four factors affects each other among thought, feeling, action, and the value path state. The green loop shows the basic affect among the four. It also reflects why the migration could be realized along the value hierarchy as stated in chapter 2.2.2.

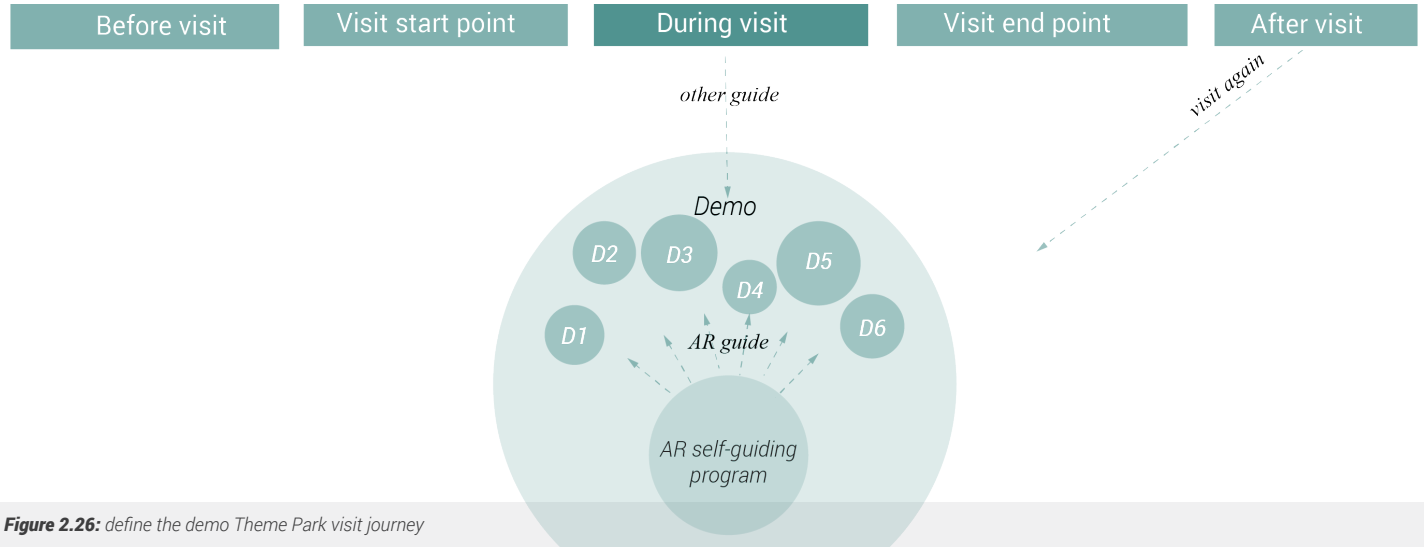


Figure 2.26: *define the demo Theme Park visit journey*

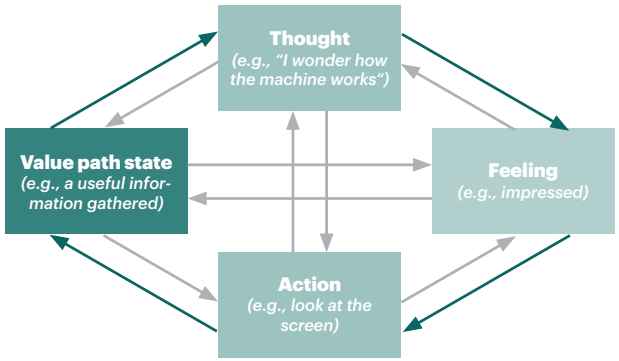


Figure 2.27: *Cognitive model (adapted from Waller et al., 2010)*

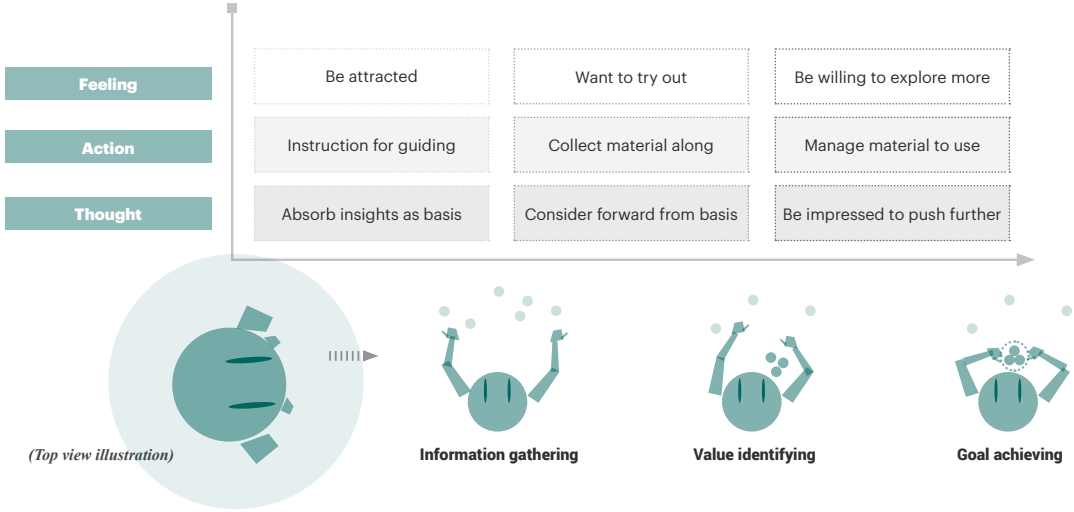


Figure 2.28: *demo Theme Park journey value path map with cognitive factors*

03

ANALYSIS AROUND USERS

INFOMATION PACKAGE & VISITOR GROUP AS THE TWO JOURNEY USERS

Base on results from the context investigation it is conducted for further analysis on journey users which are defined as information package (knowledge and materials to be showcased and conveyed) and visitor groups (all hosts and audiences are visitors). In this case this chapter reports the insights on the two aspects and explains about how the two interacts in the current situation for generate conceptual journey design opportunities.

Chapter Overview

OVERVIEW

The following figure as below shows the overview of user analysis phase.

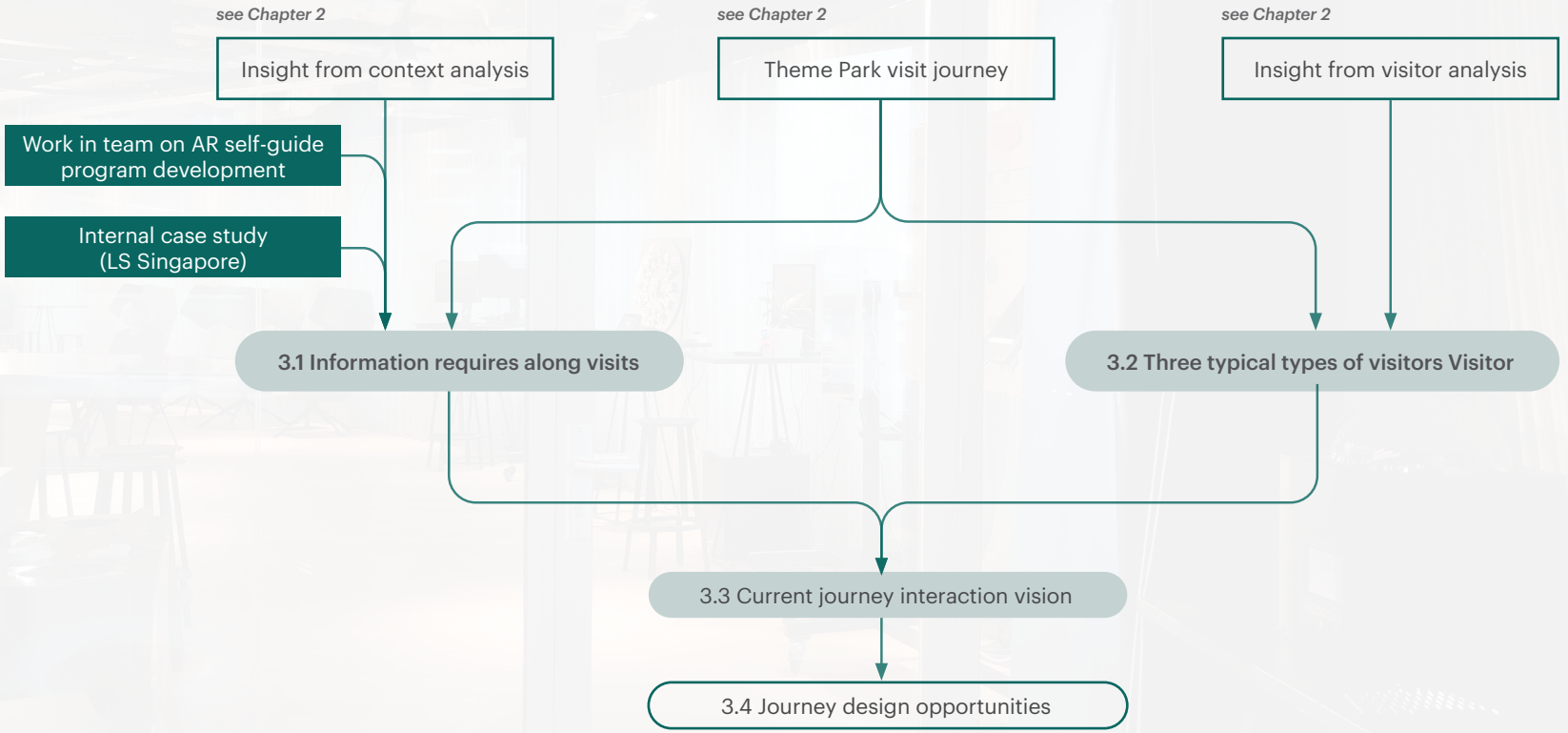


Figure 3.1: *Overview of chapter 3*

3.1 INFORMATION REQUIRES ALONG VISITS

In general, the visit for visitors are for information and knowledge obtaining as analysed in previous chapters. In this case, it is valuable to have clear insights in mind that what are the relevant and to what extend they are significant. This section summaries the insights gathered around info elements along the relevant research process.

3.1.1 Internal case study of tech in-house exhibition in Liquid Studio Singapore

As mentioned, Liquid Studio as a transnational company have other bases around the world. Liquid Studio Singapore is one of them which has their technical demo showcases designed and developed rather completed (As in figure 3.2). In this case, Liquid Studio Singapore demo showcase was considered as an internal case study which is valuable to reference that they are under the same tech trends.

Their showcase applies the five trends be inspired from Accenture's TechVision, which are artificial intelligence, distributed ledger, extended reality, internet of things, and the "human+" worker (read more in appendix K). Refer to the online meeting with Singapore side for their experience sharing, it is the modularize set-ups made their set-ups looks professional. Most of the showcases includes the physical demo with interactive screens for other information or programs together explains the corresponding technology. This gives a richness in components where made the exhibition more explorative

Figure 3.2: *Liquid Studio Singapore demo in-house exhibition (Accenture Liquid Studio Singapore, 2017)*

3.1.2 Reflect from smart plant demo user test

Along the project, I worked as part of a team of four interns that responsible for the mentioned AR self-guiding program design and development. The method was fast prototyping for fast iterating to keep upgrading base on user tests. Smart plant was one of the demos we worked with that we made a small AR game quest around explaining the tech principle inside the smart plant which is pot with sensors that can monitor the plant condition inside automaticly. It is a quest game that after the player complete the game, they shall understand the tech principle behind the showcase. The quest for smart plant was currently a drag and drop game which require the player to drag the corresponding sensor into the right place of the pot from the screen. More project relevant info can be found in appendix L, such as usability insights in AR design from user test. Due to project time limit, we only tested with two participants. One external and one internal from Accenture.

As for the take away more on journey design, it was more than an AR game which is about the needed elements for a certain demo showcase setup. As a result, though only two of them, it is difficult for user to understand how they shall complete such a quest at the beginning as they have no clue on what direction the game is suggesting to a completion of the quest. In this case, it is valuable to aware that without a context, the elements may meet such type of problem where causes confusions to the user. Base on the test result from the quest game user test and the research insights (visitor needs) around the demo design, a modularized demo showcase setup in theory is drawn as in figure 3.3 below. Four basic layers are required to frame a full package for a certain displayed technology. Include the demo layer, the other three are defined as technology concept, technical principle, and using cases.

To a larger scale, all along the theme park visit journey, a information element map is conducted as shown in figure 3.4 in the next page. It include both elements to see (awareness) and to think (consideration).

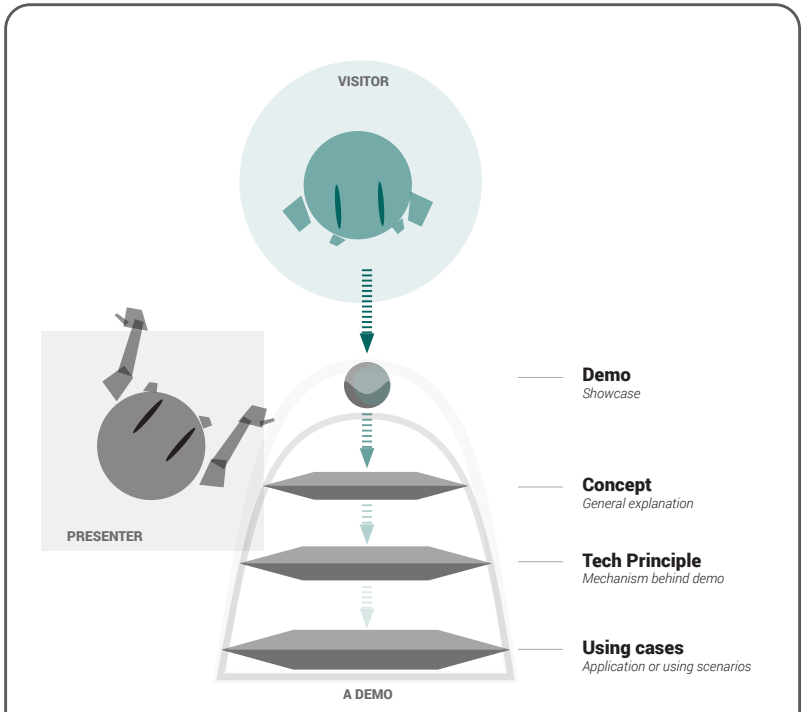


Figure 3.3: *Top view illustration of a visitor visiting a demo showcase*

TIME LINE&LOCATION	may not arrive at the location to prepare – to arrive	at the location (in LS Utrecht Office) just arrive – about to leave			may not be at the location fresh and clear – base on memory and accessable materials
FUNDAMENTAL NEED	Purpose	Relatedness & Autonomy + Competence & Stimulation			Belonging & Impact
PHASE	Before visit	Visit start point	During visit	Visit end point	After visit
VISITOR ACTIONS AWARENESS (What they see)	Tour info *e.g. location, time, schedule, dressing, etc.* Required preparation *e.g. documents, ID, etc.* Instructions for certain situations *e.g. to delay, to not attend, etc.* Contact info *e.g. website, email, phone, etc.* Further planning *If there are arrangements for other things to come, etc.* Relevant documents *e.g. welcome slides, etc.*	Space and facility conditions *e.g. layout, functional areas, etc.* Atmosphere and environment *e.g. employee working images, etc.* Corporate cultural elements *e.g. brand visuals, branding elements, etc.*	Employee situation *e.g. working style, specialists, contact persons, etc.* More detailed company information *e.g. projects, clients, tools and approaches, etc.* Business scope *e.g. technical capability, etc.* Business capability showcase *e.g. technical demonstrations, etc.*	Collection of acquisition *e.g. info about LS, common vision with LS, etc.* Insights for making revelant decisions *e.g. to work for/cooperate with, etc.*	Reflection *Collection of acquisition* *e.g. info about LS, common vision with LS, etc.* *Insights for making revelant decisions* *e.g. to work for/cooperate with, etc.* Sovernirs and materials from LS *e.g. business card, brochures, any records, etc.* Contact channels *e.g. people network, email/phone/social media,etc.*
CONSIDERATION (What they think)	▶ *Plan to ensure arriving at the target location on time, be prepared and make the journey start smoothly* ▶ *Once encounter a problem, quickly and clearly determine the steps to solve the problem*	▶ *How to deal with the materials and what should be done?* ▶ *Who to contact, who can be helpful when facing certain questions?* ▶ *Where will be holding the activities and how can the facilities be used in the space?* ▶ *Where to get the info that was aiming for?* ▶ *What is the initial impression of the company, what are assumptions and expectations made upon it?*	▶ *Understand the information and turn it into own* ▶ *Try to find the part of information that was planned to be found or explored* ▶ *Found anything interesting that was not expected as an added bonus* ▶ *Get in touch with people and things that are interested in, and push connection and understands further*	▶ *Organize the harvest as a finishing touch* ▶ *Have a relatively complete understanding of the overall impression* ▶ *The visitor 's intentions about himself and the company began to become clear* ▶ *Whether to promote follow-up development with the company, thus forming a relatively effective basis*	▶ *Based on the goal, reflect on the existing knowledge, review the relevant materials available in the hand* ▶ *Or generate intentions to further develop connections and relationships*
KEY NOTES	▷ **Information integrity** *The relevant information is helpfull to be prepared and provided to visitors in advance* ▶ **Information readability** *The platform that can find relevant information is single (email) and important information items not visible enough* ▶ **Information usability** *There is a gap between the visitor's memo or execution habits, and information or retrieval is re-entered across multiple platforms.*	▶ *For the first visit, the location of the company 's building is not obvious* ▷ *The navigation instructions inside the building play a certain role in helping visitors find the right place (company logo outside the building, elevator floor instructions, visual guidance after arrival)* ▶ *The operational guidance after entering the company is relatively lacking, and the activities and zoning guidelines are not clear (especially for self-help)*	▶ *Demonstration of maintenance requires more investment. The frequency of use of each demonstration, the situation encountered problems can be more monitored, and timely repairs, targeted improvements.* ▶ *Information about the presentation is not sufficient. This is a common situation. The purpose of the presentation, the theme, and the content that you want to present must be explained by relevant personnel.* ▷ *As a demonstration of innovative technology, the demonstration itself should be able to activate the visitor's thinking, learn new technology, accept new things, experience novelty and develop thinking.*	▷ *At this point, the visitor has relatively gained enough information, and has a more comprehensive and deeper understanding from a shallow level.* ▶ *Summarizing and finishing work has great follow-up extension value and will be a good opportunity to plan the added value of the visit*	▷ *What the visitor can finally take away from the visit is truly reflected at this stage* ▷ *When the memory and the required materials can be mastered, it can promote the effectiveness and feasibility of further operations*

Figure 3.4: *Information elements journey map (full version appendix D)*

**** Relevant quotes can be found in appendix X***

3.2 THREE TYPICAL TYPES OF VISITORS

Visitors are categorised into three typical types regarding their typical visit path along the value migration path. (The value migration path is defined in chapter 2.2.2). They are named as information gatherer, value identifier, and goal achiever.

As shown in figure 3.5, though all the three types of visitors are able to complete the journey as how they initiated, refer to the full scope, they are shortened that not obtaining a full value path because of their initial thinking. Goal achiever has a rather clear purpose to the visit that may only target to one technology showcase in specific. This tend to be client visitors. Information gatherer are possibly new joiners or interns in the company that they are more flexible in learning thing from a rather larger range. The value identifier could be internal clients or LS own full time agents. They aim for bringing value out of the showcase and technology behind. In this case, they interested in various showcases and technical topics while mainly focusing on the certain layer which tend to be the using cases for business opportunities.

Figure 3.6 on the right gives an idea on how would the three types of visitors behave according to the visit purpose map.

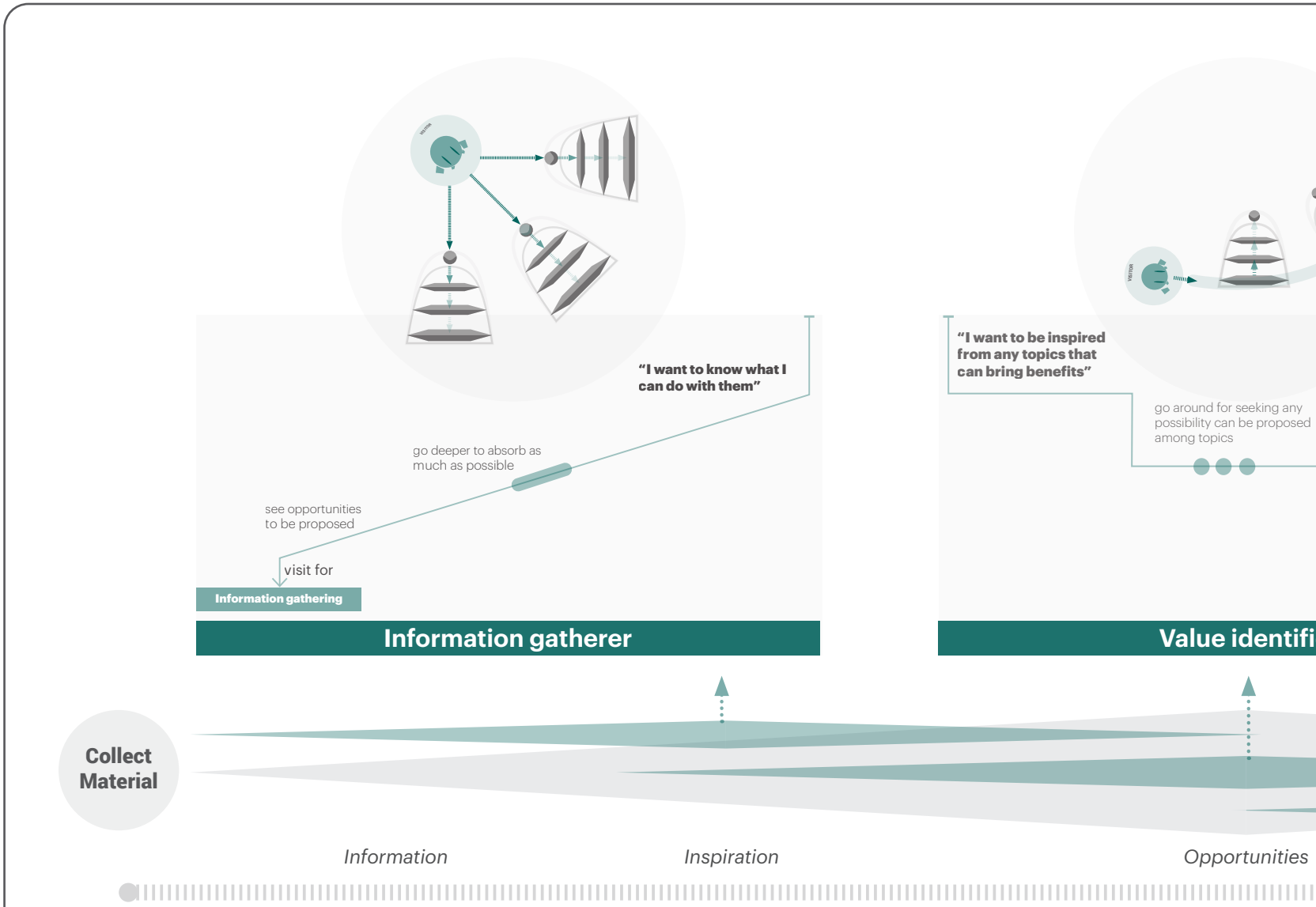


Figure 3.5: *Three typical types of visitors map along the value migration path (with top view illustrations of the visitor viewing the demo)*

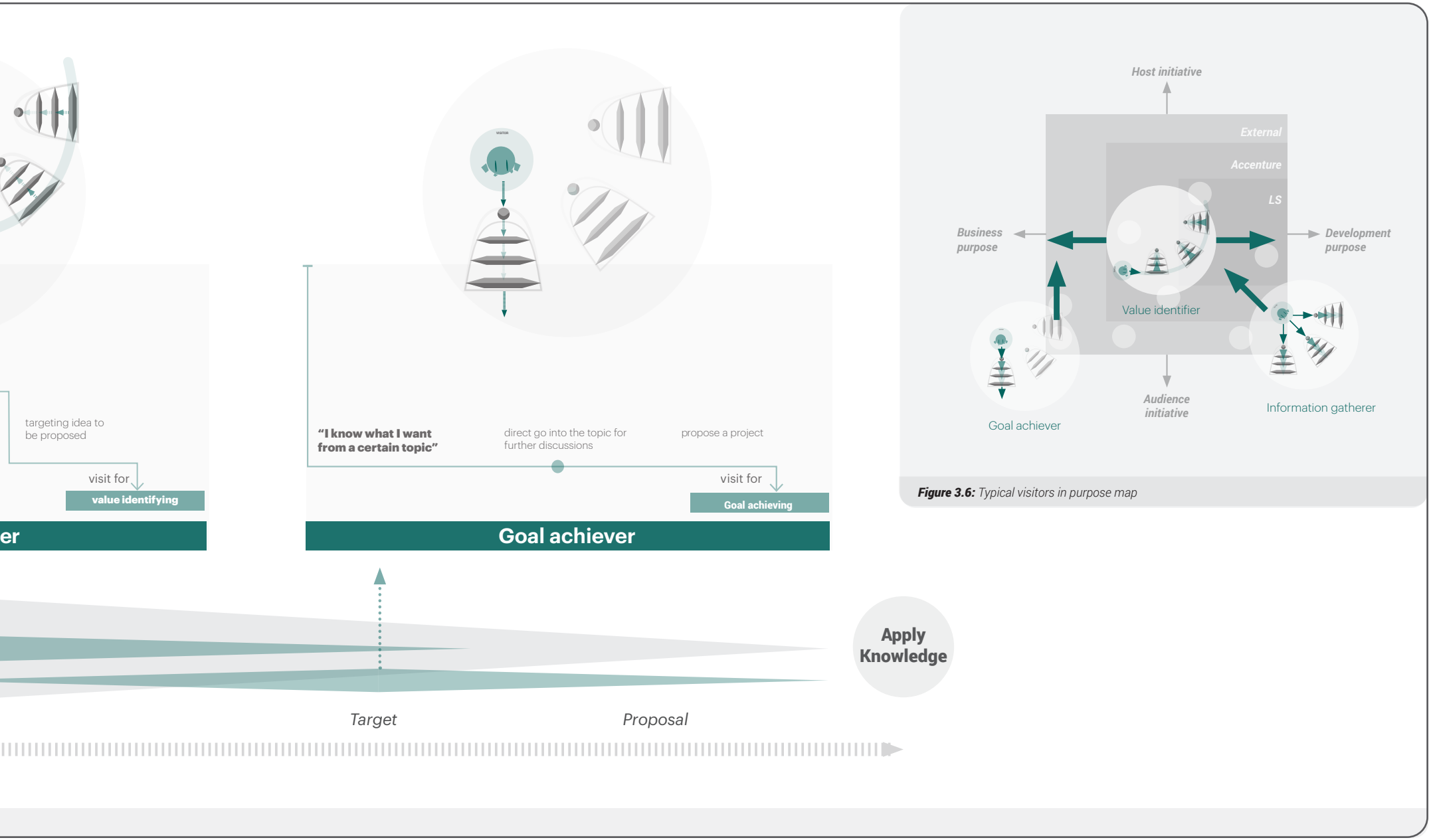


Figure 3.6: *Typical visitors in purpose map*

3.3 KEY ELEMENTS FORMS THE INTERACTIONS

Having the information elements and visitors be analysed and summarised, the interaction between the two shall be further considered that this is where the experience happens to the visitors. This section will show the analysis for conducting the design opportunities.

3.3.1 Define the value path

The demo theme park value path is defined for visitors to walk through that modelling out a unified path about how they might gain value during the visit. The two scales are based from the value migration path and the demo showcase information package layers. As shown in figure 3.7, the further the visitor walk through the value migration path , the deeper the visitor understand the showcase elements, the fuller value they can obtain along their visit. The value migration path is the value from consideration (what they think), while the depth of the showcase information package layer they go through are valuable as awareness (what they see) that feeding and activating the value migrations.

3.3.2 Current interaction model

The information package and visitor groups are considered as the two general users of the journey that one aim for using the journey to provide information out, while the other is to obtain the information needed from the visit journey. At the mean time, both users aiming for the same goal as the purpose the visitor groups initiated in the beginning before their actual visits. To achieve so, visitor groups are trying to obtain the consistency from the information materials and also with the involved visitors under various motivation to achieve the common purpose. As in figure 3.8, it is an illustration of the main interaction logics as required to achieve such a vision which is trying to be brought out from the current demo exhibition, It can be conducted from the model that the consistency from visitor groups influence strongly compare to the information package flexibility.

However, according to research, demos are not flexible or even functional enough to support the flexibility in a sense. The more important is, currently, as the interaction vision illustrates in figure 3.8, Liquid Studio prepares everything for visitors to receive on both what and how, which result in an information oriented exhibition. This means, refer to the interaction model, the focus currently is on information package side but not the more influential visitor groups side as just discussed. This lead to a reduction of the communication effectiveness via the exhibition which can be considered as an interaction problem in this using scenario. The result of internal survey on current effectiveness in chapter 2.2.5 can also reflect this.

As illustrated in figure 3.9, it reveals the current interaction vision that reflects how the current situation not effective desirably.

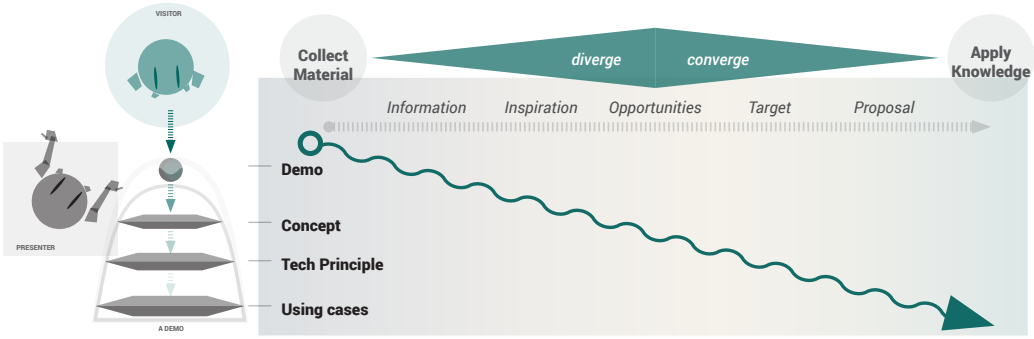


Figure 3.7: *A full value path that visitor could go through along the visit along value migriation path with the demo info deepth*

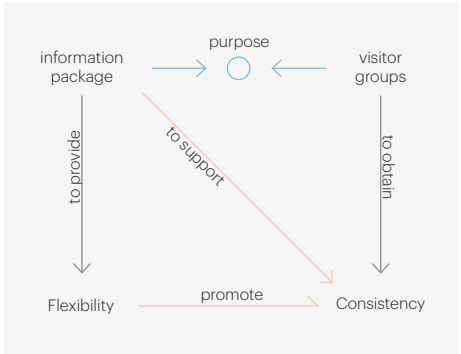


Figure 3.8: *Basic Interaction logic as desired for current situation*

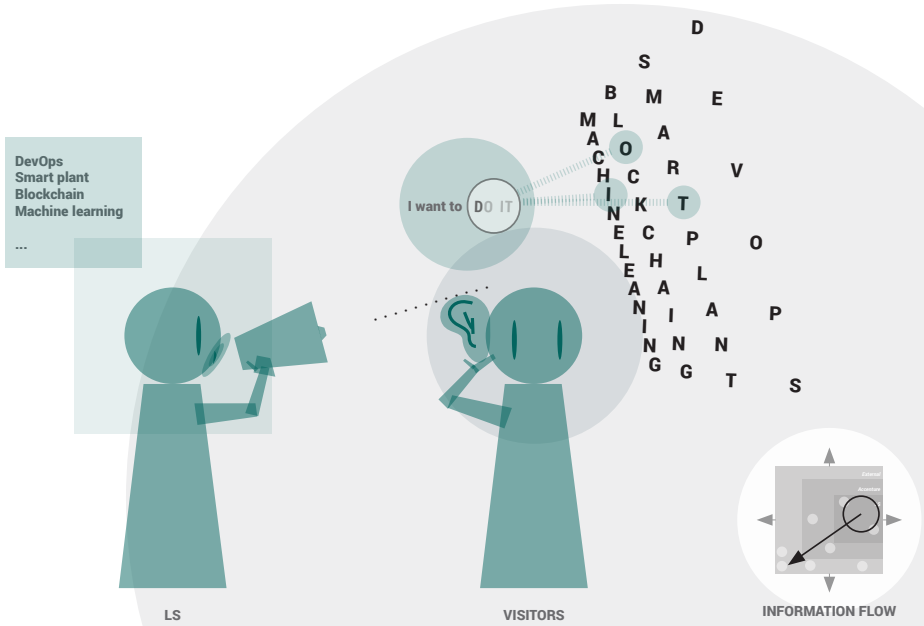


Figure 3.9: *Current interaction vision between information package provided and exhibition visitors where the presented information are not be received from visitor side effectively*

3.4 MAP OF JOURNEY DESIGN OPPORTUNITY

The key point to be optimized by journey design could be defined as the inefficiency of the information communication due to a deviation of the communication subject that the visitor groups are more influential but less considered in the current visit scenario. As mapped out in the figure, the design opportunities are conducted as below:

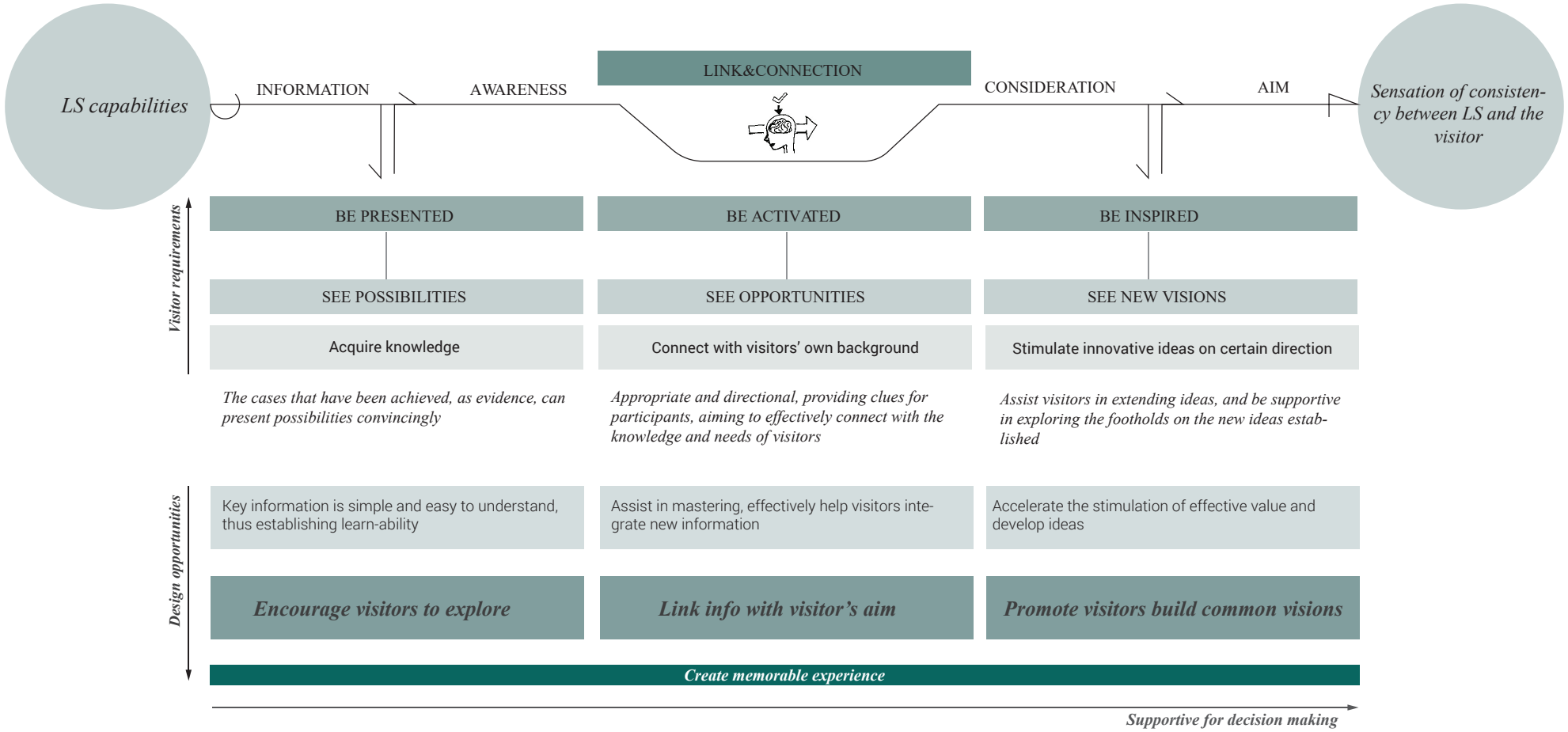


Figure 3.10: *Visitor requirements to journey design opportunities that promoting a sensation of consistency for the visitors*

04

IDENTIFY DESIGN FOCUS

FRAME SCOPE OF CHALLENGES

Base on the key insights gathered from the research and analysis processes, the design focus is concluded in this chapter for addressing the design directions. Interaction qualities, challenge statement map, and design goal will be briefly explained and finally comes the design guide map.

Chapter Overview

4.1 INTERACTION QUALITIES

Interaction qualities are generated as explained on the right for the journey design from the three layers of feeling, action, and thought refer to the cognitive journey map (chapter 2.3.4).

There are three design elements of the journey should be considered which are the journey flow, journey carriers, and the visitor experience. Journey flow is the skeleton of the journey experience which brings out the basic logic with main features as a basis. Journey carriers are which carries the information package to be brought out from the journey flow, which are the interface for the visitors to realize the interaction. By interacting with the journey carriers along the journey flow, visitor experience is brought out accordingly.

Refer to the insight from pre-research, when considering the use of mixed-reality (MR) as a means of display, the experience factor should first be considered before choosing the device to be used as a carrier. The illustration in figure 4.1 reveals a suggestive development hierarchy for any further develops. In the project scope, AR self-guiding program and multiple physical demo showcases in combine is suggesting such a smart mixed-reality visiting experience as introduced from project introduction chapter, in this case, along the design process afterward, Journey flow and journey carriers should be designed sufficient for test and validate out whether the visitor experience are desirable as proposed, rather than as a focus to be evaluated on the usability of the carriers or journey flow in usefulness.

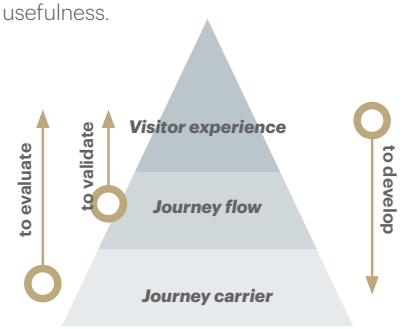
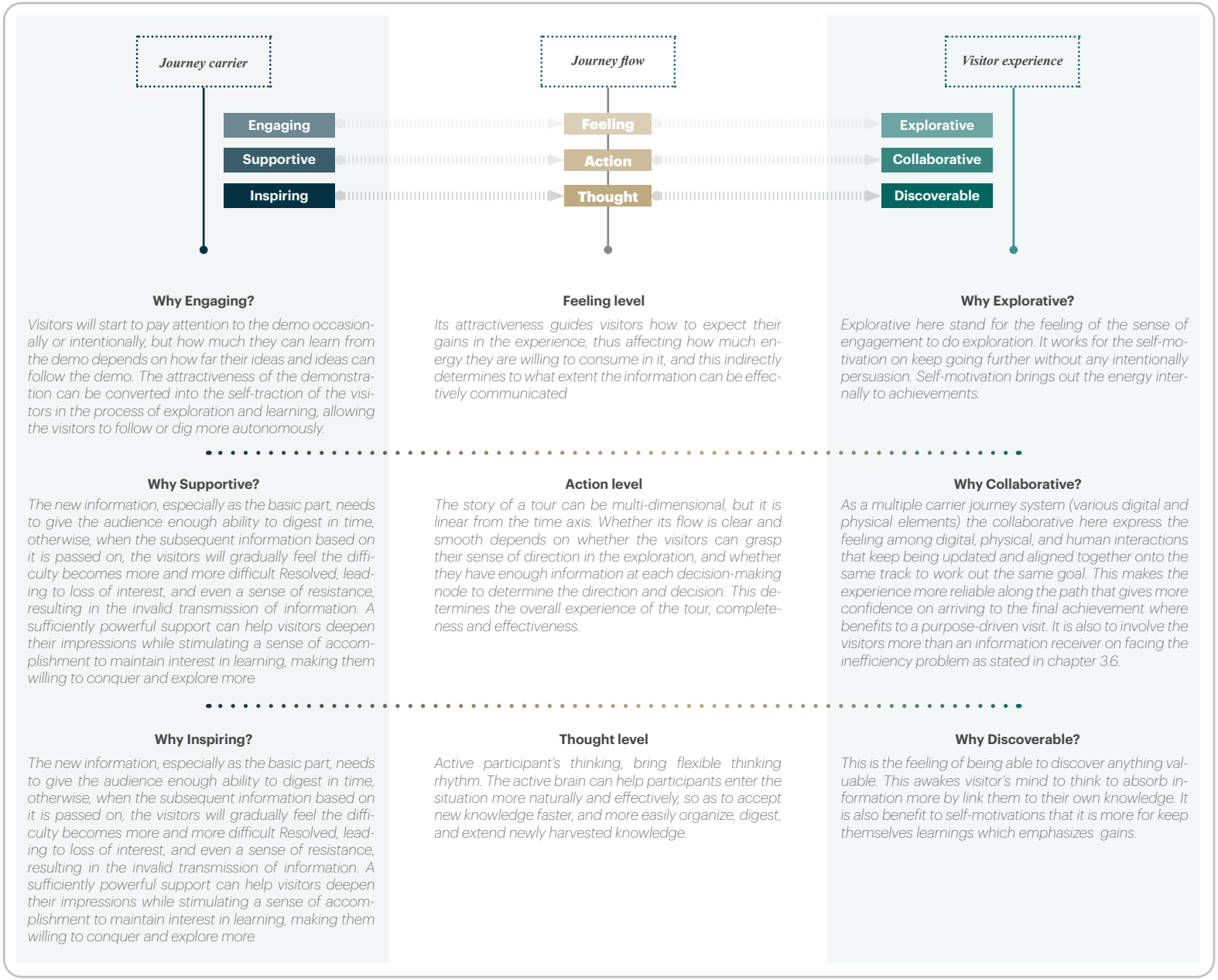
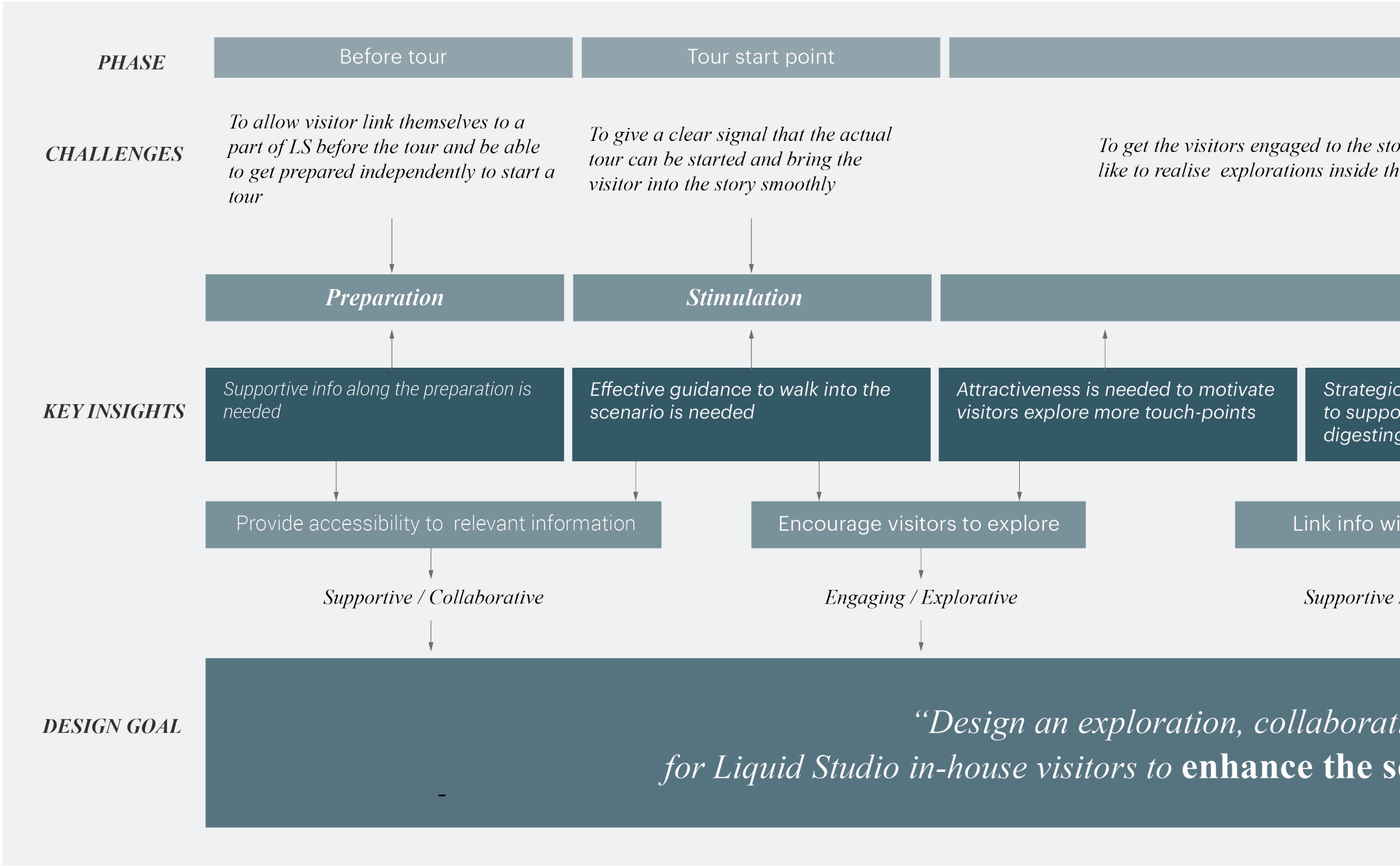
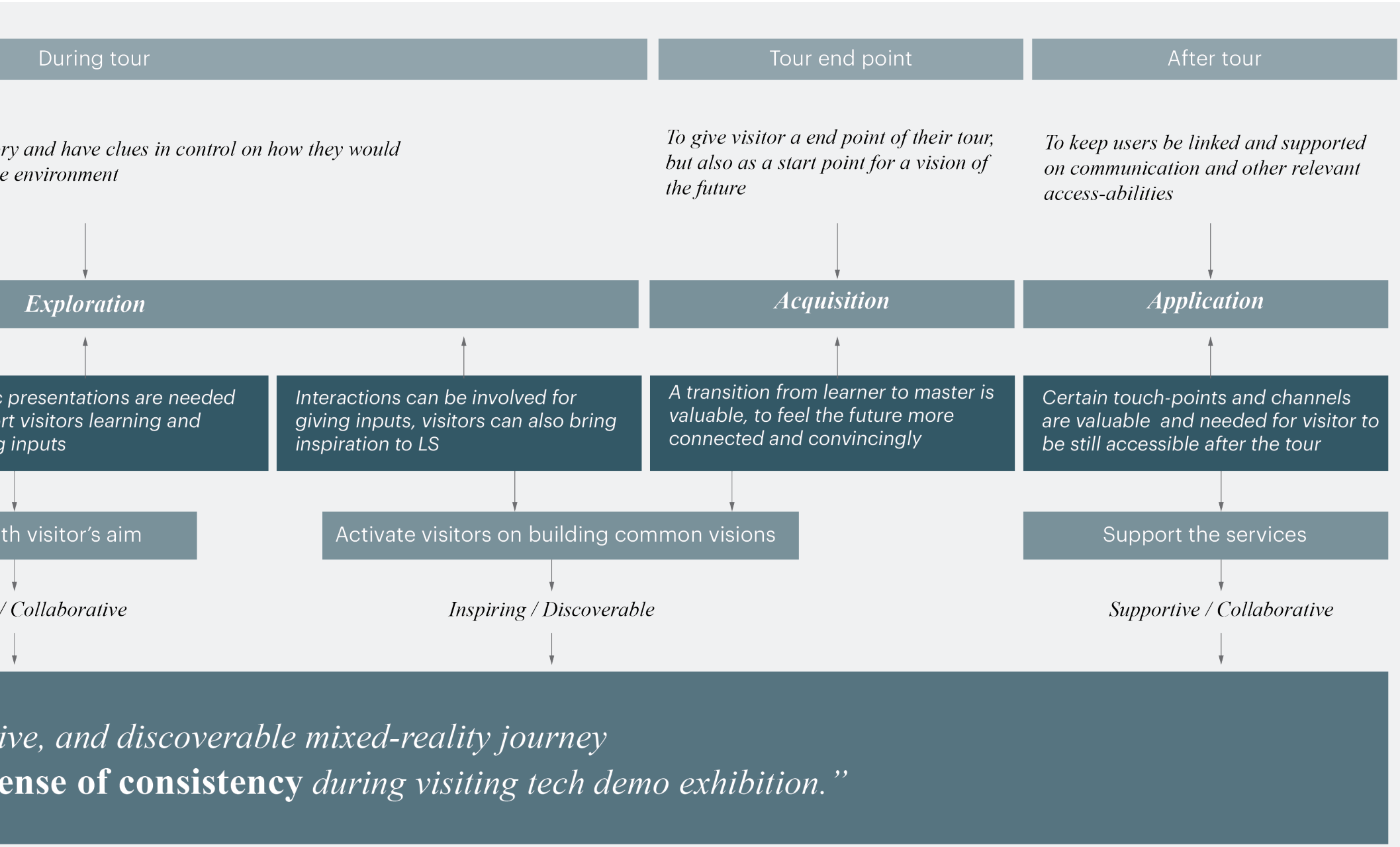


Figure 4.1: *MR development hierarchy as a suggestion*



4.2 CHALLENGE STATEMENT MAP




During tour
Tour end point
After tour
ry and have clues in control on how they would
e environment
To give visitor a end point of their tour, but also as a start point for a vision of the future
To keep users be linked and supported on communication and other relevant access-abilities
Exploration
Acquisition
Application
c presentations are needed
rt visitors learning and
g inputs
Interactions can be involved for giving inputs, visitors can also bring inspiration to LS
A transition from learner to master is valuable, to feel the future more connected and convincingly
Certain touch-points and channels are valuable and needed for visitor to be still accessible after the tour
th visitor's aim
Activate visitors on building common visions
Support the services
/ Collaborative
Inspiring / Discoverable
Supportive / Collaborative
ive, and discoverable mixed-reality journey
ense of consistency during visiting tech demo exhibition."

4.3 DESIGN GOAL

"Design an explorative, collaborative, and discoverable mixed-reality journey for Lqiuid Studio in-house visitors to enhance the sense of consistency during visiting tech demo exhibition."

to **activate** the **flexibility** of context for various materials that can be provide from Liquid Studio demo Theme Park to their visitors

to **trigger** visitors **stretch their typical path** (figure 4.2) for discovering any valuable opportunities that are relevant to those included technology services rather then to let them being hidden or wasted.

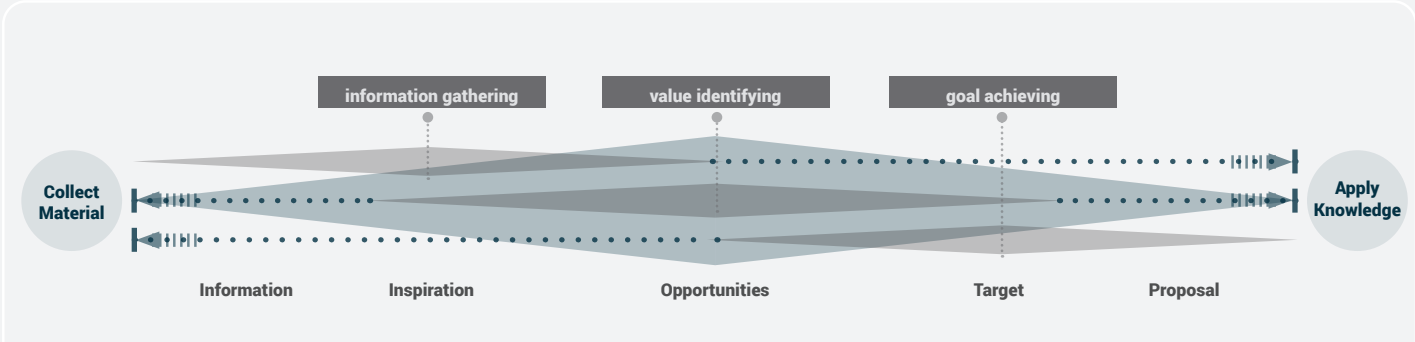


Figure 4.2: *The typical path being stretch along the value migration path of the three types of visitors*

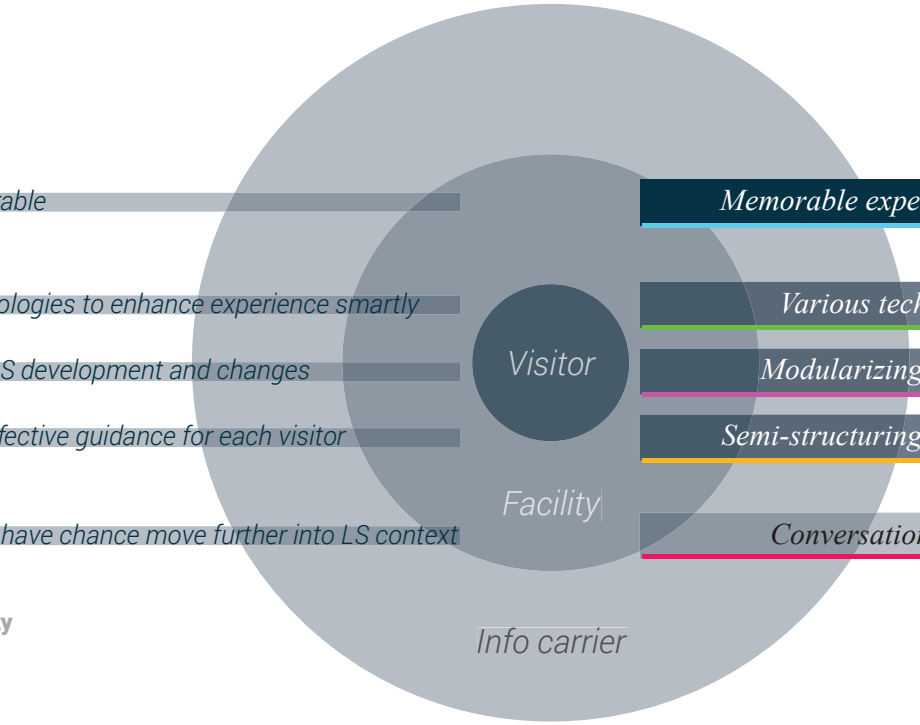
4.4 DESIGN GUIDE

In the figure below maps out the need, opportunity, and d process (figure 4.3s)

Figure 4.3: *The five design requirements for guiding the design proc*

E MAP

e design requirements to guides the further design



Design requirements	Value
Memorable experience with storytelling	The value of an impressed and memorable experience mainly comes from the depth of understanding of the visitor and extended thinking based on it
Various technical interactions	The diversity in experience stimulates and liberates visitor's interest and thinking, while technologies can assist in realizing appropriate interaction approaches
Modularizing guided exploration	The system provides framework guidance and targeted timely assistance to each individual visitor that ensuring their smooth exploration and thinking experience
Semi-structuring customizable journeys	Arrangements are controlled by the visitors to be specified themselves, to be more autonomous and flexible that enhancing their sense of participation.
Conversation/Networking spots	Conversation, meetings, or other social events may touchable for deeper connections around tech topics and business contexts within the scope

Value in experience (network+communication+corporation)

cess

05

FRAME THE CONCEPTS

CREATE & EVALUATE

Base on insight from various research activities (see chapter 1, 2, 3, 4), the conceptualization phase is process as reported in this chapter. An overview of the main processes is illustrated as figure x.

Chapter Overview

OVERVIEW

The following figure as below shows the overview of conceptualization phase.

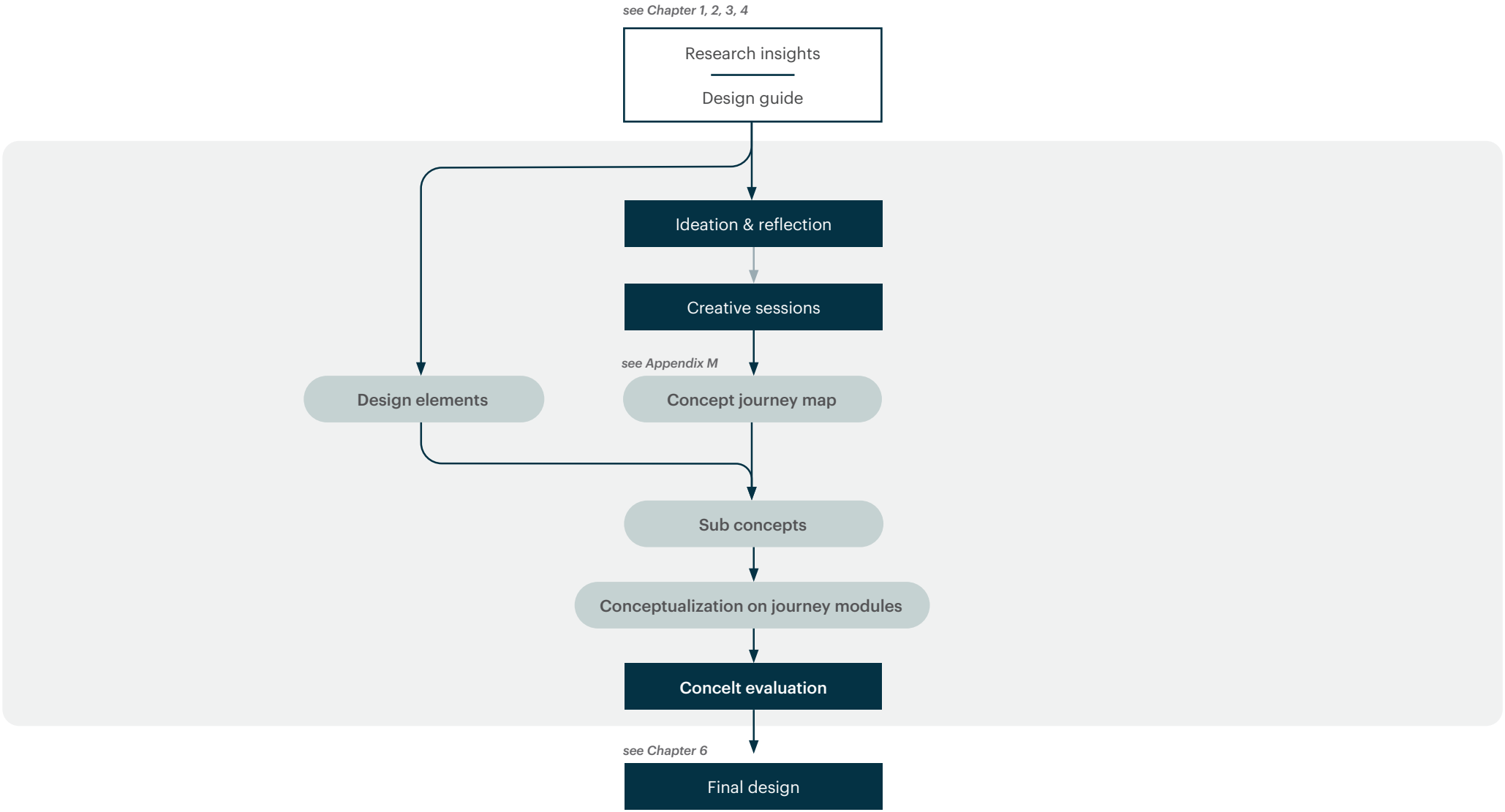
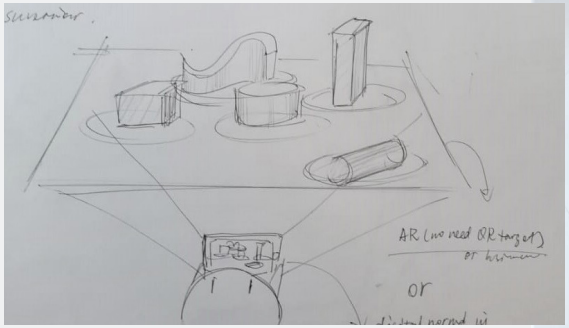
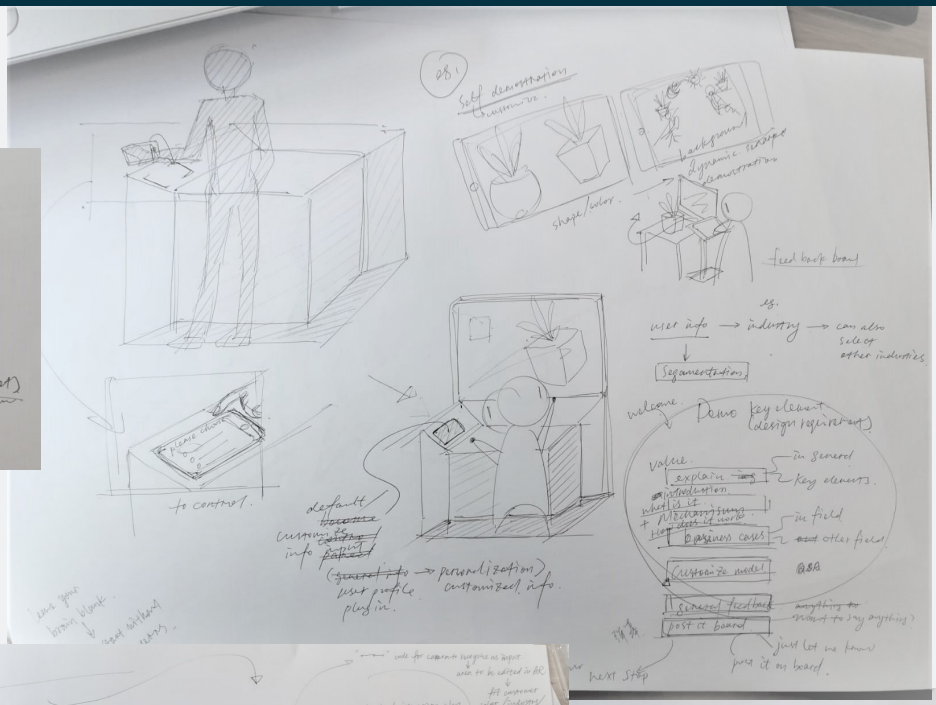


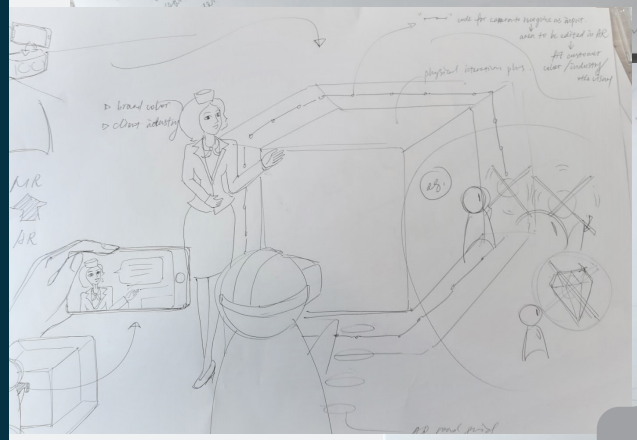
Figure 5.1: *Overview of chapter 5*

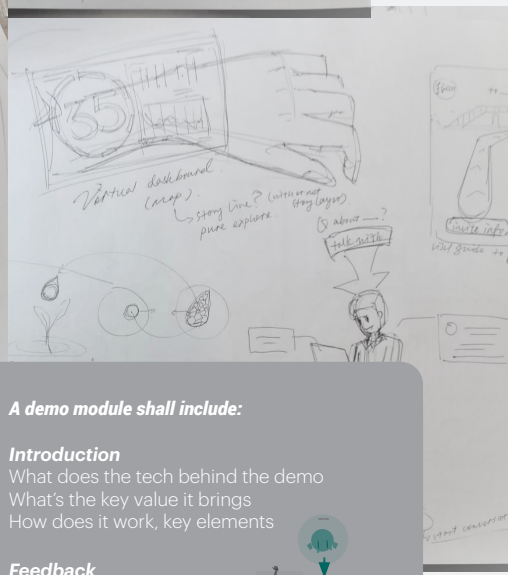
5.1 IDEATION

Ideation worked as a preparation phase for conceptualization to first diverge on possibilities for converging in later processes. Results and insights will be reported along the chapter.









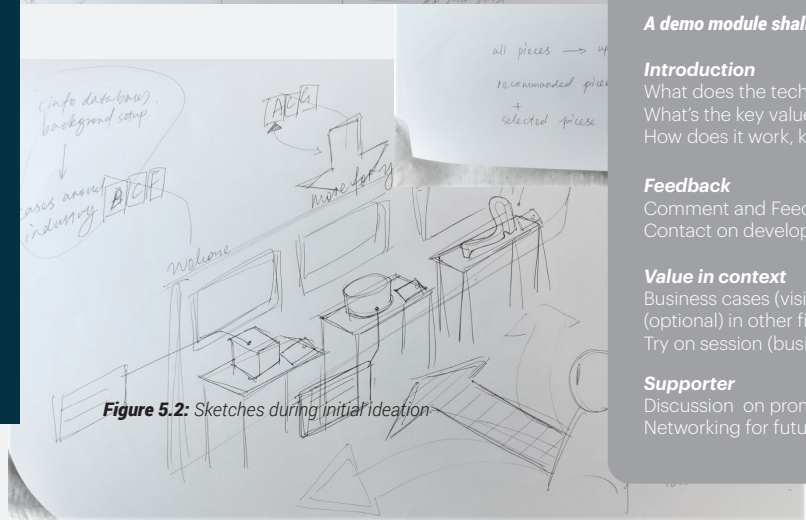


Figure 5.2: *Sketches during initial ideation*

Reflections along initial ideation

Two questions points to be considered for conceptualization were reflected along the initial ideation:

- Why work with the overall tour rather than focus on a certain partial section along the journey?

Though a certain priority for developing the holistic experience can be established among the 5 phases and ideas can come along by pieces, it requires a mindset on the overview of the journey design to aware how each element can influence and link with other parts.

- Why it should be emphasized as a holistic experience?

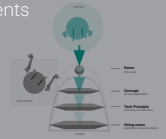
The purpose of the exhibition is relatively clear to visitors and exhibitors, but whether it can be achieved depends on whether the value points encountered in the process can be effectively obtained and thus play a role. The innovative and cutting-edge technologies presented by LS require visitors to learn, master them to a certain degree, and apply them to their own purposes.

LS can satisfy the diversity of materials, and also have the opportunity to enrich the diversity through the design experience, inspiring visitors to explore among the materials, but it is also because of this that it is important to organize and help visitors retain the gains along the way.

Fragmented memories are difficult to grow, and this is not what both parties want. Therefore, it is a very important concern in the overall experience design to help visitors establish an information collection system during the experience process so that fragmented information becomes a whole. We must proceed from a macro perspective and focus on the correlation between points and points to help the experience benefit from the integrity.

A demo module shall include:

Introduction
What does the tech behind the demo
What's the key value it brings
How does it work, key elements



Feedback
Comment and Feedback
Contact on development

Value in context
Business cases (visitor background relevant + (optional) in other fields)
Try on session (business context modelling)

Supporter
Discussion on promotion
Networking for future communications

5.1.1 Pilot online creative sessions

Aiming more on diverging to ideas and possibilities, work as a pilot session for setting up conceptualisation creative session. Insights will together summarised with the other two actual conceptualization sessions. (detail see Apx. N)

Procedure
Start with purge to clear up their minds by leave all random ideas at the beginning, then along the steps were taken for problem analysis so that they can generate the "how 2" which makes more sense for them within the scope. Then the ideation part comes along.

15 images were prepared for the 4 participants to work with as inspiration material. They chose different images from each other, and from the visual, they generate topic relevant ideas base on what they have observed from the images.

Ideas were then be asked categorized into the 3 categories, critical, realistic, and dreamer, to let participants think reflectively for then generating a concept base on those ideas.

Each of them present their concepts to each other and discussions were then naturally triggered along the presentations that participants are being inspired from each other. After the discussion, they together wrote down their final ideas into the journey time-line, and clustered and lined to show certain relevance among ideas that suggests an overall journey flow.

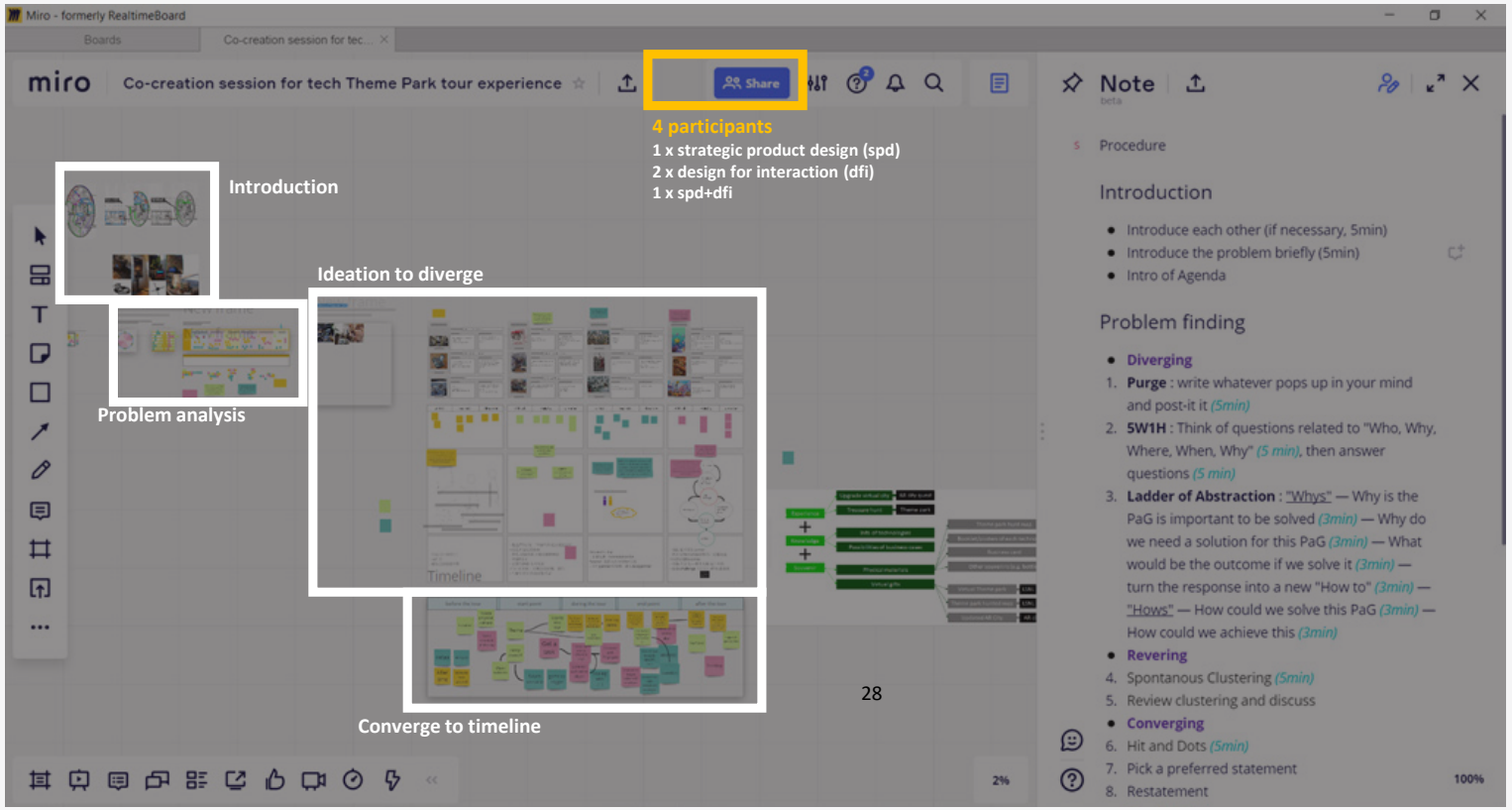


Figure 5.3: *Overview of pilot online creative session setup*

Reflection and insights for later co-creation sessions:

Overall:

- The 4 participants generated ideas from different goals they made by themselves by problem analysis process which made the outcomes effectively diverged from each other while still within the project scope. Thus, the result is appreciated by having ideas from perspectives but can still be aligned in the end along the time-line.
- Image inspiration is pretty much effective and participants stated that the overall flow runs quite effective, reasonable, and inspiring.

To be improved:

- The session was too long that it lasted for more than 2 hours, which can be possible offline but too long for online sessions
- After image ideation, to work with ideas, can let participants work on categories which are more relevant to design goal next time for further thoughts along.
- Iterate the concepts among participants may can make the discussion more effective in a way to build creations on each other

5.2 CREATIVE SESSION FOR CONCEPTUALIZATION

Research question

How to guide visitors smoothly from various technology showcases under multiple technical topics, and make the experience memorable?

Session setup

11 participants (different in backgrounds but relevant to the topic)
2 groups
Online (Miro + Zoom)
Concept co-creation

Group 1

Msc. Design Innovation – Loughborough / UCL
MA/Msc. Global Innovation design - RCA
MA Industrial design – Parsons
MFA Industrial design – SCAD
Msc. Computer science – UCLA
Mec. Marketing management – NYU

Group 2

5 Msc from TU IO (2 DfI + 2 SPD + 1 IPD)

Changes in procedure
The main adjustment from the pilot session reflects in two aspects:

1. Changed the free discussion after each concept presentation into a concept iteration section. After 1min presentation one by one, participants were asked to come up with relevant ideas base on the the next person's. Presentations run in one go and iteration ends naturally after 4 rounds.

2. The 3 categories were changed to engaging, supportive, and inspiring for idea reflection after the image inspiring ideation. This matches the design goal more direct as the next step is to frame a concept among those accordingly. (figure 5.5 presents the result from one of the participants of this section, from up to bottom are image ideation results, idea organizing and categorising, and the final one is the concept sketch be generated accordingly.)

About problem analysis
There are five new state ments came up from the 3 sessions in total (figure 5.4 present the result of problem analysis section from group 2).

Group 1 agreed with the problem as given, which is *"How to design an supportive, engaging, and inspiring mixed-reality exhibition for LSNL Utrecht office in-house tour visitors to enhance the sense of experience during visiting tech demos."*

Group 2 propsed a new problem to solve as a group as *"How to design an seducing mixed-reality exhibition for LSNL Utrecht office in-house tour group potential parterner visitors to start a relationship during visiting tech demos."*

The pilot session group of four generated individual problem seperatly as follow:

1. in business visit, the manager in the company introduce the exhibition to potential tech buyer in a way of immersive interaction, so as to attract new buyer.

2. How to formulate a strategy to continuously update the exhibition so as to attract potential tech buyers and inspire employees

3. In open day, the business partners will explore the tech in a interactive and futurist manner

4. In a company visit, how to make the experience playful and meaningful for a group of people?

Key takeaway
For each session, ideas and concepts are finalised into a timeline. Base on the three timelines, a concept Theme Park visit journey in spesific steps was made accordingly (see appendix M). Insightful ideas are processed into intial sub-concepts which will be reported later.

Figure 5.4: *Group 2 problem analysis result*

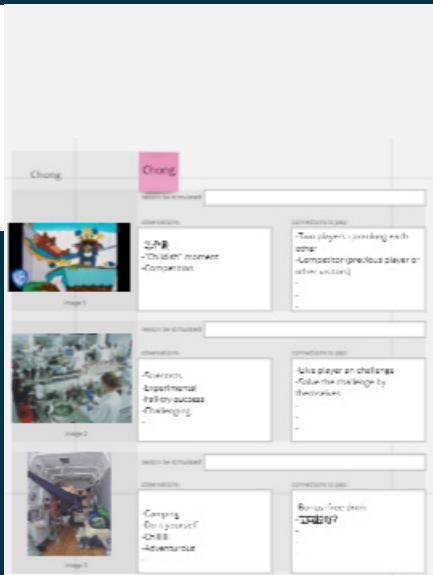
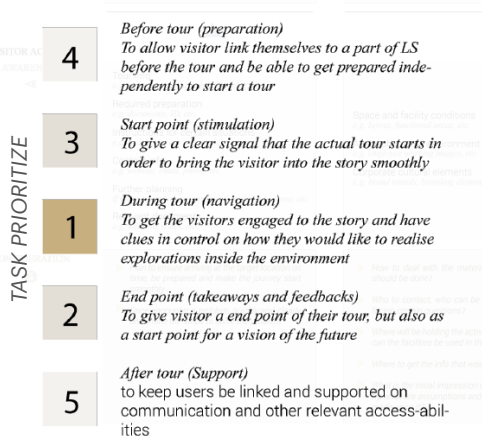


Figure 5.5: *One of the results from participant from ideation to concept generation*

5.3 CONCEPT DIRECTION AND DESIGN ELEMENTS

5.3.1 Prioritizing the 5 phases of the visit journey

Though aiming for a full journey experience design, it is not possible to make it as a whole in the beginning. Among the five phases, the prioritize is listed as below as part of insights from creative sessions. The conceptualization phase will mainly focus on phase 3 and 4. Figure 5.6 displays a general possible event locations inside Liquid Studio as a reference.



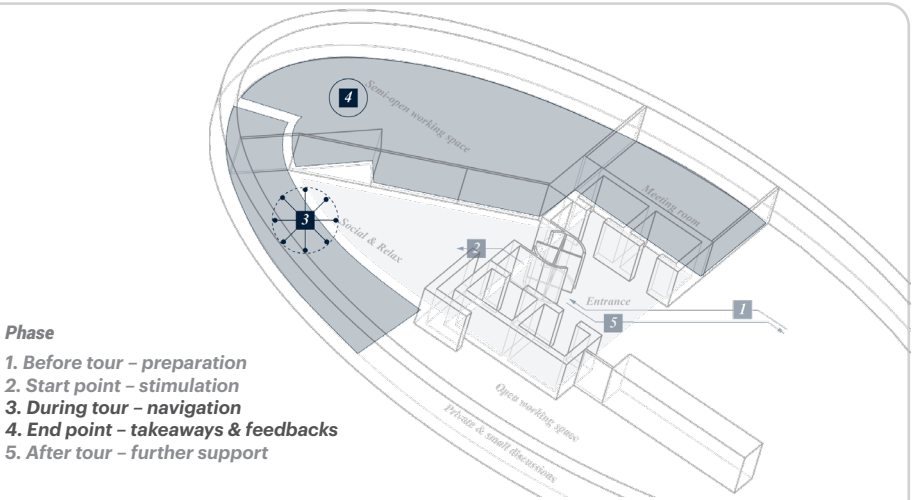


Figure 5.6: *Locations where the 5 five phases may occur regard to Liquid Studio Utrecht floor planning*

5.3.2 Design elements

Based on the design requirements listed (chapter 4.3), the five-point design element (figure 5.7) was extended:

1. Visual coding (enhanced memory points)

2. Suitable for augmented reality or mixed reality applications (meeting expectations and immediacy)

3. Guide users in the form of staged invitations; organize the exhibition display, modularize the information, and construct models to make the updated content adaptive. (Reserve room for change and development)

4. The main line of the journey experience is unique, and the branch line is autonomous, while the overall structure and function are used to assist the individual needs and wishes of the visitor (providing sufficient possibility, while avoiding excessive guidance and improving the effectiveness of information transmission)

5. Extend communication bridges in the process of exploration (trigger opportunities with development value)

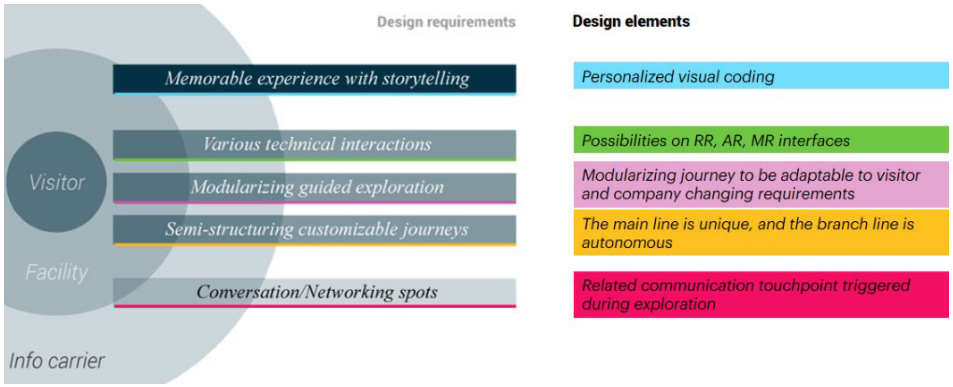


Figure 5.7: *Design elements conduced from design requirements*

5.3.3 Initial overall concept in general

At the moment, the concept was initiated and be named as "Liquid Studio Passport". It works as a information transit station and control panel along the journey system for in-depth learning and gathering information related to Liquid Studio. Regard to its features, will be briefly explained by the five design elements in the next section. (Mobile application as journey carrier)

5.3.4 Sub concepts matching with 5 design elements

Personalized visual coding

Through visual information, a sense of substitution of thinking logic and self-immersion experience at the thinking level is attempt to be generated.

e.g.
Visual substitution of the colour and identity of the welcome animation (figure 5.8) or login interface (concept regarding to Liquid Studio branding: each individual is a small water droplet, connect to each other to become creative and dynamic)

Figure 5.8: *attempts of colour blue of the three typical identities of visitors (group A as new joiner to choose the colour by himself, Group B as Accenture employees from the department use other colour Accenture logo, Group C as clients with brand colour)*

e.g.
Substitute the colours in the AR environment (for example, the target company brand colour), identity (for example, corporate logo in figure 5.9), and thematic context (for example, the city becomes an airport)

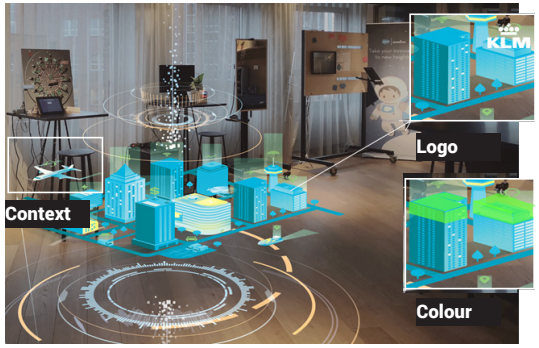


Figure 5.9: *attempts of colour blue of the three visual coding*

TO BE EVALUATED -
how would the three ways of visual coding involve the visitors through out the journey

[Context] [Colour] [Identity]

Possibilities on Physical, AR, MR interfaces

With AR technology, to connect with people (who participate in the exhibition together, LS employees, etc.) and physical materials (demo booth, company environment, etc.), currently choose to use the visitor's personal mobile as the main journey feature carrier that the Liquid Studio Passport in this project will be designed as an AR mobile application.

Serving the integrity of the overall journey flow, as a self-guide controller, personal mobile phones can provide full-line support. In addition, for now, compared to the promising AR glasses that can achieve mixed reality technology, the development of mobile phone applications is more practical, and to implement journey earlier, so as to extend to a richer platform base on testing and evaluation to further developments. (figure 5.10)

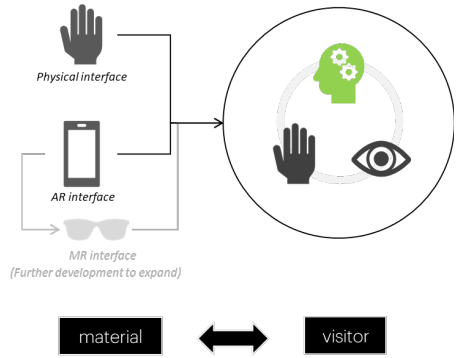


Figure 5.10: *Function carrier possibilities for the journey*

e.g.
Since the company is located in a compound office building, the guidance to enter the building towards the exhibition area can be achieved by micro navigation (in the AR environment, after the environment is scanned, the guidance information layer is added corresponding to the spatial conditions). Compared with manual guidance, autonomous exploration is more interesting, and a more comprehensive understanding for future activities in it. As shown in figure 5.11, it is showing a similar idea which is designed for airport (Řezníček, A., Bagin & Stranak, 2018).

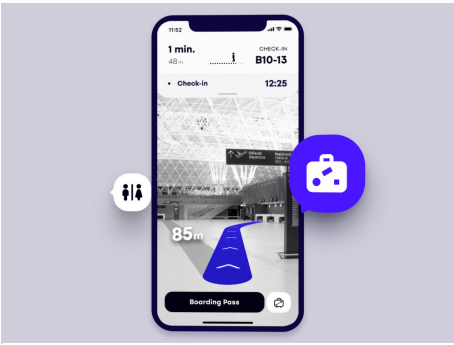


Figure 5.11: *An AR application designed for airport is navigating the user indoor via the digital interface with virtual animation instructions (Řezníček, A., Bagin & Stranak, 2018)*

Modularizing journey to be adaptable to visitor and company changing requirements

Under the main guideline, there are two layers of branches: the AR self-guide program (AR City Quest), and a group of technology booths (demo showcases). The materials displayed on each booth show a corresponding one technology.

Under the circumstance that the visitor is consciously reasonable or the company has the certain plan, the experience or arrangement of some branch modules can be reduced, and the main line can still be established. For example, if a demo run into error, or the visitor does not willing to try out AR application at all, then these branches will not contribute to the visit, but the journey can still be completed.

For these relevant projects, I work as a member of the development team as described in the introduction.

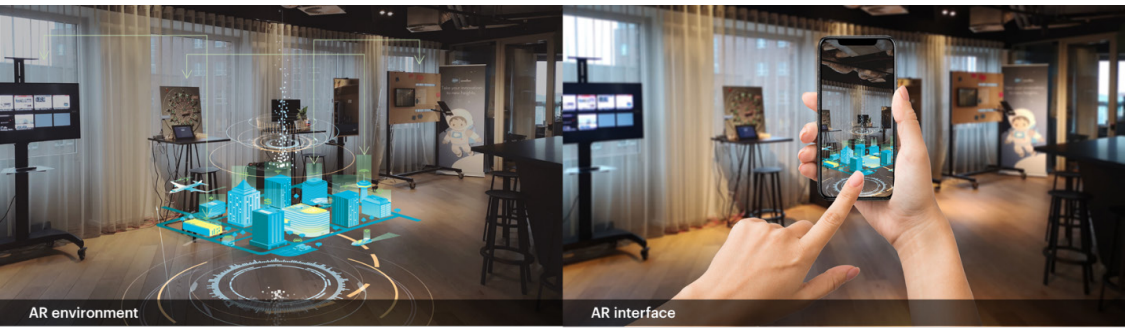


Figure 5.12: *A render displays the virtual city concept in AR environment (attempt as mixed-reality possibility as if see through AR glass) vs. AR interface on mobile screen*

About AR City Quest Concept

This is a self-guiding program in game format under a storyline. The story carrier is a virtual city (figure 5.12), which works as a map guiding the visitors among the tech demos, and the player character is the mayor of the virtual city, correspondingly as the explorer in the real world theme park. The main task is to upgrade the city to meet the needs of the citizens. The upgrade reward is mainly visual feedback, and there is a physical reward after the end (as a souvenir for visiting).

Navigation logic: Each building or area in the city corresponds to a booth in the exhibition area, and serves to display some corresponding scientific and technological services. In the AR game scene, the player selects a building in a virtual city, and accordingly selects a booth he wants to visit, and then the player is guided to the corresponding booth in the real environment.

At each booth, the player receives the AR game task invitation in the booth through the AR interface. After acceptance and completion, the building corresponding to the technology in the player's virtual city is visually upgraded. If the player completes all booth game tasks, the city will be fully upgraded; if only some booths are visited, the corresponding part of the city will be upgraded.

About entering the AR virtual city

A sticker with a special pattern on the ground serves as the entrance to trigger the AR embedded program. After the camera scans it, an invitation pops up in the AR environment, and the player chooses whether to accept it. (The design needs to deliberately guide visitors to join the game, especially those who need this self-service program)

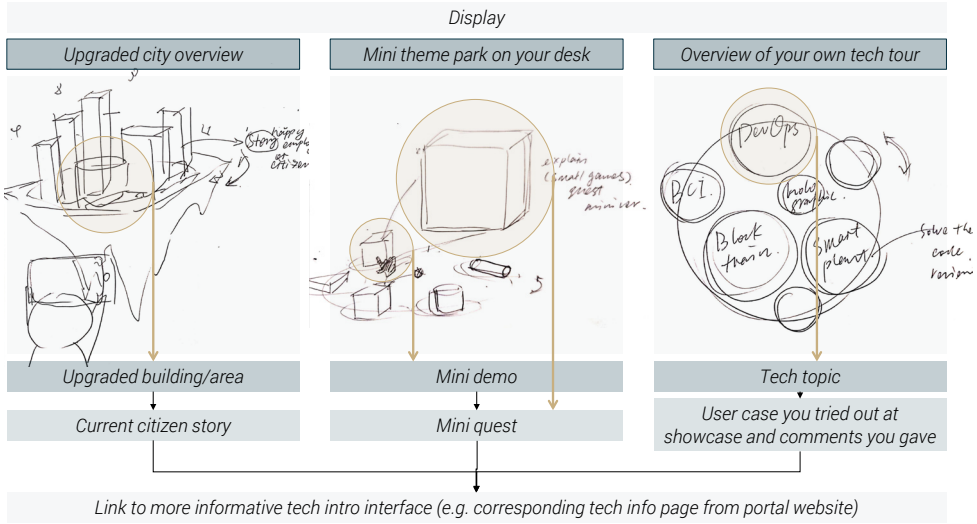
About entering the AR virtual city

The virtual city upgrade is mainly displayed by visual effects (consider further visual coding to strengthen memory points, such as colour coding, the fusion expression of LS and the visiting company's brand colour, which can be applied to the visual effect after building upgrade)

Physical rewards can be collected at the end of the itinerary. Its appearance carries a certain brand image, and it is a visual carrier for a continuous storytelling experience after the game ends. At the same time, it serves as a visual mark for triggering the virtual souvenirs in AR environment (trigger to display relevant AR image that represents visitor's personal exploration experience)

TO BE EVALUATED -
the three sub-subconcepts of the virtual image to trigger visitors personal exploration experience

[End point (takeaway) concepts – QR code AR displays for virtual re-experience]



About each individual demo showcase

Visitor's mobile phone can be placed on the mobile phone stand of the booth (the stand can still be flexibly moved), thus becoming a part of the booth (figure 5.14). The AR information layer plays an explanatory role in the form of micro navigator for the multiple materials within the setup, indicating the aim by presenting certain materials:

1. Introduce general information about technology (e.g. technology concept, value, etc.)

2. Technical working principle (camera visual recognition from physical demo to trigger the corresponding task invitation of city upgrade to allow visitor accept or not, and the corresponding building starts to upgrade after completion)

Take the smart plant as an example (current version, 2nd iteration, figure 5.13):

Drag and drop game to learn how it works (drag the icon of the parameter type to the correct position, the icon can then become a sensor of the corresponding function, including humidity, temperature and light. After matching the function to position, activate the function of the smart plant, the game is completed)

Figure 5.13: *Current smart plant AR game quest*

3. Establish contact with relevant technical personnel (being AR micro-navigated to the relevant personnel, or the expert cannot reply immediately and issue an appointment request in a certain form) (figure 5.15)

4. Self-explorable user cases by Scenario Mini Workshop programs (Visitors build virtual use demonstrations of corresponding technologies according to their preferences or needs (from another interfaces on the stage rather than the phone, such as an iPad)

Try on session (business context modelling):

Model the demonstration so that the visitor can adjust the parameters in the model program and experience the corresponding demo as a basic model customization on site, where allows visitor try out their own preference on how they would like the demo match with their expectation or propose.

5. Message board or other forms of feedback mechanism

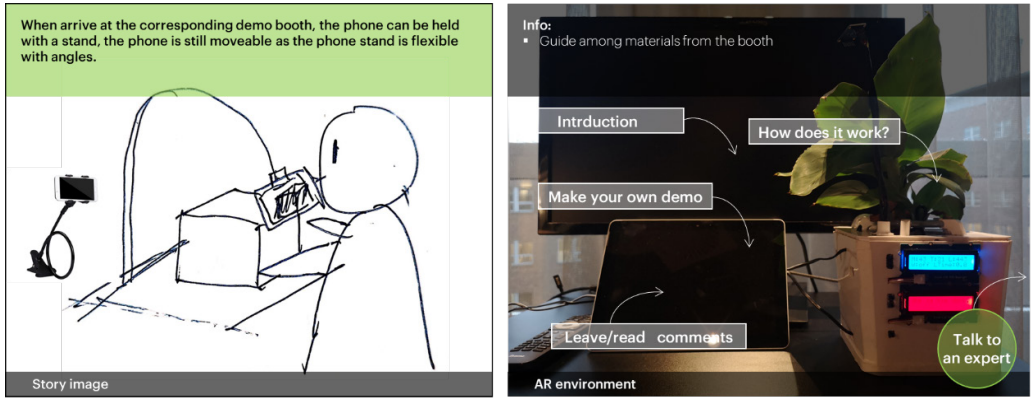


Figure 5.14: *Scenario when put the mobile onto the phone stand that being attached to the booth as a part of it that displays instructions of the showcase presented materials*

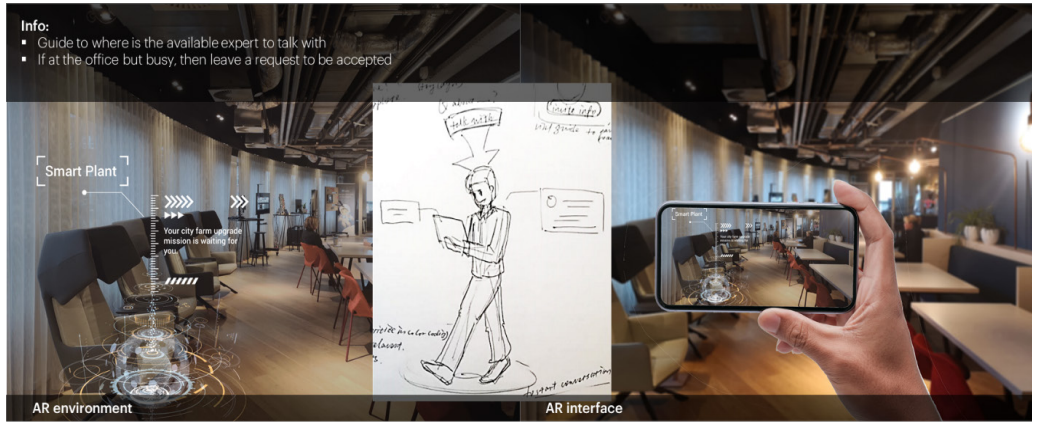


Figure 5.15: *Rendered scenario when user is being navigate to an expert in the office*

Modularizing journey to be adaptable to visitor and company changing requirements

About Guide visitors from the selected building in the virtual city to the corresponding physical booth

TO BE EVALUATED -
the three sub-subconcepts of AR navigation possibilities

[During tour (navigation) concepts – MR possibilities in the 3 navigation elements]

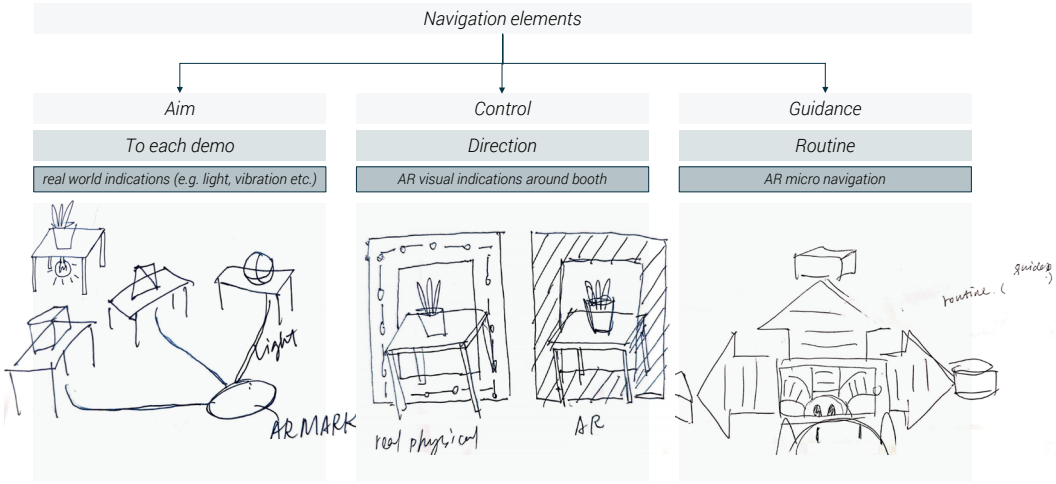


Figure 5.16: *Rendered scenario when user is being navigate to a demo showcase booth (AR visual indications around booth)*

The main line is unique, and the branch line is autonomous

The main line helps visitors clarify linear programming, and the branch line provides reference operation clues to assist decision-making

e.g
Help to organize the information required for visiting the exhibition or the meeting (such as address, time schedule, need to carry or read the file in advance, registration information, etc., figure 5.17), the operation related to the information, and other software that needs to be jumped to (such as the location to jump to The map software starts planning, and the schedule needs to be synchronized to a personal platform, etc.)

e.g
In the AR environment, when the visitor selects the booth to be visited, the system provides auxiliary information.

For example, for each virtual building, its corresponding booth, corresponding technical topic, the approximate time required to visit and learn a certain technology (figure 5.18)

(Provide more targeted selection suggestions without limiting the scope of exploration,to effectively improve the efficiency of visits, for example, according to the business scope of the visiting company (visitor group C), or the general popularity among demos in the park(visitor group A&B))

e.g
The contact information established during the visit, future events or conferences can be included in the passport, that can then be exported and synchronized to other commonly used platforms.

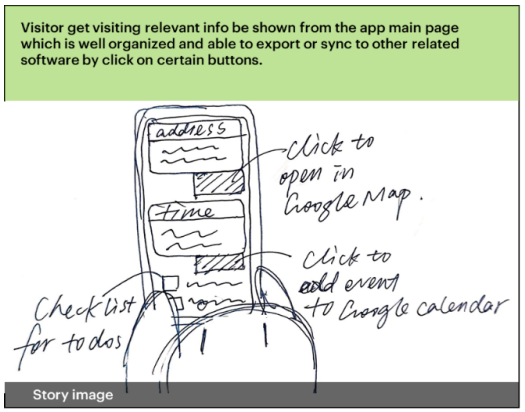


Figure 5.17: *Scenario when use the application as a journey manager*

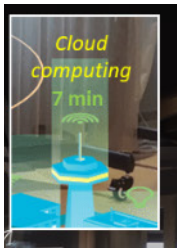
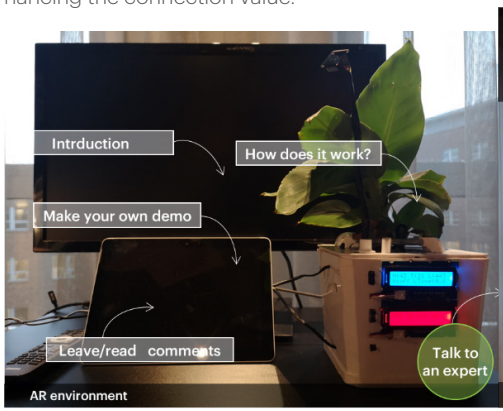


Figure 5.18: *Rendered scenario when side note displays for AR city user to make a choice on go to which demo at the moment (e.g. approximate time needed for the visit, tech topic of the corresponding showcase)*

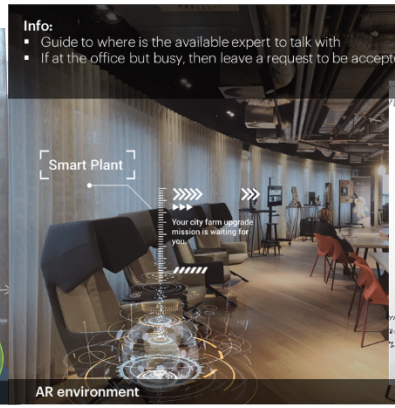
Related communication touchpoint triggered during exploration

About extending the bridge of communication during the exploration process

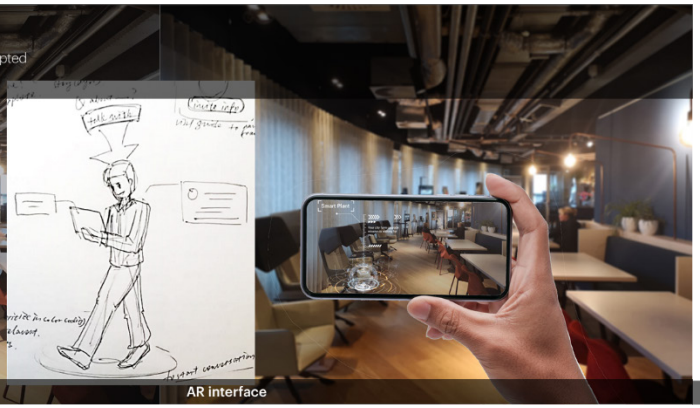
Along the exploring among showcases, contacts can be built with the person who are expert in the certain technology field. Such network building is more targeted, thereby enhancing the connection value.

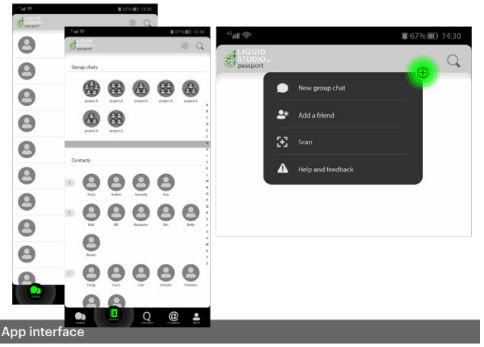


AR environment



AR environment


AR interface



App interface

5.4 CONCEPTUALIZATION ON JOURNEY MODULES

Base on the sub-concepts, a journey with modularized features was conducted. It cover various sub-concepts as last section described. As mentioned, the useful features are included, but none of them is a must done, even the whole new journey plan when consider the real using scenario, though the concept evaluation will require the participant go through all the modules for a full understand at concept level for the corresponding evaluation. As shown in the map below, conceptually, journey modules are map with design elements and interaction qualities along the time line.

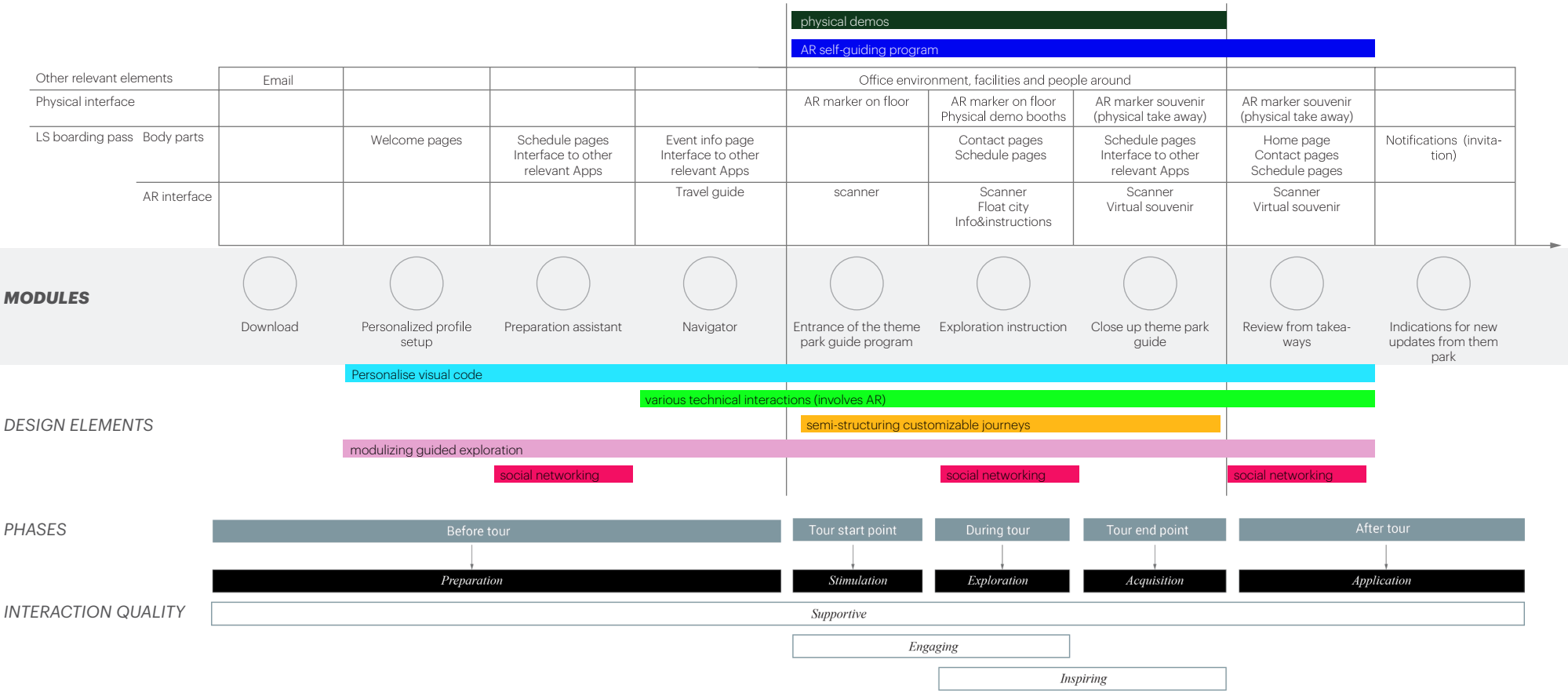


Figure 5.19: *Concept journey map*

5.5 CONCEPT EVALUATION

Research questions

1. Whether the overall journey concept and modules logical for visitors?

   - Any uncomfortable along the process?
   - Any unique or valuable element?
   - Which are the more influential sections?

2. To what extent the overall journey concept matches with the interaction qualities in design goal?

3. How would people evaluate sub concepts on certain parts of the journey?

   - For visual coding concept, which elements make visitors feel more involved among context, colour, and identity?
   - How would be the preference for visitors among human, AR, and MR, to be guided through the journey?
   - As for interactions, how would people prefer when interact environment is transferred from AR to physical real world? Indication from real world, or AR environment?
   - For virtual takeaways, what would be more preferable for visitor?

Evaluation sessions

The session begin with a presentation for introduction to the project (3 min) to give the background information and description throughout the overall journey concept (15-20 min) to let participants understand the concept along a concept story. Then the 9 modules along the storyline (figure 5.22, full story script in appendix O) are evaluated by the participant on considerations if they think the certain module causes discomfort, feels impressive, or being influential among the overall journey.

Then, interview question be designed for participants to answer are basically two types:

- Scaling: 1 to 6 (avoid neutral with small number of testers)
"To what extent you feel the certain phase of the journey is supportive, engaging, or inspiring?"

- Multiple choices: (push to make decision for opinions)
"Which one would you like the best among the 3 potential solutions?"

A storyboard in brief is displayed as well for people to refer to as the journey is rather long, especially when requiring the participant to do any evaluation by imagining themselves within certain scenario. (evaluation template shows in figure 5.20, story telling template in 5.21)

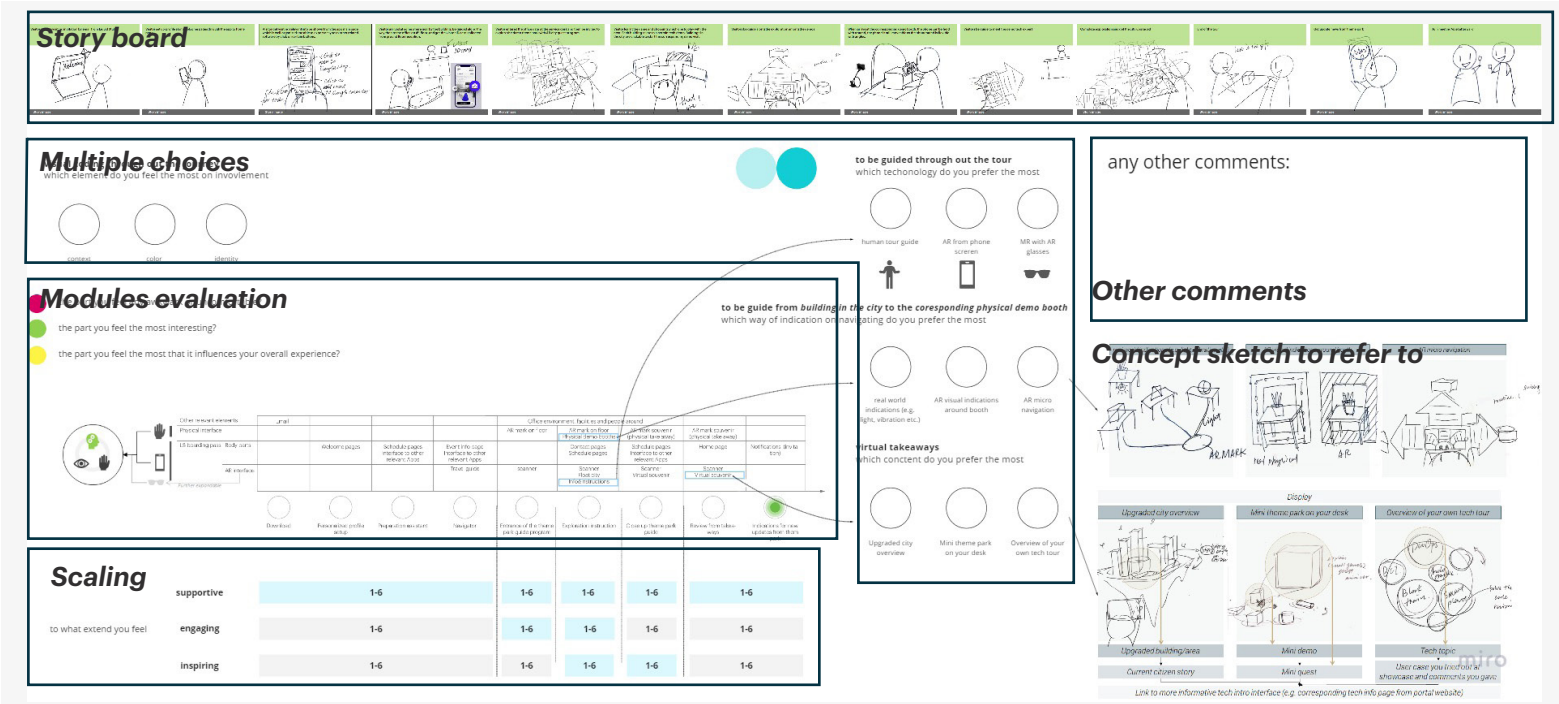


Figure 5.20: *Concept evaluation template*

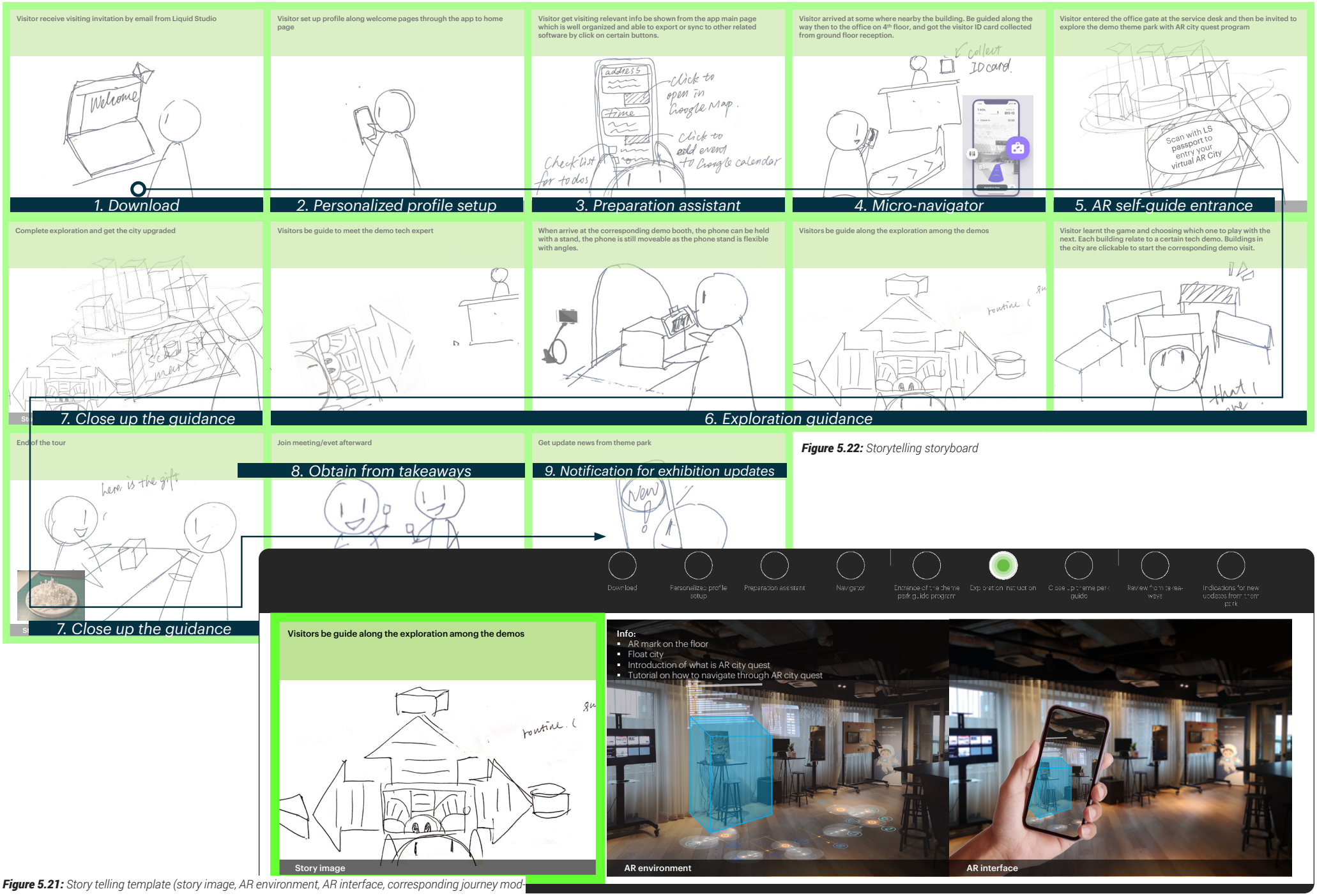


Figure 5.22: *Storytelling storyboard*

Figure 5.21: *Story telling template (story image, AR environment, AR interface, corresponding journey mod-*

Participants
To evaluate the concept, participants were selected according to targeted visitor groups as shown in the top in figure 5.23. As the main aim of doing such a evaluation is for optimizing the overall journey at concept level, some of their professions were chose to be relevant to design, while at the mean time also have some of them with more as a potential visitor rather than a designer from other perspectives.

Results
Regarding the interaction quality of the journey flow, the result shows by heat map which shows a positive result in general in figure x.

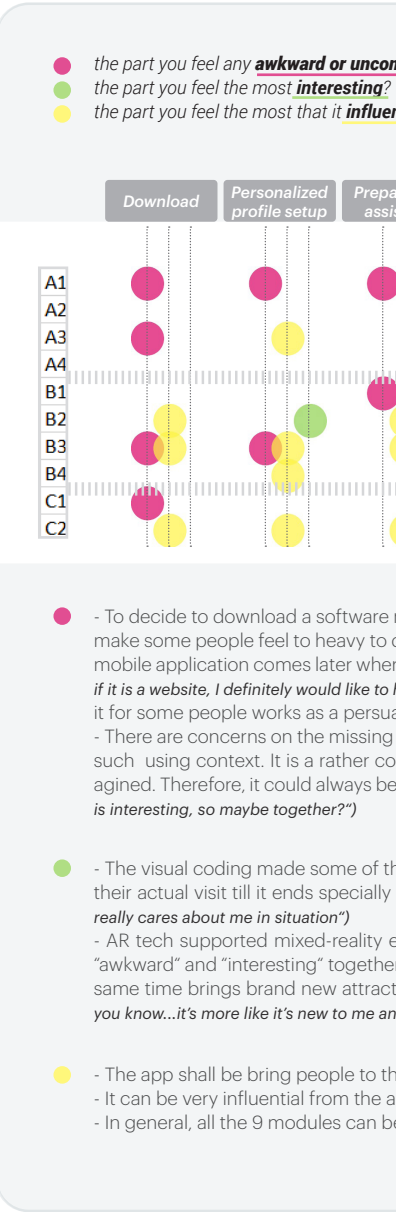
In general, overall is logical and smooth. More insights related to the sub-concepts are revealed along the next pages together with evaluation results. These as the insight are directing the final design outcomes.

		profession	Current location	before	start	during	end	after
	A1	computer science	California	5	4	4	5	5.5
	A2	Architecture	Zhejiang	5	3	4	3	4
	A3	Design innovation	Philadelphia	5	5	5	5	6
	A4	Animation	Guangzhou	4	5	5	6	4
supportive	B1	Industrial design	Eindhoven	5	4	5	5	5
	B2	computer science	Utrecht	6	5	6	6	5
	B3	Industrial design	Eindhoven	5	2	4	4	3
	B4	Design for interaction	Delft	5	3	3	5	3
	C1	strategic product design	Amstelveen	6	4	4	5	5
	C2	Manufacture	Denver	5	6	5	6	6

				before	start	during	end	after
	A1				4.5	5		
	A2				5	4		
	A3				4	5		
	A4				5	5		
engaging	B1				4	6		
	B2			4	4	5	6	4
	B3			2	4	6	5	5
	B4				2	5		
	C1			3	6	5	4	4
	C2			5	6	5	5	5

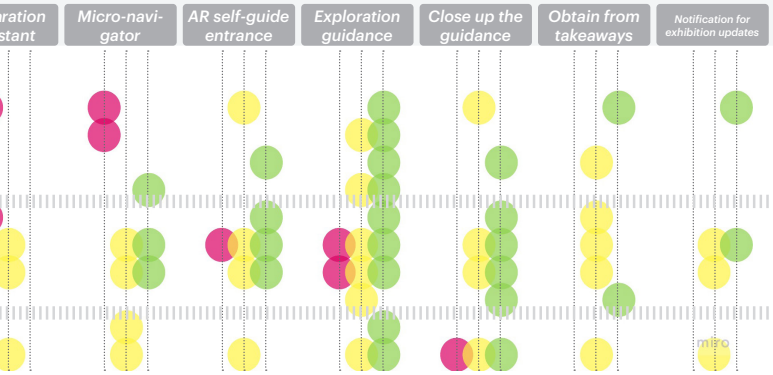
				before	start	during	end	after
	A1					5.5	4.5	
	A2					5	4	
	A3					6	6	
	A4					5	6	
inspiring	B1					6	5	
	B2			5	6	5	6	5
	B3			2	6	6	5	4
	B4					4	4	
	C1			3	4	3	3	3
	C2			4	4	6	4	3

Figure 5.23: *Heat map of interaction quality evaluation result with selected test participants*



nfortable?

nces your overall experience?



may not be a common choice for visitors when it just begins. New applications in cell phone do so for a day visit as expected. It could be more appropriated in web pages from a link and e there shows a stronger reason to do so. *("I just really don't like to install applications to my phone, have a look, there's no stress then")* Otherwise, encourager should be design rather effectively as asion.

of human guide that some participants shows strong demand on human interactions within mplex place for them to learn and explore so that question may come up frequently as im- convenient to ask people around directly. *("I still prefer a human guide with me, but the application*

he participants feel being well cared as a visitor that it reflects as a carefulness in advance of for them. A sense of personalization can be effectively bring out already. *("I feel the company*

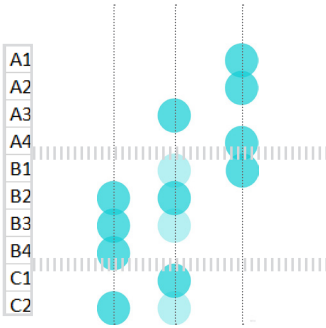
xperience is suggesting the journey attractive and fluent. Some of the modules shows as r is mainly due to the new interaction format which could be a challenge for them, and at the tive experience as expected and imagined. *("I don't know..I feel it's awkward, but not in a bad way d I guess it will be awkward in a way...but other than that it sounds very interesting")*

he physical demos rather then fix their eyes to the screen
ctual design of the app that how it is well integrated certain features for using scenarios. e useful, and together framed an experiential smart journey which is fluent.

Visual coding

Colour	Universal understandable; easy accessible;
Identity	Effective when business or commercial related
Context	Most effective; may disturb from key point

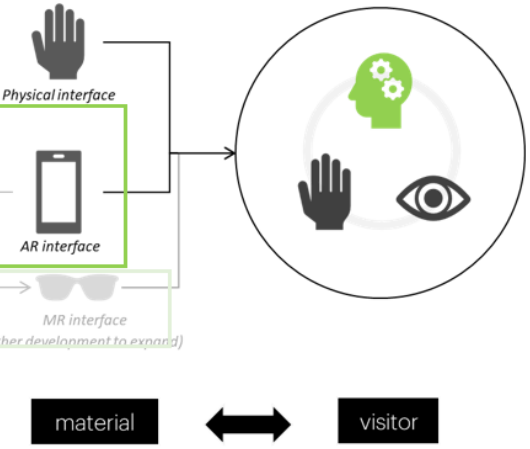
to be guided through out the tour
which technology do you prefer the most?



Journey carriers

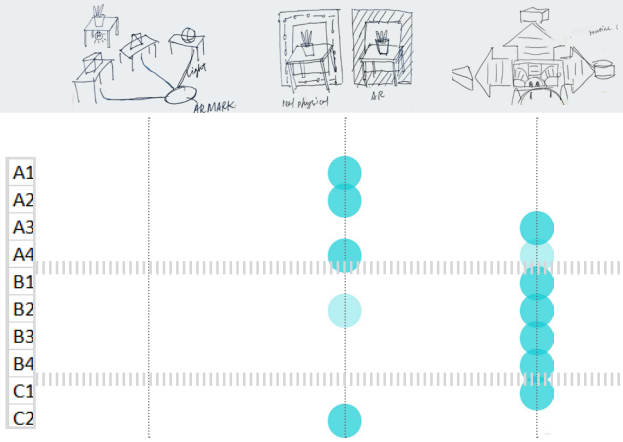
Easy combine with human factor (e.g. share screen), or manage behaviours for business context (compare with glass, understandable for other people in the environment)

Could be more preferable for younger generation



material ⟷ visitor

to be guide from building in the city to the corresponding physical demo booth
which way of indication on navigating do you prefer the most?

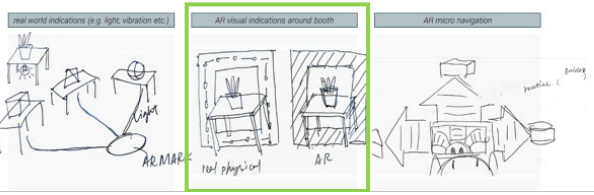


AR city display

A mark can also work as a poster for relevant news updates in physical overall setups;

Less flexible for theme park update or adjustments
Not convenient for visitors to use that they will need to move to the right point all the time
Background is full of content but can also be annoying

Navigate formate to booths



Combination between RR&MR;
Path contribute less in small space;
Physical indication may be challengeable for group of individuals are exploring

At the showcase booth

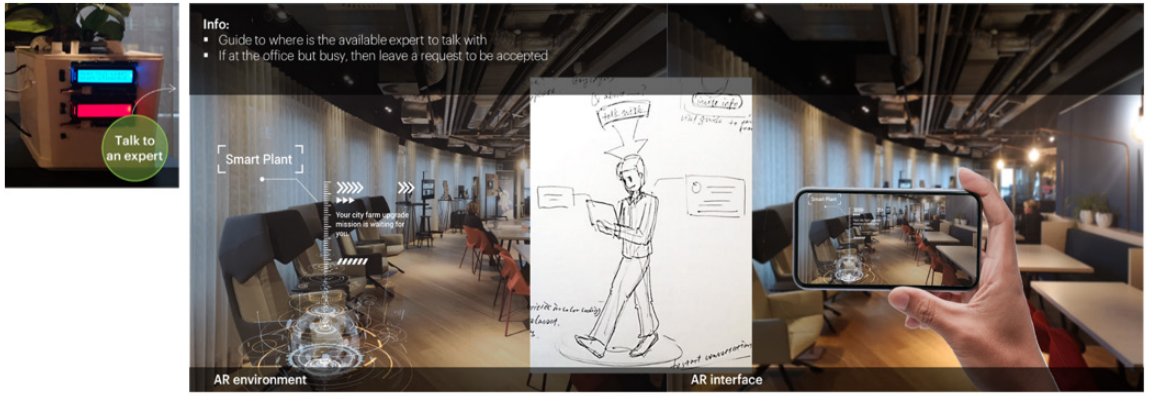
Build using scenario by visitor, tech DIY workshop, helpful for visitor think further to use cases that can benefit to themselves

Need enough information for visitor to understand why they are playing such a game (help build the logic and promote effective self-learning)

Google Jamboard like interface for visitor easily express idea and anonymously iterate on each others' inputs (work as cocreation to inspire LS from visitors)

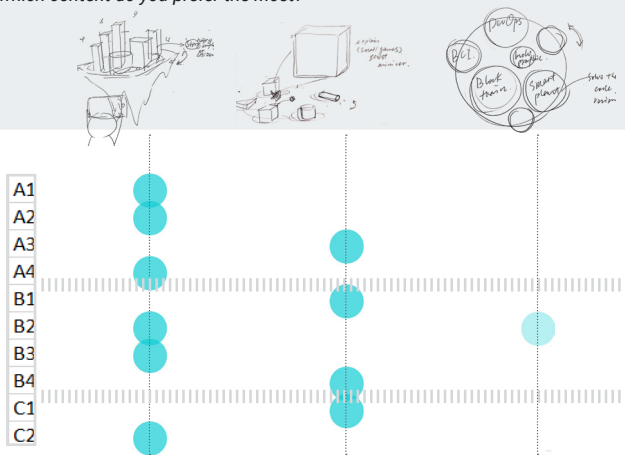
Valuable to be realised, but need to be well designed (mechanism that both friendly and effective for visitors and LS employees)

Talk to an expert



Valuable to be realised, but need to be well designed (mechanism that both friendly and effective for visitors and LS employees)

virtual takeaways
which content do you prefer the most?



- The city overview is selected as the most preferable format, but info elements from the their two selections are also valuable for visitors.

- People who did not choose city version tend to state their opinion as:
  "What I need is the technical relevant information be accessible after my leaving that can be used in later days. The city format is interesting, it reminds me my visit, but other than that but not useful"

06

PROPOSE A FINAL DESIGN
CREATE & EVALUATE

A final design is proposed base one previous processes. This chapter explains the final out come which is the redesigned journey flow, and the redesigned journey map. Prototypes were made to evaluate the final deign that addressed out for final conclusions and recommendations in further developments.

Chapter Overview


ake your innovation
to new heights.

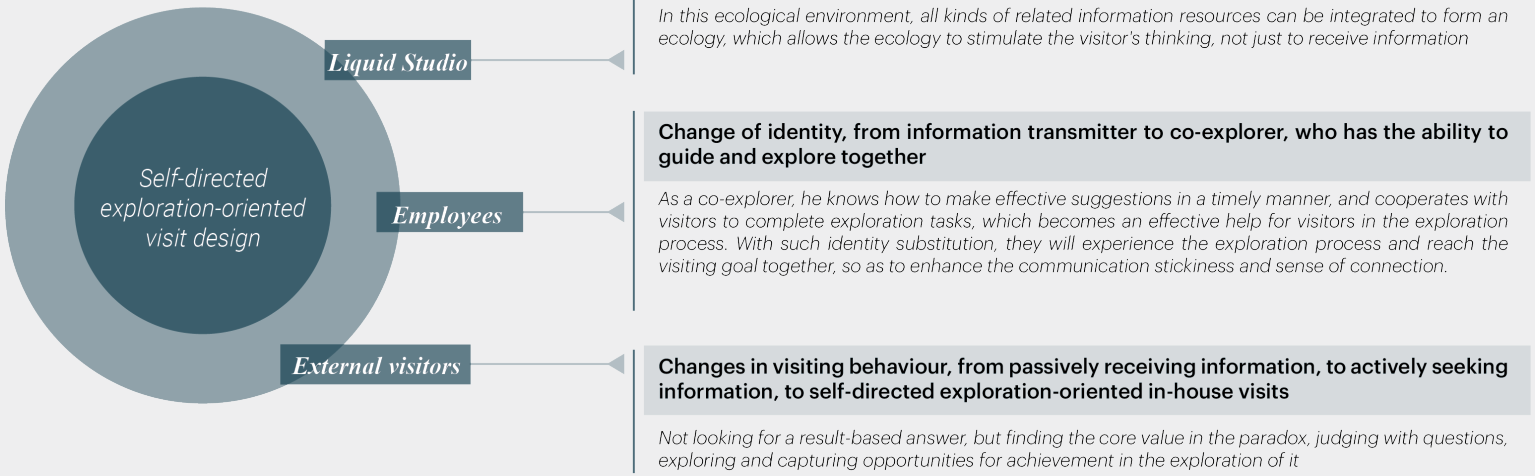
6.1 FINAL CONCEPT IN CONCLUDE

The concept is named as Liquid Studio passport, include the journey design and relevant feature carriers. In general, the value of the planned exhibition itinerary aimed to be improved through the corresponding technology carrier. The role of the carrier is the transfer and control platform of information collection and behaviour path in which brings out the “passport” as the concept as the useful materials are as the stamps being collected and reflecting obtains along the journey.

6.1.1 Role changing

It is trying to transform the exhibition-based communication from information receiving to extending for new opportunity exploring. In the era of flexible access to the environment, enhance the depth and height of information that can be received and integrated by on-site visitors

Comparing the concept of LS passport with traditional visits, it reveals mainly on role changes:



6.1.2 Desired interactio

The concept aim for bring in the visitors m
into the exhibition context so that let the
ibility of information packages be activated
the visitors. Figure 6.1 illustrates the enhan
interaction logic model and figure 6.2 rev
the desired interaction vision.

Figure 6.2: *Liquid Studio and the studio visitors are co*

on vision

nore
flex-
d for
ced
eals

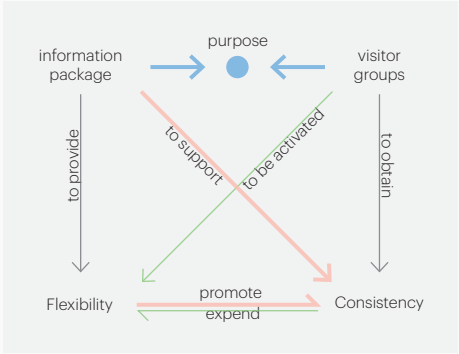
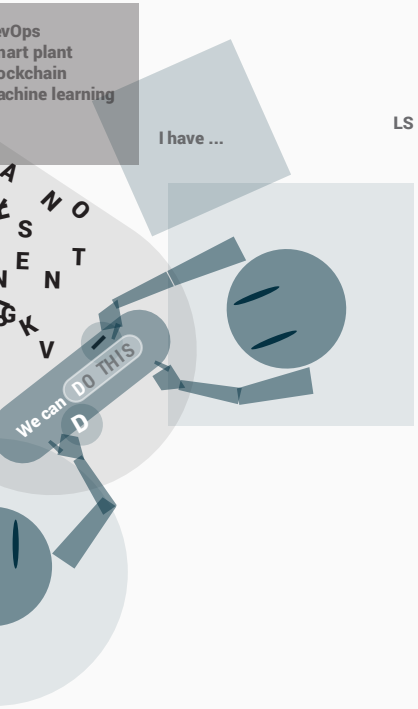


Figure 6.1: *Enhanced interaction logic*



ollaborating for a common goal

6.1.3 Conceptual model shall be realized through technology carrier

Theme park exhibition as the fusion of reality and digital, to provide mixed-reality experience. (figure 6.3)

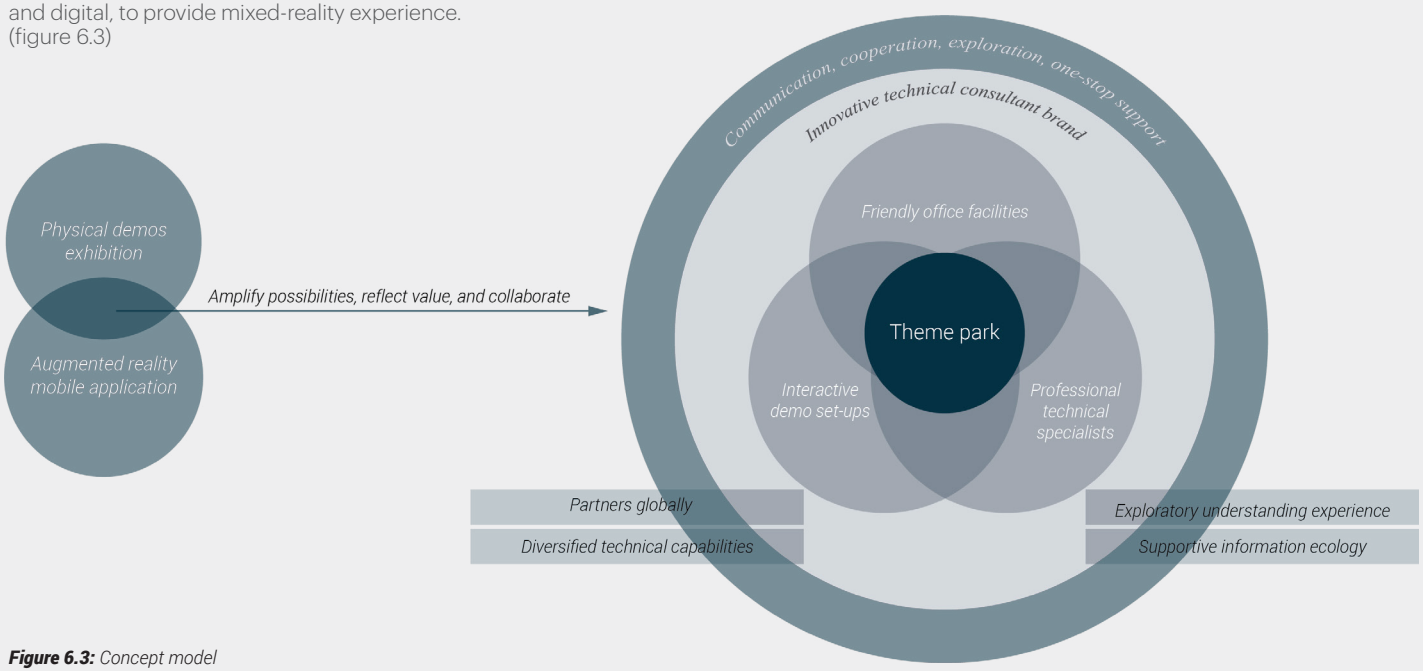


Figure 6.3: *Concept model*

6.1.4 Concept mission and vision

Mission

- *Compatible with the development of the company, show the company's technological innovation and technical capabilities*
- *Combine new technological innovations to stimulate new business opportunities*
- *Create a vital visit experience and promote the relationship between the company and visitors*

Vision

Inspire LS tomorrow

6.2 FINAL JOURNEY DESIGN CONCEPT

The final journey design concept is illustrated as the figure on the right, called 'the Liquid Studio Passport Visit Plan'. It serves both side as the visitors and the Liquid Studio as the presenter. It transforms their roles from each along the three step concept visit flow.

The three steps for the visitors is to let them be able to build their own portable exhibition, while the features provided via the journey carriers to help Liquid Studio personalizing their resources and materials that can be matched for any particular visitor demands. The carrier currently as decided is to be an mobile AR application.

Before the actual visit, apart from assisting doing the preparation, the app could provide features to allow visitors foresee their visit. During the visit, it assist visitor to collect any useful materials conveniently. When the visit end with all the material collected in the passport app, they could realise a personalized version of the exhibited knowledge package be portably took away with them, even leaving the physical environment. The material can be collected may include any images, documents, contacts, events, programs, etc, which can be useful in later communications internal or external the visit group (Liquid studio employees and visitor's peers).

Visit planner by AR mini demo exhibition
AR program that presents a miniature of the overall demo exhibition of the real showcases in physical Theme Park. Liquid Studio suggestion and peer selections could be referenced for visitors to plan their personal visit list, and align the visit team in this way in the very beginning. This is an added feature after concept evaluation analysis.

The journey flow (figure 6.5) and journey map (figure 6.6) are designed accordingly and presented in the following pages.

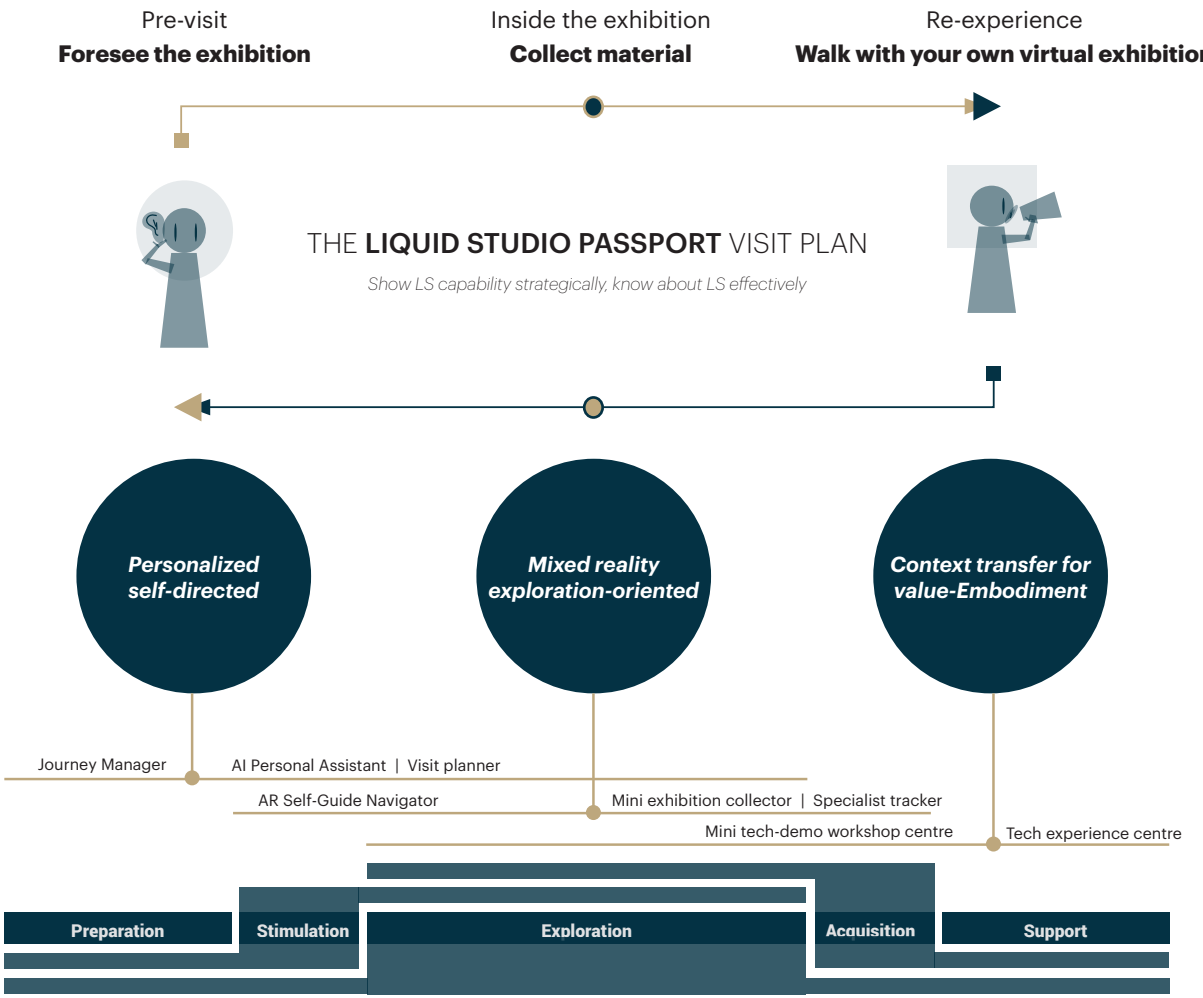


Figure 6.4: *Journey design concept*

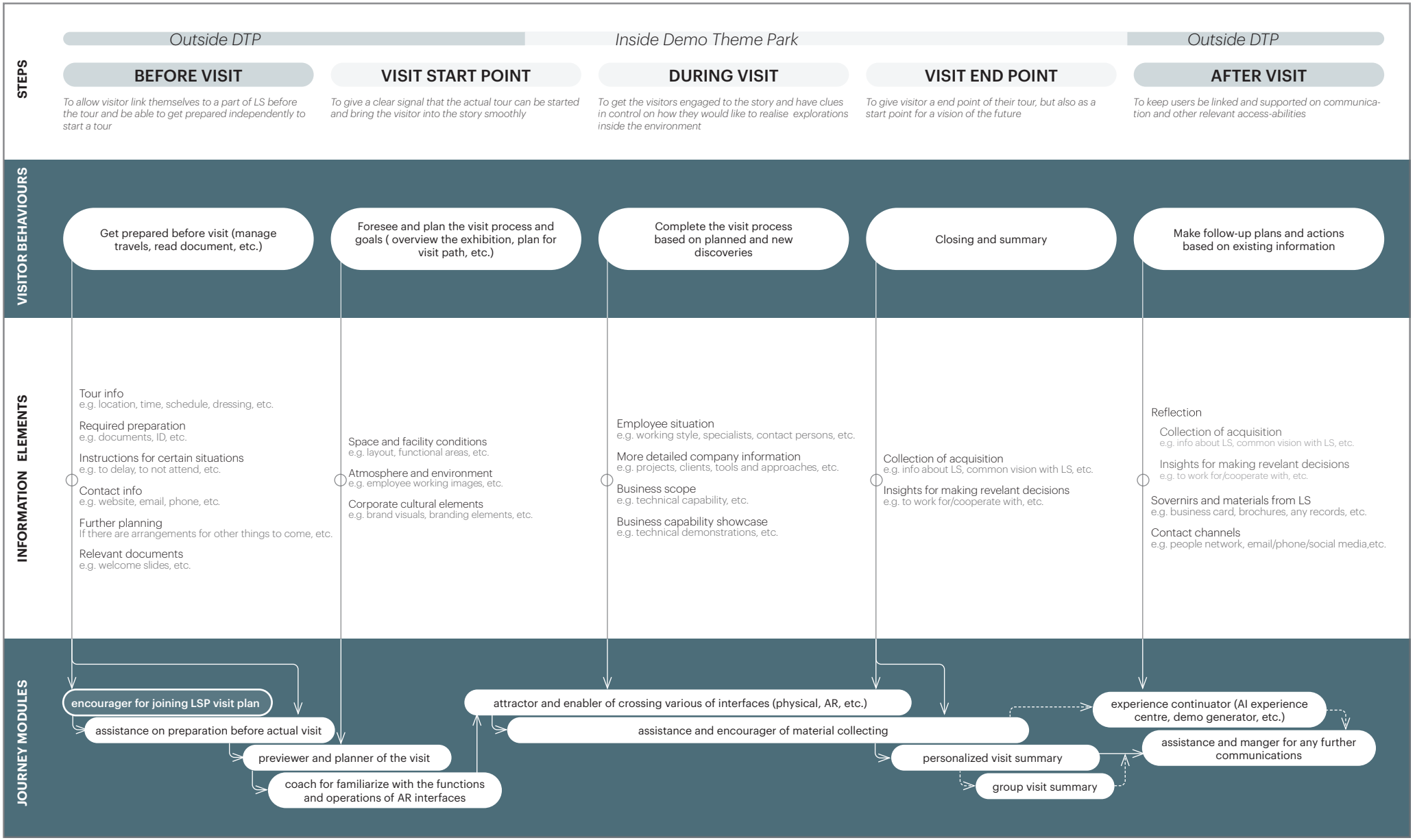
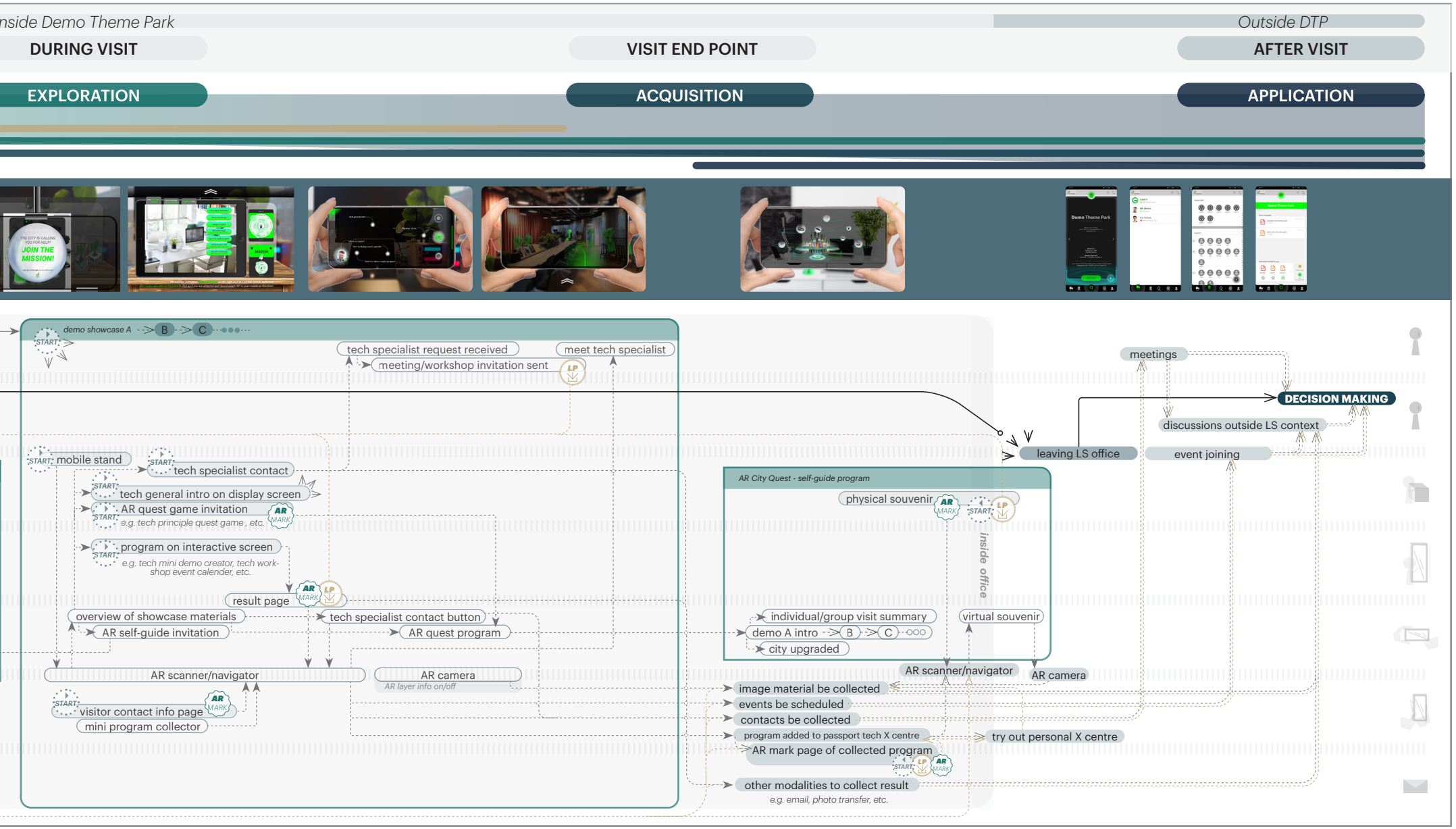


Figure 6.5: *Redesigned visit flow*

VISITOR JOURNEY MAP

Figure 6.6: *Redesigned visitor journey map*

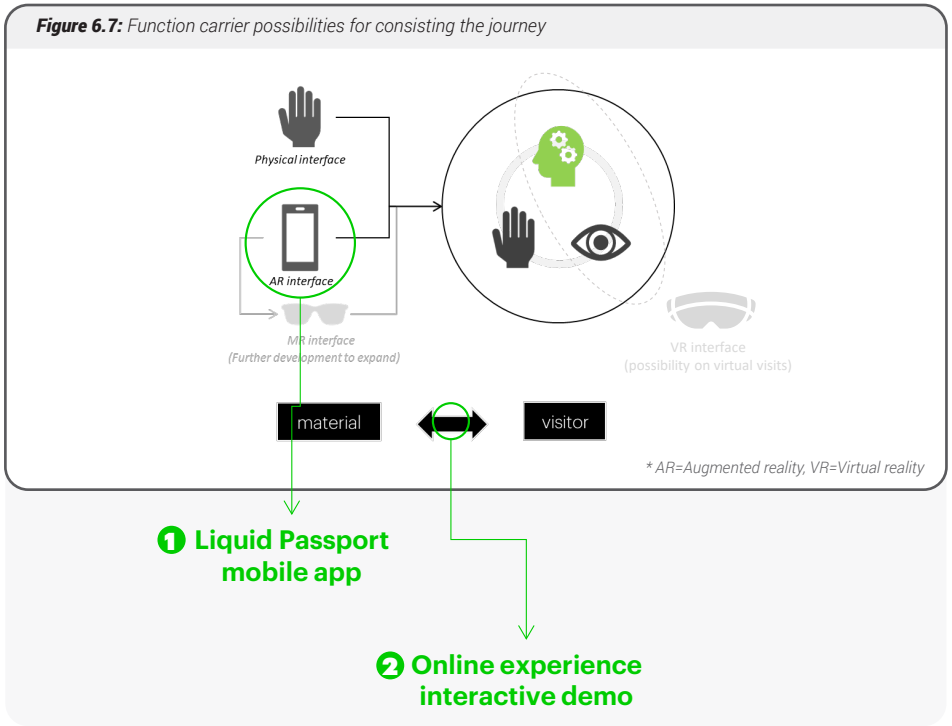

nside Demo Theme Park
Outside DTP
DURING VISIT
VISIT END POINT
AFTER VISIT
EXPLORATION
ACQUISITION
APPLICATION
demo showcase A
B
C
START
tech specialist request received
meet tech specialist
meeting/workshop invitation sent
LP
meetings
DECISION MAKING
discussions outside LS context
leaving LS office
event joining
mobile stand
tech specialist contact
tech general intro on display screen
AR quest game invitation
AR
MARK
e.g. tech principle quest game , etc.
program on interactive screen
e.g. tech mini demo creator, tech work-shop event calender, etc.
result page
overview of showcase materials
AR self-guide invitation
tech specialist contact button
AR quest program
AR scanner/navigator
AR camera
AR layer info on/off
visitor contact info page
mini program collector
AR City Quest - self-guide program
physical souvenir
inside office
individual/group visit summary
demo A intro
city upgraded
virtual souvenir
AR scanner/navigator
AR camera
image material be collected
events be scheduled
contacts be collected
program added to passport tech X centre
try out personal X centre
AR mark page of collected program
other modalities to collect result
e.g. email, photo transfer, etc.

6.3 PROTOTYPE

As mentioned earlier, there are many possibilities for choosing the main carrier for functions that consists the journey. As summarized in Figure 6.7 below, the richness and format of carrier can be extended gradual along development. To initiate, mobile application will be selected for both tests and developments as discussed.

Regarding the experiential verification, due to the corona situation, though currently not able to attend inside office, an online demonstration with the visualization scenarios can be a feasible attempt. The green circles indicates the 2 prototypes made for user tests.

Figure 6.7: *Function carrier possibilities for consisting the journey*



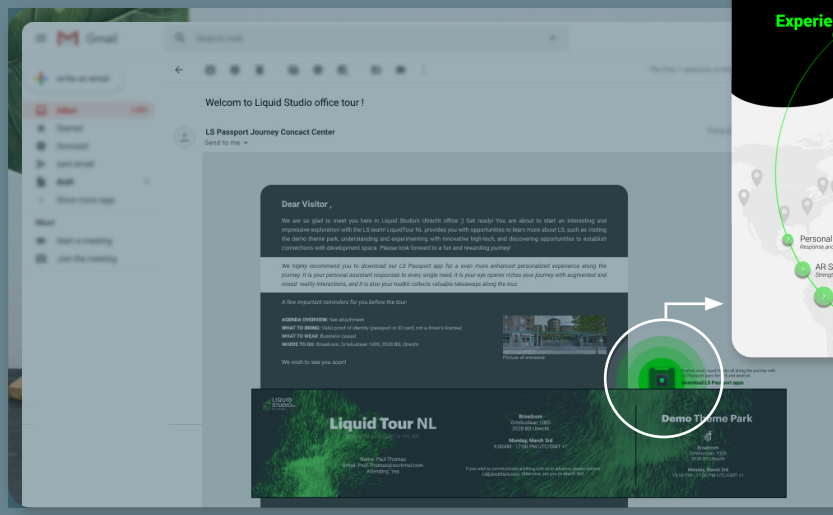
Liquid Passport mobile app
The prototype is the demonstration of interactive interface of the non-AR part of the mobile application (size in screen of iPhone 11).

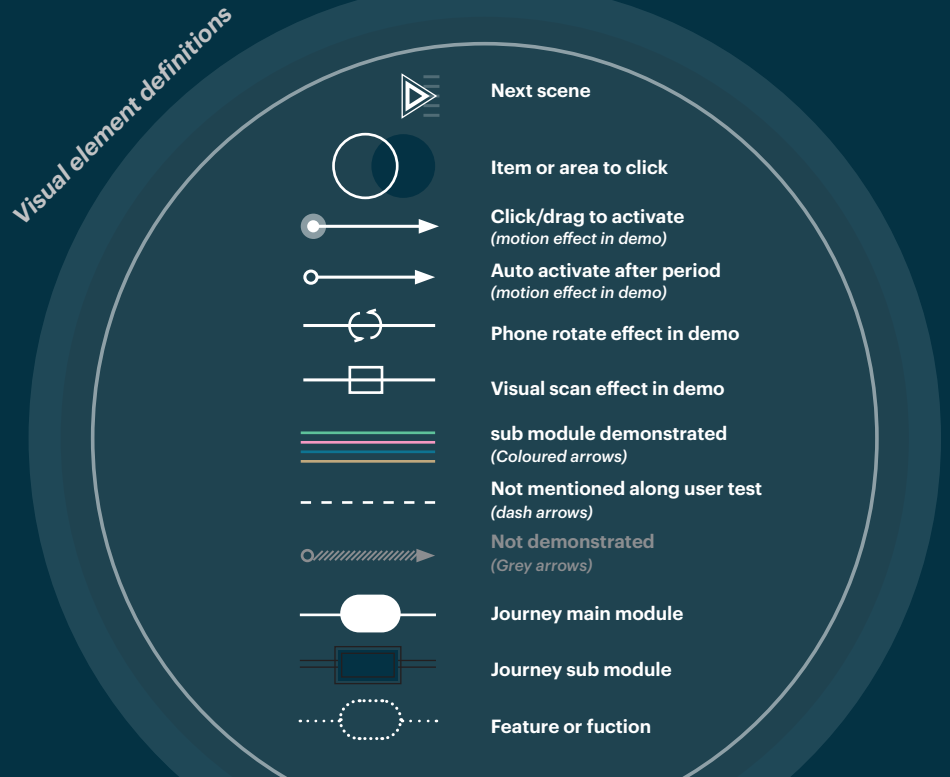
Online experience interactive demo
It contextualized virtual demonstration trying to provide experiential information for virtual visits. Visitors can then virtually experience AR interactions and journey flow from the screen and bring in the using context by storytelling.

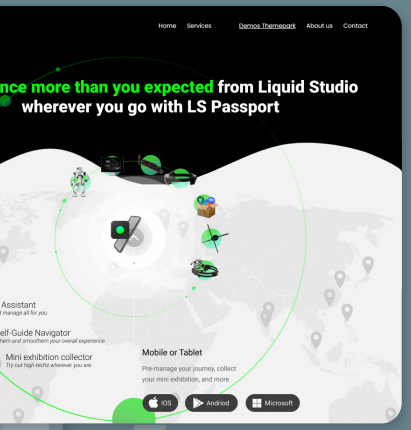
In addition for demonstrating certain functional modules and work-flow, they are also attempts on visual design in concern of Liquid Studio branding. Both were made in online interface design platform, Figma (www.figma.com). Main features, interfaces, and interaction flows are explained in following pages. It demostrates the full journey that combines interfaces from demo 1 and 2 along the storyline of demo 2.

Email visit invitation
Visit specifications and invite to join Liquid Passport visit plan

Online experience interactive demo

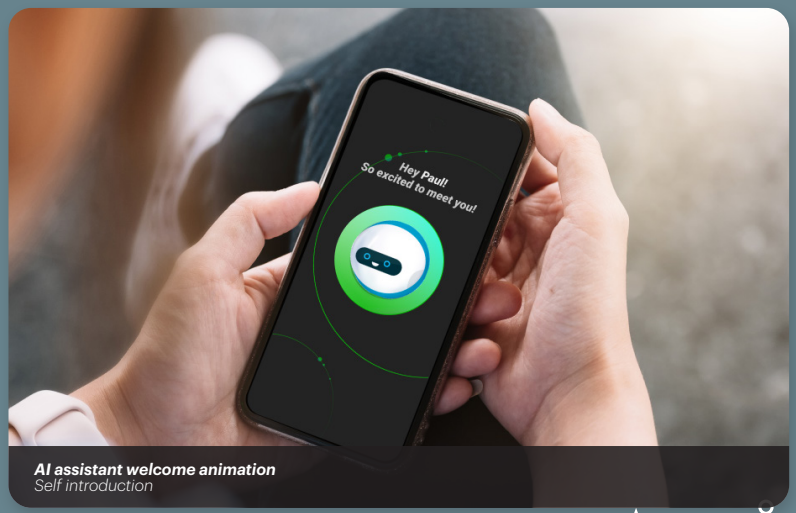






Download web-page
Liquid passport mobile application

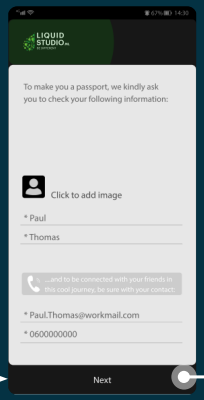
Install to personal mobile
Liquid Passport introduction by AI assistant (Liquid Q)



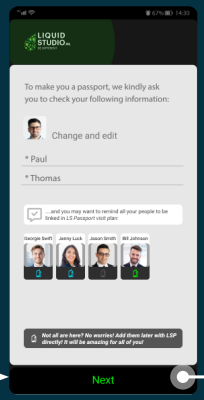
AI assistant welcome animation
Self introduction

Liquid Passport mobile app

Welcome animation
Visual abstraction that suggests a combination

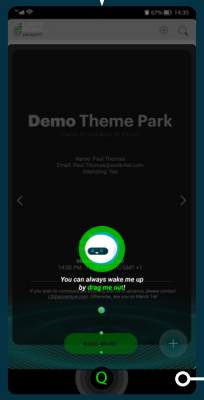


Visitor profile
Check point for pre-filled contact info

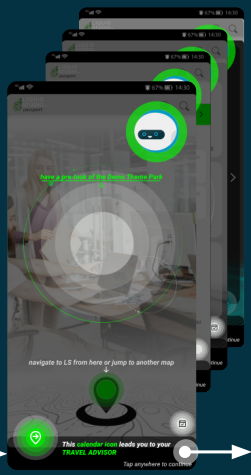


Visit group over-viewer
Overview of co-visitors

Registration done
To get access to functions

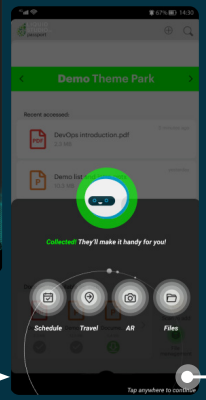


AI assistant
Introduce on how to activate AI assist

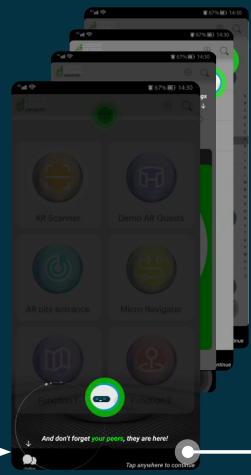


4 key modules
Introduce key features for visiting events

- *AR explorer, Travel advisor, Event manager, File manager*



Summarize
4 key features benefit for visiting events



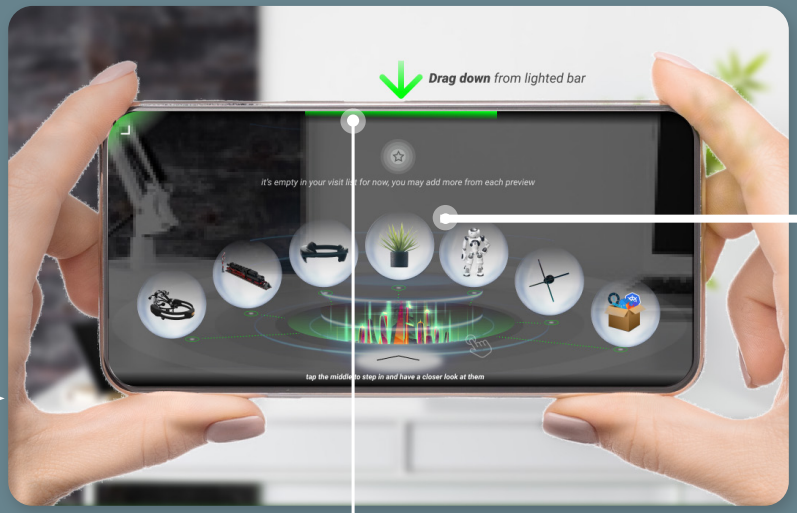
Communication
Introduce key communicational features

- *Personal profile, contact book, chatbox*

Registration | **App tutorial**

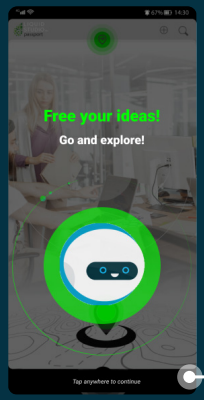
Final design

AR mini demo museum
Previewer and planner (visit plan empty)



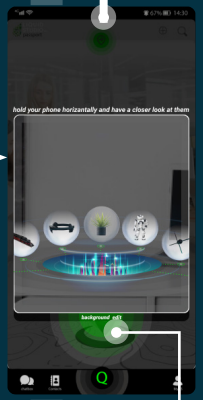
AR mini demo museum
Previewer and planner (demo are selected and added to visit plan, include AR self-guide program that the middle image changed from green to blue)

rotate mobile to horizontal



End of tutorial
Final tips

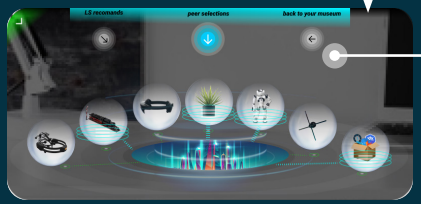
AR showcase entrance
In Journey manager page



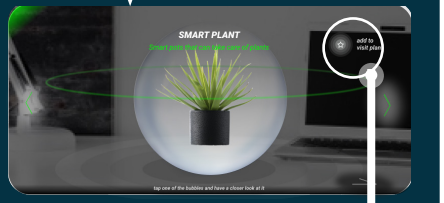
AR showcase overview

background edit (AR, NON-AR, customize, light on/off)

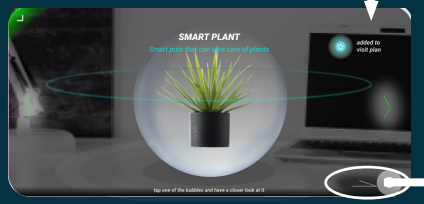
Recommendation from Liquid Studio
Base on visitor personal background



Peer selections
Co-visitor's visit plan overview



General info of certain mini showcase
Correspond to a physical demo in office

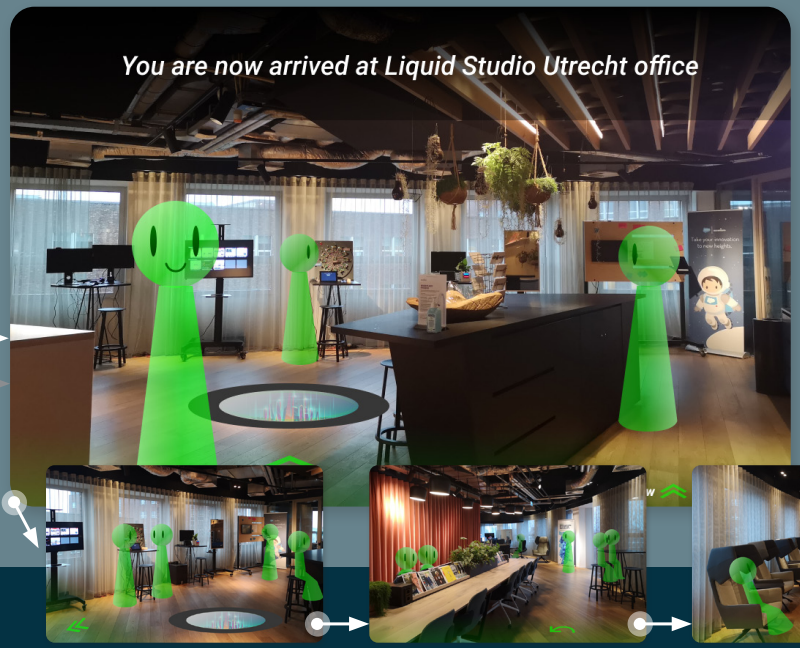


Showcase added to personal visit plan
can be seen by co-visitors can LS agent

Overview of personal visit plan
can be seen by co-visitors can LS agent

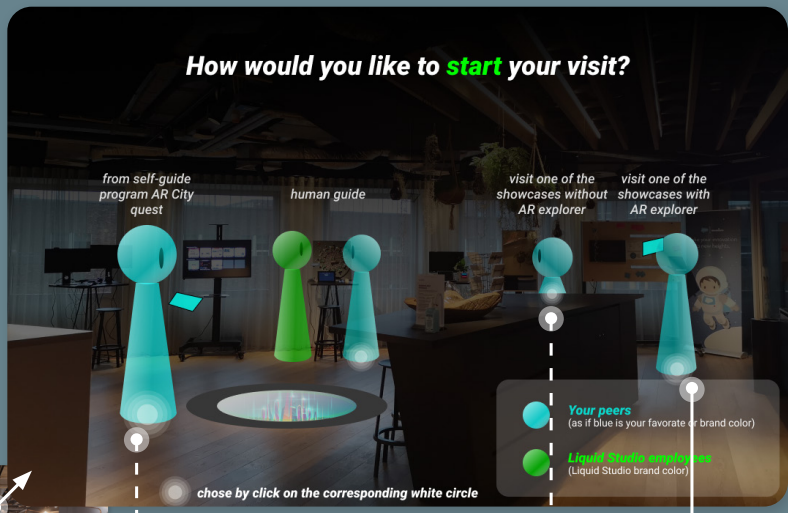
mini showcase visit encourager | **Planer references** | **Build visit plan**

Arrive at Liquid Studio Utrecht office
Animated characters indicates real human, green stand for Liquid Studio employees



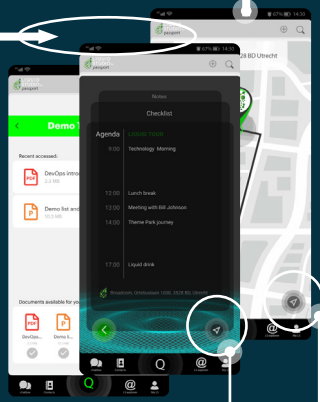
Virtual short tour around Liquid Studio office

4 ways to start demo Theme Park visit
It shall be free for visitor to choose how they would like to start in real visits



AR self-guiding program | At a physical tech showcase

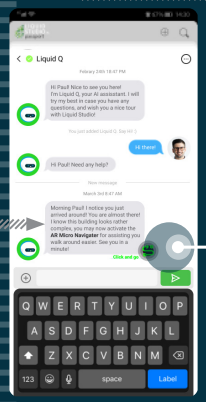
* Sub modules displays from the next page



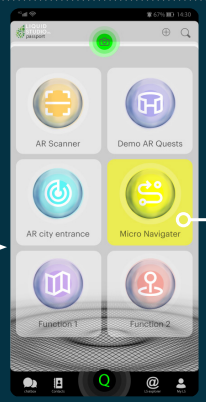
Preparation assistant
Agenda, travel planning, file, etc.

info exportable to other application

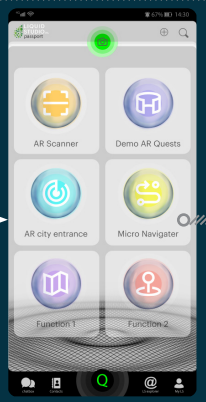
info reviewer/synchronizer



Notification from AI assistant
to activate micro navigator for the exact location of the office in the building



Indication of the corresponding AR scanner in AR explorer page
Temporary indication

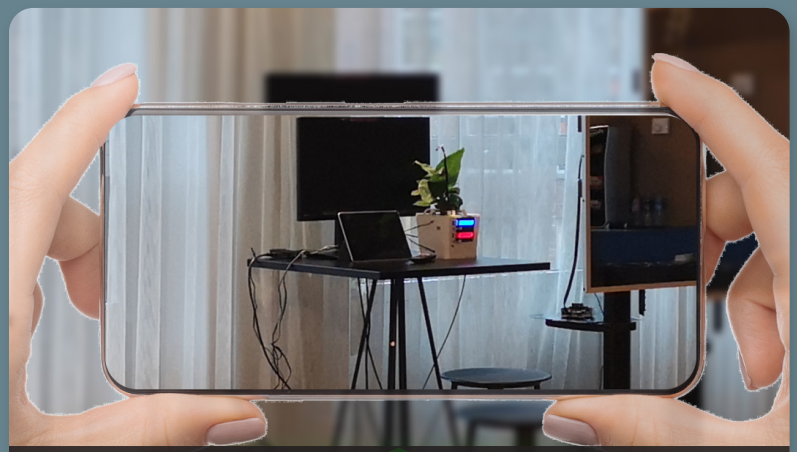


Indication ends
After delay (300ms)

Suggestion for any potential needs

AR self-guiding program

AR scan the AR self-guide program entrance on the floor
camera recognition

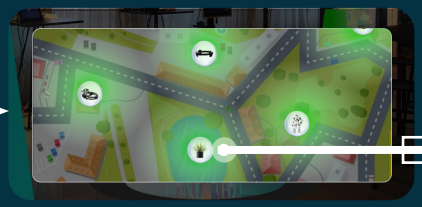


Walking to the targeted showcase
Smart plant showcase as the example

Self-guide navigator

Animation of self-guide activation
Grow from mark on the floor

Self-guide overview
Tutorial ore introduction for first time using



Self-guide AR map
To select the corresponding showcases to visit

Indication to the selected showcase
Smart plant showcase is indicated in this example

Overview of physical showcases
Self-guide in the middle with other demo around

Summary of group visit achievement
Generate useful insights for the group base on visit situations
Personal summary, guide to physical souvenir

Animation of self-guide activation
Grow from mark on the floor

Virtual visual reward after finish certain showcase visit
The visual upgrades as reward

personalized / group visit summary

At a physical tech showcase

Put the mobile to moveable phone stand to become a part of the showcase
Smart plant showcase as the example

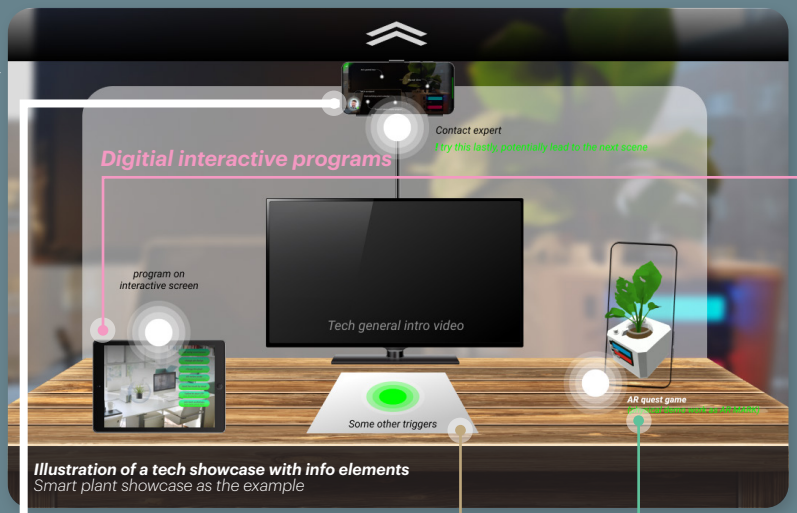
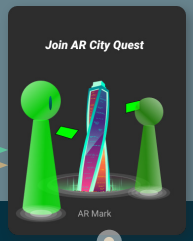


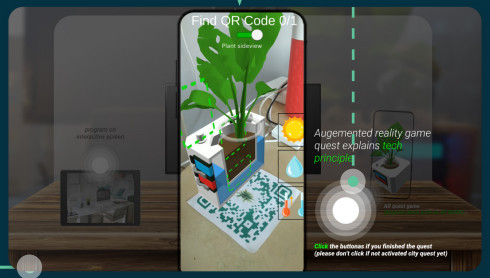
Illustration of a tech showcase with info elements
Smart plant showcase as the example



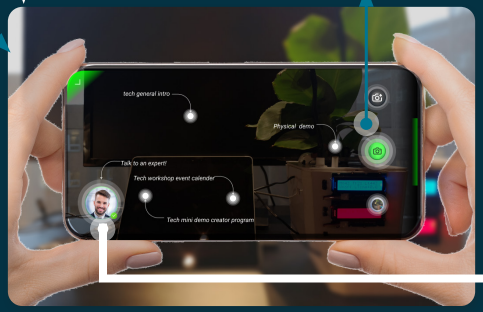
AR self-guide program

Game quest

with/without AR info layer
Take photo

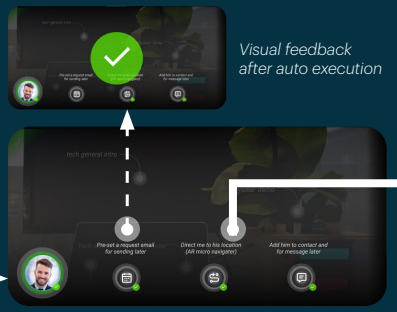


AR quest game explains tech principle
Physical demo as AR mark



AR layer as instruction
Explains elements on the table with some side functions

AR scanner, Contact tech specialist, Photo taker



Visual feedback after auto execution

Options to contact the tech expert
Link the visitor to tech specialist behind the demo with indication whether they are available or not via three contact options

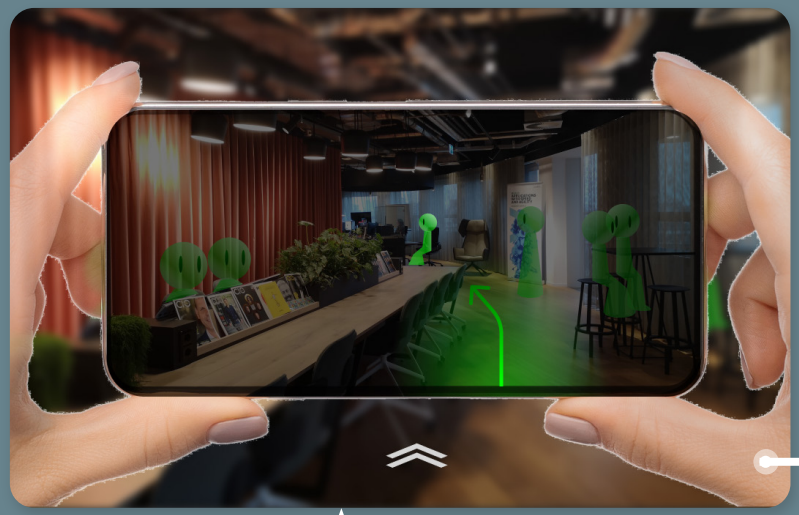
Email prepare, micro navigator in person, send message or add contact in Liquid passport mobile app

AR self-guide program invitation
For visitors not choose to join in the beginning

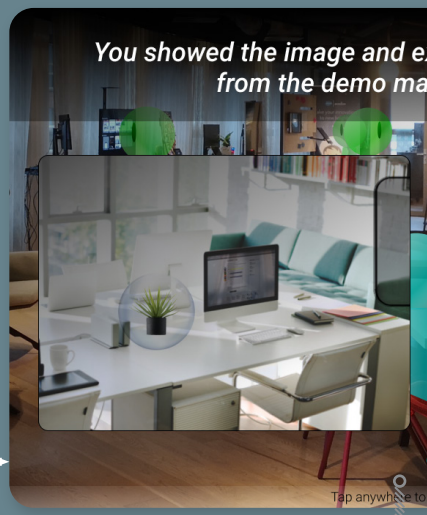
Connect to tech expert

Zoomin to review digital programs at the showcase
Smart plant showcase as the example

Micro-navigator to tech expert
AR scanner (camera recognition on surroundings to plan the path from visitor to expert)



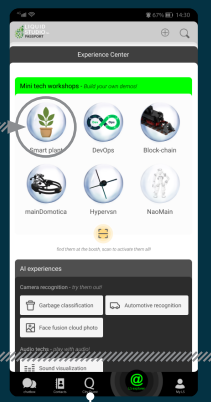
Be connected with expert
Promotion of effective and valuable communication

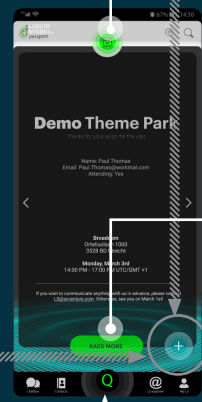


Add events
arrange meeting to push further

Scan AR mark to collect to the passport
Marks show up when there are materials for visitor to collect

mini demo creator, workshop calender, mini demo visitor created, etc.





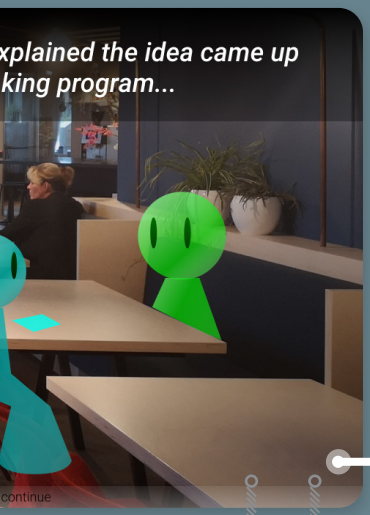
Tech experience centre
mini demo creators, tech experience programs

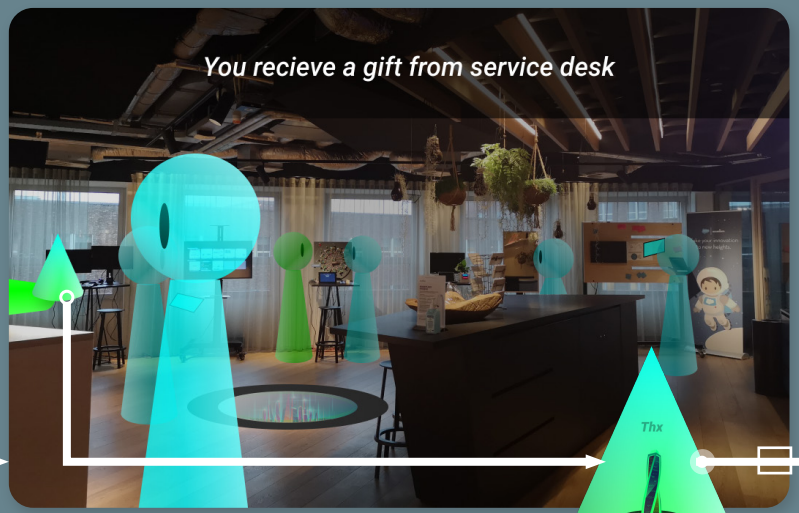
Event manager
General info around events (left/right on switch between events)

Connect to tech expert

Physical souvenir collect at the end of tour
AR mark as carrier of virtual souvenir

AR scan to activate virtual souvenir
Place the souvenir on visitor's own desk

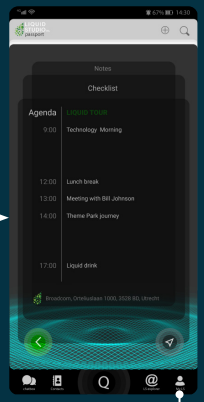




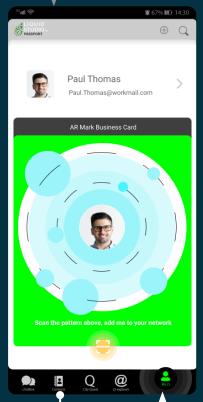
Add file
For later usage

Add contact
For later contacts

Switch among the four event relevant function modules

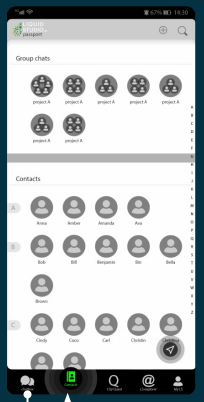


Event specification
Agenda, checklist, note taker

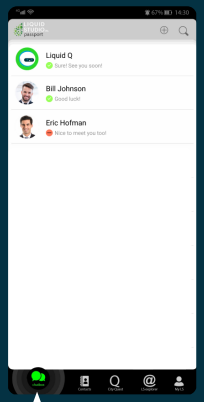


Visitor contact profile
Quick contact adding during networking

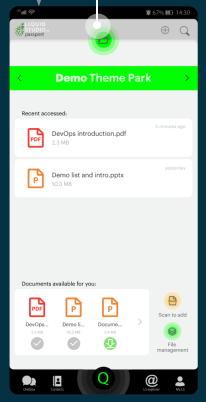
business card AR mark, name, contact, setting



Contact book
individuals and groups

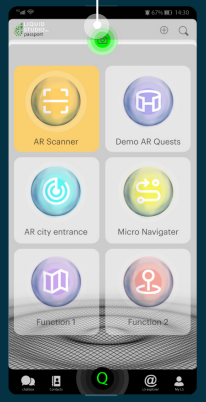


Chat box
AI assistant, Liquid Studio employees, visitor peer



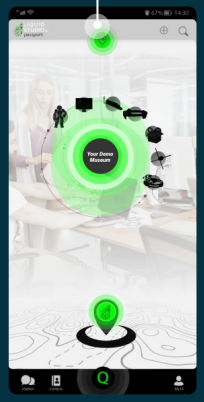
File manager
File may need along events (left/right on switch between events)

Recent access, available to download, add new, etc.



AR explorer
Entrance of AR inter-faces

6 AR entrances for different scan contexts.



Travel advisor
Location navigator, demo visit previewer and planner

Sync updates in demo Theme Park, other event location management

virtual souvenir activate animation
grow from mark of physical souvenir

Overview of personal visit (personal summary)
virtual souvenir, re-experience

experience continuator (AI experience centre, demo generator, etc.) | assistance and manger for any further communications | takeaways management

Final design

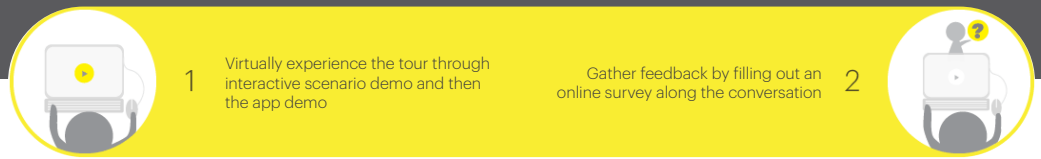
6.4 USER TEST AND EVALUATION

Research question

To what extend the journey design fulfilled the design goal (by matching the interaction quality matrix of explorative, collaborative, discoverable)?
Though not the focus, how the current version app design performs in concern of usability? (System usability scale) and experientially (engaging, supportive, inspiring)?
What are the limitations to make recommendation for further developments?

Session setup

Online (Miro + Zoom)



Procedure

1. *Briefly go through project background [5min]*
2. *Go through interactive scenario demo by host for participant and explain along the story lines [15-30min]*
3. *Do online survey with an interview for feedback gathering [30min]*
4. *Go through the passport app demo by participant [10min]*
5. *Do online survey with an interview for feedback gathering [20min]*

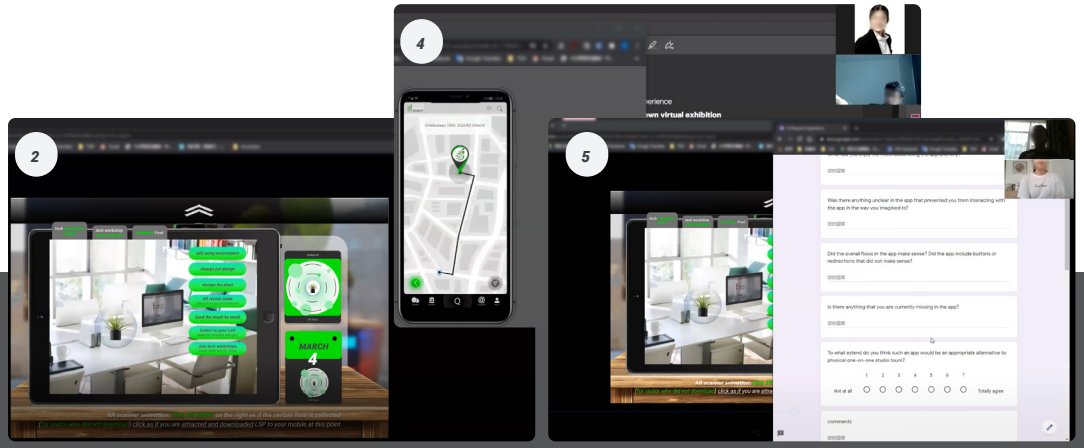


Figure 6.8: *screenshots along process as a procedure overview*

Material and preparation

The two prototypes as described in the last chapter were used for the first two demonstration processes during the sessions. Other materials see appendix P.

Pilot tests was first run both for the app and the scenario demo for test out whether the procedures and prototypes could be effective (one participant from each target groups, one potential new joiner, one potential client, one full-time employee in other department in Accenture). One change was made for the scenario experience part from the pilot test that the host shall run the interactive demo for the tester and explain along, for a better understanding to the scenario rather than let them use the demo them selves that the interface is not fully developed but just for conveying the concept behind them. Then the actual sessions comes after. Quantitative data from pilot test were not process while qualitative analysis went together with the actual ones.

Participants

9 participants, 3 for each group categories as potential visitors, went through the test and data were collected. Some of them also participated in conceptual evaluation session while the others were new.

Results

Qualitative results were conducted along the session (raw data in appendix P) and data analysis of quantitative data. Analysis method, result and insights will be further explained in the following pages where directs a conclusion of the project.

Method

There were three parts of evaluation along th
feedback interview. Firstly about the overa
journey experience as if fulfilled the three inte
action qualities of explorative, collaborative, ar
discoverable. Participants will be asked to give
score to each quality between 1 to 7 where 7 is
full score. Third part have the similar setup th
for evaluate how the passport app influence
the journey that as the journey carrier, whethe
it matches the interaction qualities of engagin
supportive, and inspiring. Same as the first pa
a score between 1 to 7 need to be given from th
participant. In between the two parts is the SU
usability test for the passport app. The intervie
started with the SUS test and then how it is infl
encing the journey experience.

Quantitative data analysis

Experiential evaluation

The final scores on the 6 interaction qualities a
resulted as in figure 6.9. The highest score com
from 'Explorative' while the lowest id 'Collabor

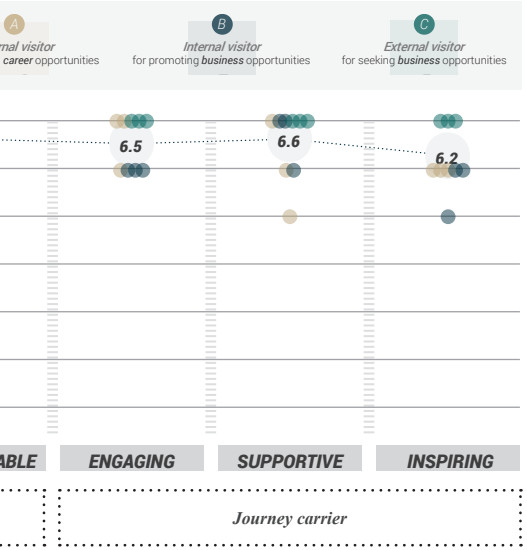
Figure 6.9: *Result of evaluation on interaction qualities*

tive'. Refer to the feedback along the interview, the flow and all features were well integrated in a logical and attractive way, however, in real using scenario, it would be very much depend on how the showcases performs in reality which is not available to evaluate for now. This is also where the 'Collaborative' got the lowest that being influenced most.

Passport mobile app usability evaluation

The data was collected according to System usability scale (SUS) on evaluation questions and the method to process the collected data (Usability.gov, 2020).

The ten statements were adapted from original version for fitting the evaluation context as shown in figure together with the data result. Though there is no previous version to compare with, as in figure 6.11, the interpretation of the passport SUS could be stated for later iterations to compare with. The overall SUS score is 78.8 which is regarded as "Grade B".



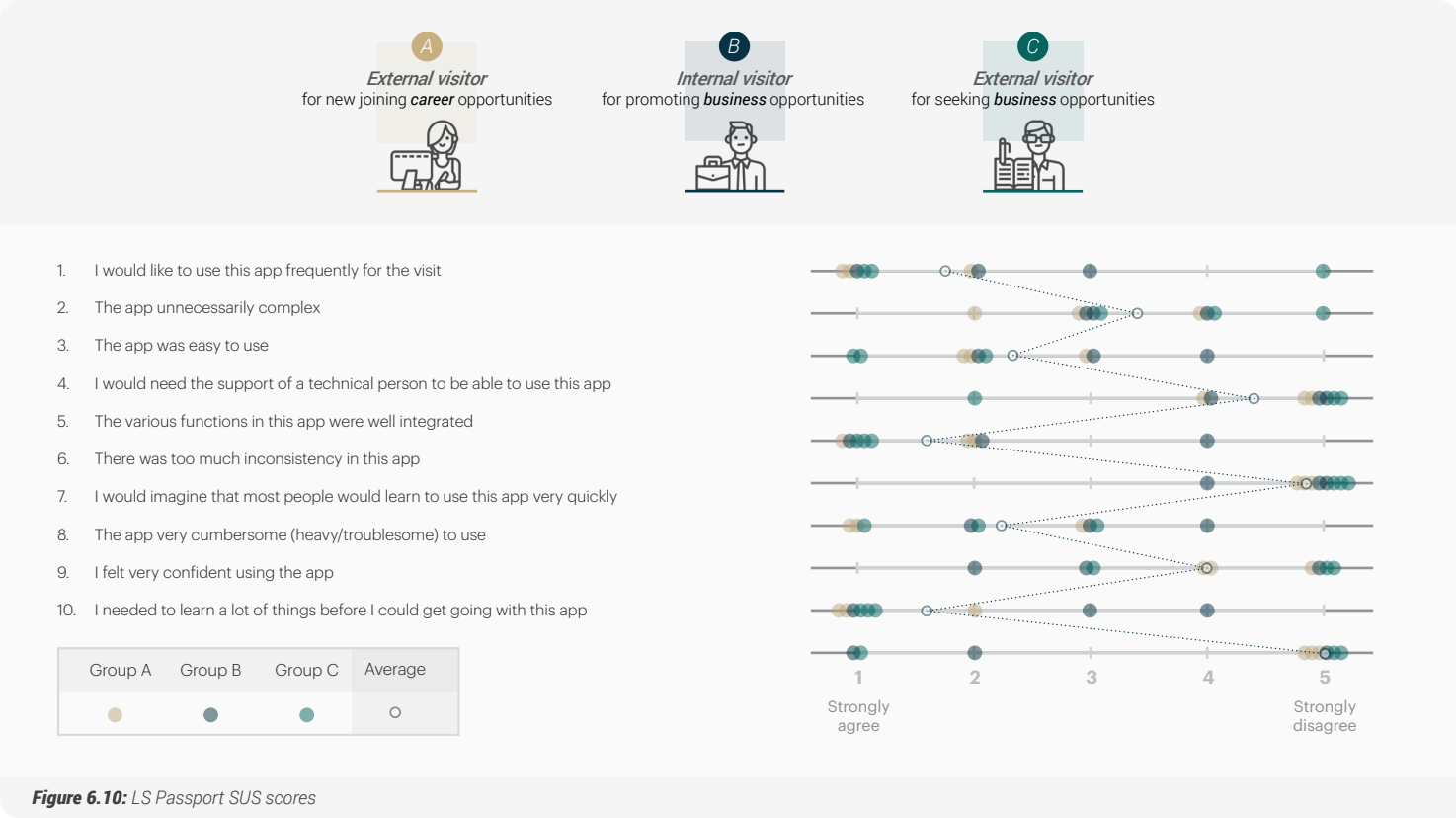


Figure 6.10: *LS Passport SUS scores*

The three groups of participants are calculated separately to conduct a comparison, though with a small sample. It shows a higher score from Group B which is 85 in average while the other two groups are both 75.8. In this case, in terms of usability, it can be conclude as 'Good' among different user groups.

Group A users: 75.8 (average)

Group B users: 85 (average)

Group C users: 75.8 (average)

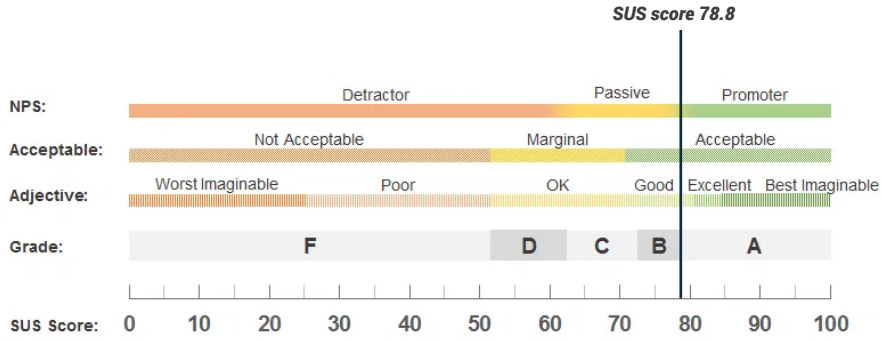


Figure 6.11: *Interpretation of LS Passport SUS scores (AnalyticsWeek, 2018)*

Qualitative analysis on insightful feedback

Visitor experience

[Explorative]

The various of features be carried from the passport journey are making the complexity of the context engagingly manageable in a flexible manner.

"I like the part to attach the phone on the movable phone stand. This remind me of the puzzle game that need you to see through a special card to find out the clue be hidden in the original visual and solve the puzzle, which I really enjoy." - B3

The balance of digital and physical materials from the journey seems unbalanced where there are too much digital interactions for a physical visit tour as some participants reflected from the scenario demo. Though it is partly due to a lack of the real context of a real showcase experience, the perspective worth to be considered on what kind of balance it should be as desired for such a context.

"There are a lot of interactions need the mobile screen where I have the concern that it may attracting too much attention from visitors that the main part shall be the physical exhibition rather than the mobile app." - A1

[Collaborative]

By bringing the visitor acts a part of the exhibition, the journey enhances their involvement effectively.

"The using case demo creator is a very important feature as how I see it that here it brings out the true possibilities, so it would be very useful if visitors can generate idea along the visit, and valuable to be taken away" - C3

However, there comes up a concern in terms of privacy that how much information is shared to what extend by this visit. This can be a valuable aspect to be considered.

"I am actually generating my own idea along the experience (mini demo creator program), this shall be very useful in terms of both side. I only have one concern regarding privacy. If this idea is considered as my work, I mean I will be the only person to use it, or Liquid Studio will use it in other cases." - C2

Additionally, in terms of collaboration, as also reflects in quantitative result (5.7 in average out of 7), there are also limitations shows from the test setup that for some of the visitors, though the flow and features suggests the potentials rather realistic, they still need more practical experiences to get the potentials approved.

"I can not really feel the collaborative in a sense that I feel the most influential aspect for this depends on the actual demo and real materials in the exhibition. But in terms of the flow itself, it is performs greatly." - A2

[Discoverable]

From the features the app provide to the technical knowledge that are potentially accessible from the actual exhibition, the steps were keeping the visitor engagingly leaning which is adding value to themselves in person so that lead to a higher appropriation then expected.

"I feel my brain was turned up that I feel it clearly i start to think shortly after the journey starts! It amazing I feel along the journey I learned a lot. Things are new to me, but also clear for me to understand." - C2

Journey flow

[Supportive | Collaborative]

Some of the feature are not show up as main highlights but still be pointed out from participants that are valuable to see being there as a part to frame the flow as a complete one, such as to give feedbacks.

"Feedback session is important to exist, though may not really expected be used by everyone. Just for those people who have a concern or idea to express regarding things happen along the journey or the company for example." - C3

From company perspective, the independent self-helping systems is benefit for control the visit qualities that they could provide for their visitors.

"By having such a system, a benefit for the company would be the level of the quality can then be controlled in a sense that risks in human factors can be somehow reduced. Results along predictable to some extend with standard divisions" - C (pilot test)

By having the feature "talk to an expert", the value of the journey has a clearly enhancement as reflected from most of the participants. This is pushing communications rather effectively.

"It is very cool that it leads you to the technical contact person, it is very useful for business cases." - B (pilot test)

Material collecting series of features are playing important role along the journey which is a common opinion from most of the participants. Takeaways virtually and physically are both appreciative from the participants that the potential using scenarios are useful and valuable on further communications and promotions.

App design

[Supportive]

Regarding functionalities in terms of UI (user interface) design, though features are useful to be included, the framework and interactions in specific shall be further evaluated for a better performance.

"I would say the most highlight feature of the app shall be AR explorer that you supposing use it the most frequently along the visit. Thus, I do not agree hid this feature that behind after 3 steps clicking. I would expect a straight forward access to this function everything I enter this application" - B3

"The switch of the four event related sub features is not a normal one, I mean this is totally a new design for me for an app's user interface. I do not have problem on using it like this I wonder how it could be adaptable for other users, but just a concern." - B2

In general, include the AR interfaces from the app, though need some tutorial in advance, it is easy to learn and useful for potential visitors.

"Features are new but I can learn that, once you tell me and I won't make it wrongly again, as you see, I can now easily go through the demo on my own" - C (pilot test)

"It is something like learning how to drive a car. It takes efforts to do so, but when really use is as a tool ,it becomes very useful, you'll definitely need it" - C (pilot test)

There are various functions in the app which could be a problem for external visitors to be willing to use in their own mobile in the beginning. Therefore, the app be provided as installed from companies could be an option.

"There are too many functions in the application which could make it heavy. This is more likely be suitable as an internal using app" - B (pilot test)

[Engaging]

In general, the app is considered as well designed in terms of styling, functionality and working flow. The AR animation demonstrated in interactive demo shows an effectiveness that suggesting a desired using scenario.

"Animation transitions are in slow version which makes it easier for me to learn and follow as it provide me some time to reflect and the moving parts are working as a hint that tells me which elements are important. This keeps me engaged" - C (pilot test)

[Inspiring]

It is a comprehensive experience be supported with the journey carrier. The complexity among the value elements is still there but the carrier is offering a way that make it better manageable. In this part, the app works sufficiently.

"It is definitely opening my eyes for me, brings much more than I expected, which are all valuable to happen." - C2

Discussion

Visitor experience in general

In general, it reveals a high level of comfortableness for participants by finishing this virtual visit experience along the passport visit plan. A scoring question (scale 1 to 7, 7 as the full score) was asked during the interview, ("how comfortable did you feel going through with LS passport visit plan?") which 8 scored for 6 and 1 for 7. The flow was logical, no missing part, though lots of features presents but no pressure as there are free room left for them to choose if in real using scenario which is easy to be imaginable.

On the other hand, for another question, "how much effort did it take you to get use to the passport journey?", reveals a quite separate scoring from 1 to 7 that some felt will need quite some effort while some believe it would not cost

any effort at all. Here is mainly the discussion on whether the AR application interface combine with the various environmental interactions would be designed to be user friendly enough, and whether it allow people to learn this new interfaces in a short time effectively. This part was hard for participant to give a clear opinion as the interface is just showing concept rather then a real one in concern of usability. However, it is the usability in the real scenario that the participant are doubting with. It could depend on visitor's own knowledge background as if he or she is familiar with smart devices controls, or it can also be as if there is no relevant experience that he or she need to learn it from the very beginning. As the AR involves, all these relevant experience that depends on the carrier devices need to be designed in a high concern of usability in terms of realizing the desired experience for visitors.

When asking about "To what extend did you enjoy going through with LS passport visit plan? " under the 1 to 7 scoring scale, it resulted in a 6.6 in average. This reflects a positive result in terms of the overall experience.

Finally, as mentioned in the beginning, this project is aiming for the independent visits solution as an attempt to enhance the current version rather than replacing it. A question was asked under this consideration as "To what extend do you think such an app would be an appropriate alternative to physical one-on-one studio tours?" on the scale of 1 to 7, the average presented as 6.2. This shows that functionally, it allows the visitor to achieve the visit independently with quite a potential, however, the participants also explains that human matters are always important.

"In terms of technology, I would say it is definitely workable to be alternative for one-on-one tour, it is supportive enough for a visitor to complete the visit independently, if not consider much on the human factors which makes it complex to say." - C1

TO CONCLUDE

Regarding the project assignment

In conclude, the design brought out the interaction qualities sufficiently in terms of "explorative, collaborative, discoverable" for the desired visitor experience, and correspondingly the "engaging, supportive, and inspiring" as for the journey carrier. In this case, I would conclude that the design goal as stated was achieved by the designed Liquid Studio passport visit journey.

Regarding the initial assignment, "creating interactive smart exhibition in the liquid studio to provide immersive walking through experience for inspiring studio visitors around multiple technologies in order to promote new business possibilities", the process on addressing it was successfully conducted by achieving the design goal as framed.

Limitations

In terms of the project limitations, under the worldwide corona situation, it was mainly rely on online processes that the practical factors may hidden throughout the process. Though in-field research were done in the first few days before we started to work from home, any result afterwards may be influenced by this fact as the in-field researches or activities were no longer being possible. As an attempt facing this, the scenario interactive demo was made to deal with this situation, however, the limitation is obvious that the digital interaction could not alternative a physical one, especially for an physical located interactive exhibition.

Another limitation is about the user test that the desired scenario shall be purpose-driven visits as analysed from research, which is hard to achieve for the test sessions. Though a purpose was given to them refer to their potential relationship with Liquid Studio to start their virtual visit, it is not really worked out along the session as it is given rather then initiated by themselves as should happen as in real cases. Some of the participants noticed this along the test and predict that the test result would be better that they may have stronger feeling to those elements once they really have a purpose though out the storyline rather then following my guidance.

Additionally, the AR UI was made for carry out the concept that less considered on its usability. As it is mainly a new concept with new interactive technologies for most of the participants, it causes their imagination be somehow limited to it was desired.

Recommendations

As for recommendation for further development and research regarding the Theme Park visit journey, as facing the limitations as explained above, it is mainly about how to bringing in the real context as much as possible.

This project is rather complex that it involves multiple stakeholders with various backgrounds, physical materials and digital interfaces in different levels of immersive interactions, and emerging technologies with a number of unique application to be communicated. In this case, it is always important to keep the mind open for any new voices that the part be seen is always limited, especially for such a topic where innovative and practical values are both importantly influential.

In this case, I would suggest it to be launched as early as possible within a certain scale for gathering practical data and let it grow inside the field which is more valuable than doing this theoretically. Regarding the three potential visitor groups as mentioned in the project user tests, new joiners and Accenture employees could be firstly considered, and launch for clients the latest till it can be considered as prepared.

REFLECTION

I have to say this is a challenge experience for me to individually manage and execute such a large scale design project. When it is finally coming to an end, I start to feel pressure which sounds weird but happens realistic. I would not know such an memorable experience was waiting for me when I initiated this intreseting project. If I have a chance to talk with the me who is deciding to make this project at that moment, I would say to her:" Do it, don't hesitate, and good luck."

The biggest challenge

It is always a challenge for me to express my works, but previously I always have my team mate as support. However, this is the first time that I really need to depend on myself that no one else is able to do so. Along the project, I was keep explaining my work to a huge number of people (at least for me was a huge number) from multiple fields with various backgrounds. I was not stressed as I know I will face it without easiness, but really feel tired afterward that it really cost me energy to do so, both for preparation and execution. I can still feel that even I have already done those first tries long ago enough.

I always know this weakness in myself but never have a real try on dealing with this, until this graduation project. There were a lot of times I feel that, to some extend, I am just the same as the technologies I am trying to design for, we need to pay effort on finding the right direction for people to understand us as we wished when communication happens. I always joke with my friends during the time that I was actually doing the project for finding the missing piece of my own personality. This is a bit abstract, but what I want to say is like I just mentioned, I am trying to find a way for the technologies to communicate themselves, but at the mean time, I am also finding the way for myself.

I know there is still long way to go as communication and expression could be a life long course, but I also have the feeling that I have improved a lot on this because of this project. I will keep on the learning and reflecting on this aspect that I really noticed the usefulness and value behind good communications, no matter for study, for career, or even for life.

Project management

Regarding the project management, as a result, it is almost two months longer than was expected. In general, the takeaway from the process for me can be concluded as "open to changes". The office and the faculty both locked off by the virus situation since my project kick off day so this project can also be a course for me on how to work from home. People changes work patterns to adjust in such an environment and to be adaptable to it.

Under the worldwide corona virus situation, all communication were executed online and work individually. This negatively influenced the communication effectiveness and personal psychological healthy condition which could be addressed as a main challenge facing in terms of project management from my point of view. However, as I was working with team, we can still get each other encouraged through daily stand up meetings for updates and alignments. This helped me doing time managements in a sense. Groups, especially in such a challenging period, is really valuable.

Reflection on personal project motivation

One is about emerging technology application studies, and the other one as personal skill on communications and collaborations were the personal motivation for executing this project. In conclude, both motivations were well fulfilled .Within the technical innovation context, opportunities to work with technical expertise were exciting. In the mean time, as part of the Theme Park development team, I had the experience to be trained on both collaborations and communications skills

ACKNOWLEDGEMENT

It is a memorable year for most people on this planet, including me, though in my case, this project covered half of it, which is 6 months in total. Many thanks to this period of time that letting me feel my self, feel my family, my friends, my everyone. In the end, I have to express my gratitude to all of you who gave me great suppot along this road.

First of all, to both of my supervisor teams, Arnold and Ianus from TU Delft, and Miriam from Accentrue Liquid Stuido. I have to say, without your supervision, without the trust and flexibility you gave to me, the project would not run into a succes. Especially when I was doulting myself, your positivites really carried me to walk through those darknesses.

Secondly, I would like to say thank you to all me participants. Thank you for your engagement for spending time and sharing your experience, your knowledge, and your thoughts to insightfully support the project being push further.

Last but not least, to my dear family and firends, thank you for your love that you have never give me up. I have to say I had a hard time and you were the light always being aside me. You worth my every step, and thank you for letting me know this.

The project is running to an end, and it let me know where I can achieve as a desginer. Thank you.

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