



**CHALMERS**  
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# **The Exploration and Design of Social TVs for Use in Hotel**

Supporting social experience of hotel guests  
through TV and mobile devices

Master's Thesis in Interaction Design and Technologies

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## **Abstract**

Social TV is connecting non-located TV viewers via information technology, allowing remote viewers to interact with each other via the television set and personal devices. This thesis aimed to explore the social needs for leisure hotel guests and design social experience for them through the usage of TV and personal devices.

The whole thesis work was mainly driven by the question “how can integrate personal devices with hotel TV in ways that support interpersonal interaction for unacquainted hotel guests”. During the process, Human Centered Design was adopted to develop the work from divergence, transformation to convergence. In each section, a number of relevant methods were used to elicit guests’ social needs, generating and evaluating various concepts.

In the end, the final concepts that were developed served as examples of social TV possibilities in the context of the hotel. Except concepts that were exemplified, a set of social TV design guidelines were identified and summarized as an important part of the research outcome, inspiring and supporting people who work around the social TV field.

**Keywords:** social TV, social experience, human centered design, hotel

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# 1. Introduction

People around the world have been travelling more. According to the latest UNWTO World Tourism Barometer, international tourist arrivals grew by 4.4% in 2015 to reach a total of 1,184 million. The year of 2015 marks the 6th consecutive year of above-average growth, with international arrivals increasing by 4% or more every year since the year of 2010 (World Tourism Organization 2016). This undoubtedly raises higher requirements for the tourism industry, which includes transportation, accommodation, and food. Especially in current days with omnipresent technology, the way that people travelling has changed to be much more convenient and flexible. According to a Google survey (2014), travelers rely on social media and search engines to get trip inspiration, use Internet as a main resource to plan their trips, and tend to use smartphones throughout the travel process. These changes demonstrate that the technology is a strong assistor driving traveler experience to be better.

As Larsen et al. (2007) said, tourism is increasingly concerned with making “connections with [rather] than escape from”, social interactions. In this sense, tourism is a particular sensory and social practice that is performed in continuous interactions with other people in place (Bødker et al. 2013). Behind the sightseeing tour, the sociability during the journey is increasingly associated with tourism. Crompton et al. (1979) emphasized the importance of “pull” and “push” factors in shaping tourist motivations in their study. “Pull” factors are tangible factors that makes the destination attractive for visitors, while “push” factors are intangible factors pushing tourist away from home. For business travelers, most of the reason pulling them to travel is working factors. While for leisure travelers, the main factors pushing them into are relaxation, pleasure-seeking and culture (Jönsson et al. 2008). Under this context, the trips are mainly made to meet their social needs. These needs could be connecting with local friends, visiting different cultural sites or being refreshed by new experience things, etc.

In addition, a survey presented that over eight in ten U.S. online travelers are active on social networks, and more than half of them who access the Internet via mobile to update social networks with trip-related posts (tnoos 2013). The travelers’ heavy engagement with social media shows that social experience plays an important role in their travel, no matter where they are. By this token, it is crucial to support social aspects for visitors, enhancing the social version of customer experience during their travelling.

The hotel, a main part of tourism, provides the basic bed and storage for clothing and some additional facilities, is a powerful aspect impacting on the traveler experience. Factors influencing customer satisfaction are not limited to traditional service aspects, such as uncomfortable bed, unpalatable breakfast, noisy space, etc. Nowadays, since consumers become more sophisticated about technology in their professional and personal lives, Free Wi-Fi has been one of the top crucial factors when choosing a hotel for both leisure travelers and business travelers (Press.hotel.com 2015). What travelers need is not only staying in the hotel room.

Viewing the hotel technology market, booking online, digital checking-in and check-out, and digital meeting rooms, are all highly valued services to improve the guests’ experience. In spite of all this, the hotel TV is turning away from most guests’ activities. Guests complain of the tediousness of hotel TV, some even give up using it. Instead guests carry their entertainment with them, such as tablet, phone, etc., rather than relying on on TVs when staying in the room. It can be seen that people are increasingly relying on smart mobile devices and networks. An important problem highlighted by this phenomenon is how to renew the use of the TV and how to integrate portable personal devices into TV usage in the context of the hotel.

## 1.1 Research question

The research question of this thesis work was initially formulated as:

***“how can personal devices be integrated with the hotel TV in ways that support the social experience for guests in the context of a hotel?”***

With the project proceeding, the scope of the project was narrowed down with a new research question:

***“How can personal devices be integrated with the hotel TV in ways that support the interpersonal interactions for unacquainted hotel guests?”***

Around this the research question, some research objectives were raised:

- (1) Identify the incentives that evoke social interactions among guests during their hotel stay
- (2) Explore possible uses of hotel TVs and personal devices in the hotel
- (3) Discover design opportunities that will support guests’ social experience when they stay in hotels

The planned work is not only providing guests with various social opportunities to be engaged in their journeys, but also improving guests’ experience by providing them with memorable experiences. In addition, it is hoped that this value-added work would have a profound impact on the hotel client’ loyalty.

## **1.2 Scope and result**

The social experience for hotel guests implies interpersonal interactions during the guest's’ stay. In this project, the research focused on social interactions among unacquainted guests who stay in the hotel at the same time, instead of interactions between guests and their friends or families. The researcher assumed that guests have no aversion to having social interactions with other guests. That is social experience is a meaningful experience for guests and adds value for the hotel industry are assumed by this research project.

The research was mainly focused on leisure travel guests as the target group, who were involved as informants and testers in multiple stages of the research.

In addition, this research emphasized an explorative process over a high fidelity prototype output. Therefore, the final results for this project are some guidelines directing TV manufacturers and hotels to provide suitable social experiences for their target customers. And some design explorations are provided as illustrations of guidelines as well.

## **2. Background and Related work**

This chapter gives a brief introduction around stakeholders, social experience within travel, related work around hotel TVs status in quo and social TVs.

### **2.1 Stakeholders**

For this project, a range of stakeholders are involved, who are people of Lava, the hotel industry, guests and me. People of Lava, a Swedish LED-TC, LCD-TV and TV related products manufacturer, is the company that this thesis is working for, starts to steer away from the production of TV-sets, and re-think TV usage in hotels. The company aims to understand new possibilities for their TVs and deliver unique social experience for guests through integrating the hotel TV-system with guests' personal devices. Throughout TV history, watching TV is a social experience. How to drive TV back to support social experience for people who stay away from home is an interesting topic for me to explore. Also the endless possibilities of TV product with new technologies in this project is a big reason for to choose it as my thesis. In addition, as a student with design background, what this project is looking for is perfect consistent with my mind of digging deep, exploring what people really need and seeing what design really works in this project. The hotel industry aims to find more additional value-added service for customers, thereby improving their revenue and brand value. Hotel guests, the end user of the hotel TV service, will be the main target group of the research. In order to bring a memorable social experience for them, guests will be considered and involved in the whole design process.

### **2.2 Social Experience Within Travel**

Tourism, is an essential social experience for travelers, regardless of the travel purpose. From the social science perspective, Stickdorn et al. (2012) described five common experience forms: recreational (e.g. entertainment), diversionary (e.g. recharging energy), experimental (e.g. rediscovering oneself), experiential (e.g. staged authenticity) and existential (e.g. ultimate nostalgia). These are psychological factors stimulating travelers to pursue different things outside of regular daily life. Places they are visiting imply special meaning and are given affective substance, with social interactions being integral to the making of places in tourism (Bødker et al. 2013). These interactions happen between tourists with fellows, tourists and other tourists, and between tourists and locals.

However, as of today, social media has been spontaneously used as a tool to assist guests' social interactions during their travel. Take for an example, before planning the journey, people like to review comments on travel sites or ask their close friends for decision making. During and after their trip, travelers like to update their status and post pictures on social networks for sharing their experience.

#### **2.2.1 Social Experience in Hotels**

Some hotels have attempted to emphasize guests' social experience in their hotel. Sol Wave House in Spain positioned itself a "Twitter-themed hotel" by engraining Twitter into their overall operations. Guests get to know and chat with each other, experience, compete, and share photos through a virtual community called "#Social Wave", only available from the hotel's Wi-Fi. In addition, two Twitter concierges work to meet guests requests and generate conversation in that virtual community (Miller 2013). The goal of this hotel is to provide new experiences and emotions shared with a virtual community for young and social clients. Likewise, 1888 Hotel, Sydney is known as an Instagram hotel, which encourages guests to post pictures of their stay with the hashtag "#1888 hotel" (Ola 2016). These two hotels make good use of social media to heighten social experience as their brand feature.

As more and more guests start to share their experience on social networks, the hotel industry recognize user-generated content as an important power to brand marketing and enhancing guest staying experience. Four Seasons Dallas set digital walls as social hubs (Cox 2014) in their lobby for

their 4<sup>th</sup> of July festivities and received over 243,000 social impressions, 153 guest-generated posts in three days (Cox 2014). In addition, there are some hotels with multiple locations in the world asking guests to capture their best photo of their staying experience in the hotel and to tag it with the specific location (Cox 2014). Afterwards a social hub with beautiful photos in different locations is set around the hotel entrance. Once getting in, guests will be attracted attentions and even feel pleasurable to have more contribution on the hub. For these two cases, the use of the user-generated content enables guests to have more motivations to share their staying experience and have more interactions with other visitors.

While in the Aloft Cupertino Hotel (Aloftcupertino.com 2016), a screen-faced, waist-high robot named Boltr works as a bellhop to serve guests with smartphone chargers, newspapers or snacks from the front desk to the guest's room. After being served by Boltr, guests can leave a review with the Tweet using the hashtag #MeetBoltr. Afterwards Boltr would do a small dance as a reward for their reviews. Through interaction with a digital concierge, the hotel provides guests with another type of social experience, which attracts guests' attention and brings them a feeling of freshness.

In these cases, due to widespread and easily accessible social media, the hotel industry utilizes it as a tool to encourage guests to follow them and share their experience among the hotel community. It is not only a way of extending their markets, but also a way of supporting guests' sociality within their trip. But strictly to say, the sociality is only a derivation of the hotel marketing strategy rather than the hotels' original intent, let alone the hotel TV. From this, the field of the hotel TV supporting social experience has not been tapped.

## **2.3 Related work**

The hotel social TV is barely existing in the past work. Some related work, comprising hotel TVs and general social TV, are described below, in order to give some background to this area:

### **2.3.1 Hotel TVs**

The hotel TV for the purpose of this thesis is considered the television set provided to guests for entertainment in their room. The most common is the traditional TV, allowing guests to watch different programs depending on local channels. In this way, viewers receive information passively. Moreover, smart TVs were stepping into the hotel scene, evolving TV behavior from something to watch to something to interact with actively. Throughout the hotel TV market, Samsung (2016), LG (2016) and some hospitality technology companies have launched similar hotel TV products. Common parts of existing smart hotel TVs content include TV channels, hotel information, guest services, local attractions and social sites and applications. Except watching TV channels, guests can log in their Facebook, Twitter, Instagram, and some other social networks to update their status. They can also have a careful look at the local attractions to plan for their upcoming activities. Furthermore, they can have a close communication with hoteliers, such as room order service and quick check-out. One thing worth being pointed out here is that hotel TVs have attempted to integrate the personal device with the TV usage in some ways. By syncing the mobile device with the TV using Wi-Fi, QR code or Bluetooth, guests can use the mobile device as a remote control, or casting movies, videos, music and photos from personal device to the TV.

### **2.3.2 Social TVs**

Television, is a social and entertainment experience in our personal and social lives. Initially the TV emerged as a kind of "Electronic Hearth", the center of the family activity (Tichi 1991). Based on the TV program, families and friends sitting in front of the TV to have a shared experience. Gradually the shared experience extended from family and friends to colleagues, coworkers and even the entire city. The previous TV program became the main topic being discussed during water cooler moments (Mowery et al. 1991). These facts prove TV works as a connection driving people to have more interaction with each other. With the popularity of the television, people tend to watch the TV with

less people. At the time, with increasing involvement of the digital devices, people's behavior when watching TV has changed. The Nielsen report (2016) showed that roughly 40 percent of tablet and smartphone owners in the U.S. used their devices daily while watching TV. Checking email, surfing for related or unrelated information and visiting social networks are listed as their top three simultaneous usages of the mobile device when people watch TV. As it stated, the erosion of personal devices weakens viewers' attention in TV time. Under this situation, in order to tailor to the viewer's behavior, the concept of social TV was elicited by some researchers. This field looks at connecting non-collocated TV viewers via information technology (Sahami et al. 2011), allowing remote viewers to interact with each other via the television set and some personal devices (Cesar et al. 2011).

Interestingly, to enhance social interactions among TV viewers, researchers have studied social TV a lot. Hwang et al. (2012) proposed a Comment TV system enabling viewers to share their comments in parallel with time-based content through the way of texts, images and related videos. Another similar example, barrage feature used on the web TV, favoring viewers to publish their text-based comments anonymously at the same time with video is playing. Both allow viewers to experience audiovisual content-and get social connections synchronously. One problem arising from them is that video sites are easy to be filled with irrelevant or disrespectful comments. However, one interesting phenomenon reflected from the barrage feature is that some viewers tend to have more passions for comments instead of contents per se.

Another example from Bian et al. (2012), Matchmaker, was designed as a friend recommendation system through TV using character matching. When tuning into the TV program, Matchmaker would help audience find friends within their social network. It matches the audience with the TV character based on their profiles, and then recommends audience to make friends with another corresponding audience. Through using the relationship in TV programs as a parallel comparison matrix, Matchmaker recommends a suited well relationship between audience members using the social network. Although the survey conducted afterwards shows that the likelihood of adding friends through Matchmaker's recommendation is relatively low (23.5% said sometimes, 41.2% said between never do and sometimes, 29.4% said they would never do) Bian et al. (2012), this system encourages the audience to explore more TV content viewing and provides more opportunities for people to make connections.

Back to its originality, television has been the context of social interactions between people, provoking viewers to recommend, annotate, gather around and influence content (Montpetit et al. 2012). However, Social TV is reshaping the way of people consume TV content. Instead of happening in a tangible social context (family, working, etc.), those social practices around the TV content are transformed into an extended virtual and remote network. The interpersonal relationship is extended from the close circle to further, such as useful contacts, associates and strangers (Dezfuli et al. 2011). The impression of "anti-social" and "quasi-interactive" (Thompson 1995) TV has been overthrown through the way of social TV, enabling viewers to keep more active when watching TV.

In reality, social TV has evolved from the research field to the market. Looking back, the social TV phenomenon was best embodied during the 2012 London Summer Olympics at an unprecedented scale, which arouses great attentions from the public. During the opening ceremony, 5.0 M Twitter comments swarmed into the social media (Labs 2012). While watching the event, viewers engaged themselves in expressing their opinions and emotions on social media. This high social media activity around a TV program is undoubtedly an indicator of high viewer engagement, and and interpersonal interactions.

Except Twitter, another social TV application is worth being mentioned. Wechat (Weixin.qq.com, 2016), a mobile text and voice message communication App developed by Tecent in-China. Strictly to say, the social TV derivative refers to Shake TV feature in the Wechat rather than the whole mobile application. Based on ACR (Automatic Content Recognition) technology, an identification technology

to recognize content played on a media device or present in a media file, Shake TV brings a service enabling viewers to have more interactions with the TV program. When viewers watch a TV program, Shake TV can automatically recognize which type of TV program is being viewed through shaking their mobile devices and then get viewers access to the relevant interactive activities. This model of social TV enables viewers to obtain the relevant information about the TV content, endows viewers some reward through interaction with the TV program, empowers viewers to become reviewers, and participate in the voting part to influence the content. Also the interactions between TV program and viewers give rise to viewers' interactions further. These activities are all social representation deriving from the combination of TV and Wechat. Since then Wechat has become a join point connecting TV screen and mobile screen. Shake TV is a supplement for the communication and interaction shortage between TV and viewers, changing the unidirectional communication channel to interactive communication.

Retrospect to existing social TVs, TVs in hotel have not too much highlighting on social aspects, except some social network portals on smart TVs. As we can see, beyond the hotel context, the social network is a cornerstone supporting the development of social TV. Furthermore, the social TV extends the use of the mobile device as an important role in the TV experience.

### **3. Theory**

In order to get an understanding of the current state of the theory framework around the thesis topic and get some insights that can be applied in the later work, the relevant literature is reviewed. They mainly involve following parts: social experience, service design, emotion design and second screen.

#### **3.1 Social Experience**

People are social creatures whose emotions have close bound with the social factors. It can be seen from Maslow's (2016) hierarchy of needs that what human need is interpersonal and involves feelings of belongingness once their physiological needs and safety needs are fulfilled. This means human demand for a sense of belonging and acceptance in their daily life. Yamakami (2012) brought up social experience as the way a person feels about using a service in an interpersonal, informal, role-taking and public context, which highlights the social aspects when concerning the person's feelings after experiencing a service or system. While with the advance of technology, more and more social products spring up. From this, except taking user experience into consideration, social experience is an important point when designing for people.

##### **3.1.1 Comparison Between Social Experience and User Experience**

User experience refers to a person's feeling about using a product, system or service. This term was invented by Don Norman (1995) to cover all aspects of the person's experience with a system. Compared with user experience, social experience deals with the shift from the intention of human computer interaction to human human interaction. Beyond the efficiency and satisfaction of the product, the focus of social experience rests on the satisfaction of the social interaction. In this review, social experience can be said as socially invoked user experience.

Originating from 1990s, user experience has shaped many design approaches and methodologies. While social experience, being concerned only for a few years, has not owe its specific design framework and methodologies. Also social experience is dynamic, vague, complicated, and hard to be measured (Yamakami 2014), which is another reason resulting in it is still in the early stage. Toshihiko presented the four relationship models of social experience and user experience in his paper and discussed their strengths and drawbacks. Based on these four models, the author discussed different criteria for design choices. The design methodology used is not mentioned in his work, but different positioning of social experience provides guides for the later work. In addition, through learning from the mobile social game design, Yamakami (2012) generalized some guidelines for how to design good social games.

##### **3.1.2 Motivation of Social Interaction**

For social experience design, it is important to figure out what are motivations for people to have social interactions, which might give some other hints to evolve social experience and its methods. Väänänen-Vainio-Mattila et al. (2010) discussed the main drivers of social experience include self-expression, reciprocity, learning and curiosity. Also from the motivational and psychological perspective, Giacoma, G. and Casali, D. (2009) proposed Mo.De. (Motivational Design) as an interaction design approach for the analysis and development of social networks. They use functional needs, social usability, relational motivations, and circadian activity flow, to structure the design of socially-enabled products or services. Here the dynamic factors stimulating people to feed on the social network are relational motivations, encompassing competition, excellence, curiosity and appurtenance.

##### **3.1.3 Social Usability**

As described before, social experience is open-ended and unpredictable (Yamakami 2014), thus it is challenging to do evaluation around social experience. Yamakami (2014) also illustrated six requirements of the framework for social experience design: abstractness and applicability to a wide range of social activities, consistency, constructability, learnability, enabling social emotions and

ability to facilitate social activities. Regarding this, learnability, social interaction, engagement can be seen as metrics for the evaluation of social experience. As for the basic metric, social interaction, there is one term social usability used as the quality attribute that assesses how easy social interactions are to make. In the practical field, Giacoma, G. and Casali, D. (Intense Minimalism 2010) conclude a page of social usability checklist from their experience as social network designers, which mainly involves four parts, including relations, identity, communication and emergence of groups.

### **3.2 Service Design**

Service design is a relatively new field of expertise, which was first introduced as a design discipline by Michael Erlhoff (2005), involving the activity of planning and organizing people, infrastructure, communication and material components of a service in order to improve its quality and the interaction between service provider and customers. Service design is a process rather than defining some features for a product. The goal of service design is to offer a valuable service experience beyond the product itself. Taking the hotel industry into consideration, the criterion of evaluation its service quality is offering a unique valuable experience for customer that is far beyond a comfortable place to stay overnight.

While experience is the underlying aspect of the service design requiring attention to customer behavior, expectations and perceptions (Teixeira et al. 2012). In this way, the customer experience and expectations are critical considerations in service design. But customer expectations is not the only focal point in service design. In this field, the service must be intended to be useful, accessible and demandable in terms of customers, as well as it is desired to be effective, efficient and different from the competitors.

For service design in the hotel, the physical contributions like materials, tools, equipment, space in service delivery enable the abstract service to become visible (Kozak 2008). Gradually, research on atmosphere design in hotels is increasing. (e.g. Heide et al.2007). While a few amount of studies around the emotional/psychological service design is conducted. In this view, the customer experience or expectations as the core of the service design has not been sufficiently studied. Lee (2011) discusses hotels' service design from the destination point of view, and suggests that "the same service all around the world" theme is increasingly turning into a disadvantage, and local features should be taken into account.

According to Ottenbacher et al. (2005), service design is the major way for hotels to achieve their business objectives and increase their service values. Lo (2007, 2010) stated one model of service design for hotels. Ranging from the basic level to the higher level, which are functional, sensorial and meaning-oriented. Functional layer, which focuses on practicality and function, refers to the basic amenities and services that fulfill the basic needs of guests in the hotel. Sensorial layer is value-added feature enhancing the guest's enjoyment by delighting one or more of the human senses (visual, auditory, etc.). Meaning-oriented layer aims at generate memorable and meaningful guest experiences. Except identity or status, some other aspirations, such as wellbeing, social responsibility, could be inspired in this layer. Thus in this project, the social experience work will be mostly around the higher level of service design.

### **3.3 Emotional Design**

Emotional design is a design approach that emphasize the importance of eliciting users' pleasant emotional responses. With this approach, design research and practice are extended beyond function, form and usability, to emotional dimensions that enrich further experience. According to Donald Norman (Jnd.org), visceral, behavioral and reflective constitutes the framework of emotional design. Visceral is the sensory input of the product, referring to how things look, feel and sound. Behavioral means how things can be used, being ascribing to functional part of the product. Reflective is about



the meaningful things after using the product, including self-image, personal satisfaction and memories, which are independent on the individuals.

Throughout the whole stay experience of customers in hotel, there are mainly factors influencing the emotion of the guests. Shaw and Ivens (2002) believed customer experience consists of the physical customer experience and the emotional experience. The former is the customer experience deriving from the physical performance of the services. The latter means feeling evoked when customers experience the service. Despite growing awareness of the impact of customer emotions in hospitality, little research effort has been devoted to understanding the wide range of hotel guest emotions. In Lo (2010) dissertation work, he analyzed travelers' hotel stay experience from pleasant, unpleasant and anticipated experience aspects and discussed the specific factors resulting in the experience under each category. Then a model of emotional design and some design opportunities for hotels is proposed from him. Regarding three levels in this thesis work, the work we are going to do is mainly around the higher level which means explore design opportunities to provide a pleasurable, even meaningful experience for guests.

### 3.4 Second Screen

With the advanced technology development, more and more digital devices are entering into our daily life. People are surrounded by multi-screens every day. The phenomenon of multi-screen usage by using more than one device simultaneously are becoming increasingly common. According to another Google investigation (2012), people use an average of three different screen combinations every day. They are the use of smartphone & television (81%), smartphone & laptop/PC (66%) and Laptop/PC & Television (66%) respectively. It can be seen that the dual screen usage between TV and smartphone accounts for the highest percentage, which means smartphones are the most frequent TV viewing companion during dual screen usage. Here the smartphone is called a second screen, which is involved in a multi-screen usage in order to enhance the experience on another device, such as a TV.

Depending on the context, people consumes multiple device and move seamlessly between them throughout the day. There are two main modes of multi-screen use, sequential use, and simultaneous use. The former means moving from one device to another device sequentially at different times to complete a task. For example, once being motivated by a commercial ad on TV, people attempt to search and buy the product on the phone. The latter signifies using multiple devices at the same time for a related activity or an unrelated activity. Take for an example, at the time of watching sport events on TV, the use of publishing relevant comments on Twitter through phone is simultaneous. While the data shows 22% of simultaneous use is complementary (Google 2012). Thus the second screen activity has a close bound with the contents on another screen. Contents viewed on one device can trigger specific behavior on another device.

For the multi-screen world, how to design an ecosystem among these devices is crucial to making the user feel comfortable and efficient. Precious Design Studio discovered and documented six patterns for “ecosystems of screens”, which help understand and define strategies for the multiscreen world. They are **coherence**, **synchronization**, **screen sharing**, **device shifting**, **complementarity** and **simultaneity** (Patterns for Multiscreen Strategies 2011). **Coherence** points the product in different devices should be coherent, no matter its appearance, features, and use. **Synchronization** is that the content of an account should be in sync once being logged into different devices. **Screen sharing** means that multiple screens share a single source. Junkyard-Jumbotron (2011) utilizes random devices into one large screen display to explore how sharing screens influences social interaction. Shifting the content from one device to another device is named by **device shifting**, such as when using the Android cast feature, enabling the streaming of media on the phone to the Android TV. **Complementarity** represents that various devices are complementary to each other in order to conducting one activity. For instance, when the smartphone is used as a remote control to interact with the TV. **Simultaneity** implies devices are used simultaneously either in a related activity or an

unrelated activity, which is the same with the definition of simultaneous usage mode. Some main principles for success crossing screens are: be consistent, be connected, be considered, and be concise.

People has shaped their ways of consuming multi-screens, but there are some slight differences among these devices usages. From user experience perspective, people has their own preferences for each type of digital device. Depending on different time points, their usages are summarized in Table1 (Dumont 2014). As it can be seen,

	Smartphone Default Device	Laptop Productivity Tool	Tablet Entertainment Tool
Stacking Time	Social check-ins	Getting work done, searching	Alternative entertainment when bored by TV
Meshing Time	Polls, sharing opinions via social and messaging	Detailed digging into TV content	Additional video content
Shifting Time	Further digging on the move	Tasks where you need to be fully engaged	Extensions of TV content experience

*Table1. Multi-screens usages*

## 4. Methodology

This chapter describes the design methodology and the methods that were intended to be used during the research process.

### 4.1 Human Centered Design

Human-Centered Design is a research and design methodology that develops solutions to problems by involving the human perspective in every step of the process. The International Standards Organization describes Human-Centered Design as an approach to interactive system development that aims to make systems usable and useful by an explicit understanding of the users' task and environment. Human-Centered Design intends to include the user throughout the entire design process (ISO 2010). The name of the methodology starts with human, suggesting a concern for people instead of the user (Giacomin 2014), the intention is to break the researcher out of the mindset of the thinking about the abstract user. It allows design work in a broader view instead of being constrained in the predetermined usage layer, providing an open-minded way of design thinking.

As a framework focused on solving the problems of people, HCD aims to explore solutions that meet people's needs and preferences. It is a process and a set of techniques used to create new solutions for the world, which not only helps organizations connect better with people they serve, but also helps researchers see new opportunities (IDEO 2008). The application of this methodology is resilient rather than simple, linear and fixed process.

Using a human centered approach to design and development has substantial economic and social benefits for users, employers and suppliers. HCD is not just a method of improving the usability of a product, it can also reduce the risk of the product failing to meet the stakeholder's requirements (ISO 2010).

### 4.2 Design Process

IDEO has created a toolkit for HCD which includes three main phases: Hear, Create, and Deliver (IDEO, 2008).

**Hear: collecting stories and inspiration from people.** The purpose of this phase is to understand what people's needs, hopes and aspirations are. During this step the main activity is to perform different qualitative and quantitative research methods.

**Create: translate what you heard from people into frameworks, solutions and prototypes.** In this phase, synthesis and interpretation of what the researcher got from the previous phase is done. The result of this process can be used as a basis for possible solutions. Within this step, further iterations would be driven by different rounds of evaluation.

**Deliver: realize solutions through capability assessment, cost modeling, etc.** The purpose of this phase is to evaluate each solution's feasibility and viability. Possible ways of doing this include measuring the effects of marketing and what the manufacturing will look like, as well as the financial aspects of the project.

Corresponding the HCD methodology, IDEO (2015) proposed another approach to tackle different design challenges: 1) Inspiration, 2) Ideation, 3) Implementation. **Inspiration** is mainly around getting to know the context and understanding people. Through building empathy with the target communities and individuals, requirements elicitation and even design opportunities discovery are the main activities at this stage. **Ideation** is concept generation depending on findings from the first stage. This is done through using various ideation methods and conducting rounds of concepts evaluation with stakeholders and users. The goal of this stage is to identify and create opportunities for design. Coming up with a bunch of ideas, iterating and refining the concepts until fulfilling customers' needs

are main activities of this phase. **Implementation** is about bringing solutions into life and into the market. In this step, optimal concepts coming from previous stage are built in the form of prototype. Facing different concepts, running prototypes in real world, pilot, even establishing the marketing plans are critical to get the solution into the real life.

Jones (1992) raised designing as three-stage process, consisting of divergence, transformation and convergence. To put it simply, these three stage can be described as “breaking the problem into pieces”, “putting the pieces together in new ways” and “testing to discover the consequences of putting new arrangement into practice”. Divergence is about extending the boundaries of the design, defining and describing problems. Based on things get from divergence stage, transformation is to transforming possibilities into design opportunities. For the last stage, convergence is weighing and scaling down solutions through different evaluations until the satisfying solutions are produced.

### **4.3 Methods**

Corresponding to the HCD methodology, a number of methods support various stages of the research process for different purposes.

#### **Literature review**

Jones’s (1992) design method on literature searching, states as an aim: “to find published information that can favorably influence the designers’ output and that can be obtained without unacceptable cost and delay.” Literature view is a (semi-)structured way of exploring relevant literature regarding the design field at the beginning of the project, which provides some qualitative inputs for the later work. It is a process that not only help researchers clarify thoughts on their study, but also enable them to have a good grasp of the relevant work of others. In this project, a holistic literature review around the hotel TV and social experience field is performed to get an overview about the relation among relevant areas.

#### **Interview**

In order to understand people's needs and expectations, it is good to talk with them directly. Interview, as the critical issue in the inspiration stage, is an excellent way to collect information from the people who ultimately use the product or service. Depending the interview structure, interviews range from highly structured to completely unstructured depending on its purpose (Engelbrektsson 2004). Actually most interviews fall somewhere in between (Wilson and Corlett 1990).

While interview is suitable for use with both literates and illiterates. Compared with the questionnaire, interview has higher response rate than written questionnaires. Moreover, the personal interview has the advantage of getting deeper insights about interviewee. Especially for the project that has not too much explicit requirements, interview is an effective and direct way to know what target people really need. One drawback from interviewer is the presence of the interviewer could influence the response.

#### **Experience map**

The experience map is a visual or graphic interpretation of the overall story of an individual's interactions with the product, service, or brand, over time and across channels (Grocki 2014). It is a way to easily map the experience throughout the existing service. Besides experience map, different names are used to refer to similar representations, such as Customer Journey, User Journey or Blueprint. This method is an important tool to help people understand how the customers experience the service at different points and grasp the entire flow of an experience. Ronnie (2015) distilled five critical success factors for an actionable and valuable experience map:

1. Establishing clear goals and outcomes
2. Representing the customer perspective
3. Basing journey maps on quantitative and qualitative research

4. Building to communicate
5. Ensuring post-mapping executive ownership and governance

Based on the qualitative studies from literature review and interviews, experience map method is a good way to summarize the current state of the situation and figure out critical touch points for the experience, helping researcher discover some possible design opportunities and keep consistent experience in different channels.

## Persona

Stemming in the late 1990s, the Persona has been a common approach in the field of interaction design. As Cooper (2014) stated persona is a user archetype you can use to help guide decisions about product features, navigation, interactions and even visual design. Actually, personas are representative behavior and activity profile for a customer base instead of the real user descriptions.

Cooper characterizes his persona method as “Goal-Directed Design” and maintains that it makes the designer understand the user. In other words, it is users’ goal that are the focus of the persona descriptions, e.g. workflow, context and attitudes. The persona is primarily shaped based on the user studies, and used for the ideation. In order to creating effective personas, Cooper presented a process showing how to create personas, which contains 8 steps as Figure 1.

One thing need to mention here is that prioritization of personas is essential. To assure the design decisions don’t become generic in the face of too many audiences, it is necessary to prioritize different types of persona through some filters, such as primary, secondary and special persona.

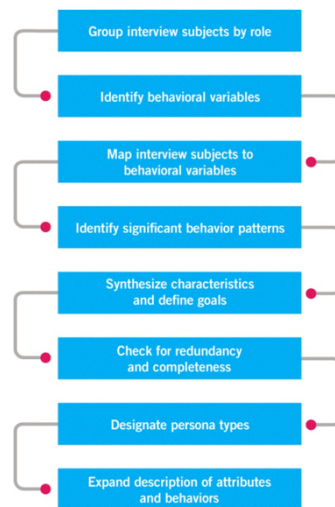


Figure1. Persona Creating

## Brainstorming

Brainstorming is a group creativity technique by which efforts are made to find a conclusion for a specific problem by gathering a list of ideas spontaneously contributed by its members. The best way to get an idea is to get a lot of ideas. Through Brainstorming, a large amount of ideas come up in a limited period of time. During this period, participants are facilitated to generate more ideas depending on the specific problems without criticism. Osborn (1963) claimed two principles for idea efficacy, which are defer judgment and reach for quantity. In order to do a better brainstorming, sharpen the focus, no criticism, go for quantity, welcome wild ideas are gradually established as basic rules for brainstorming (Kelly 2000). Regarding its application, there are many variations deriving from it. Nominal group, group passing technique, directed brainstorming, individual brainstorming, etc., all of these are detailed brainstorming techniques with different ways. While as the idea engine,

brainstorming is easy to make people get into the frustrating mood, because it takes lots of energy and sometimes peers feel ashamed if there are no new ideas coming out from his/her mind. Therefore, keep brainstorming session in a playful way instead of regular meeting is important.

## **Prototype**

In order to deliver a good user experience for end user, prototype is an integral part in the design process, which is created in different design phases depending on the sub-goal of the design. The author (Preece 2002) argued that prototype is a limited representation of a design that allows users to interact with it and to explore its suitability. Different prototypes serve design with different purposes: to test the feasibility the designs, to do the usability test and to convey ideas to peers, which are intermediate objects between the rudiment and the final version of the design. There are mainly two types of prototype in the design of digital products:

### **Low-Fidelity Prototype (Rapid prototype)**

Instead of shaping the final design, Low-fi prototype is usually used as exploration in the early design stage, which has big difference with the final design. Mostly the early prototype is taken as the form of the paper prototype or some other simple materials. With its cheap, simple and rapid prototyping characteristic, low-fi prototype has obtained the extensive application in the design process. Moreover, rapid prototyping is an incredibly effective way to make ideas tangible, to communicate with peers, to learn through making, and to quickly get key feedback from the people you're designing for (IDEO). One drawbacks from low-fi prototype is that they are often paper-based and do not allow user interactions.

1. Determine what to prototype.
2. Make your prototype.
3. Take your prototype out and test with people you are designing for or people you want to convey your ideas to.
4. Integrate feedback and iterate your prototype.

### **High-Fidelity Prototype (Functional prototype)**

High-fi prototype is a more realistic version of the prototype that looks much more like the final thing and has the identical functionalities with the final design. Generally, it is built at the end of the design process, being useful for testing functions. Due to its complete functionality and fully interactive, it works well for detecting some detailed problems for the final version of the design. While compared to the low-fi prototype, it is more expensive and time-consuming to develop.

Hence, in different projects, different prototypes will be used depending on the different purposes. For ideation part, simple prototype will be used to convey concepts and collect feedback from target users. For implementation part, the high-fi prototype is going to be used as a final design representation to evaluate its detailed designs.

## **Evaluation**

In interaction design, evaluation method works an effective way to assess if the design solutions meet user needs, which is helpful for the final design with high customer satisfaction. Based on their effects, evaluations are mainly divided into formative evaluations and summative evaluations. The former is conducted during design as a part of an iterative process, and the latter refers to tests of completed products (Nielsen 1994). To deliver a better experience, both formative and summative assessment for concepts will be conducted in the HCD process.

### **Opportunistic Evaluation**

Before the final design being produced, evaluation are opportunistic investigations, which means providing designers with quick feedback about the idea in the early stage (Preece 2002). This type of

evaluation is an essential ingredient for a successful design because it confirms whether it is worth proceeding to develop an idea. Usually these are finished through in an informal way, showing idea to people and ask opinions depending on the design goals. This is effective and time-saving way to do evaluations without requiring too much resource.

#### Usability Test

Usability test refers to evaluating a product or service through measuring the testers' performance on typical tasks, which is the best way to understand how users experience the product. However, the usability test is conducted after finishing detailed design in the later stage. The goal of the usability test is to identify usability problems, collect quantitative and qualitative data from users.

## 5. Process

The overall process was pursued with the Human Centered Design approach, employing Jone's three stages: divergence, transformation and convergence. The scope of this project changed as the iterations progressed. The full explorative process is outlined as a funnel in Figure 2, starting from the exploration of hotel TV usage and the social experience of hotel guests, and culminating in the development of a set of concepts for social TV in a hotel context. A number of human centered tools were used to gather qualitative data about target users in the exploration phase. In the concept development phase, three iterations were adopted to generate the final results: the design concepts and guidelines, which were developed in parallel with each other.

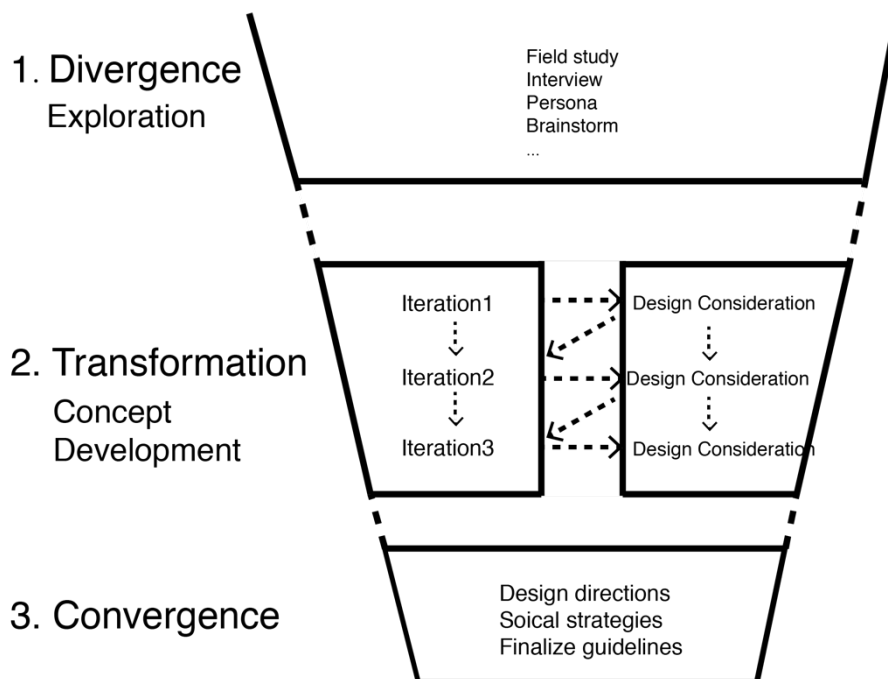


Figure 2. An overview of the research process

### 5.1 Divergence: Exploration

The divergence phase was intended to explore the usage of hotel TV and the social needs of guests, and get to know what the social TV could provide for guests in the hotel context. In order to make well-grounded designs, a number of methods were utilized in this part: field study, context-based social interaction explorations, preliminary interview, personas, brainstorming personas, scenario-based interview, social needs exploration and create opportunity areas.

#### 5.1.1 Field Study

Field study is a general method for collecting data about the target user, their needs and their product requirements. In a field study, investigators observe how users work, their working space, taking note about their activities and asking questions when appropriate.

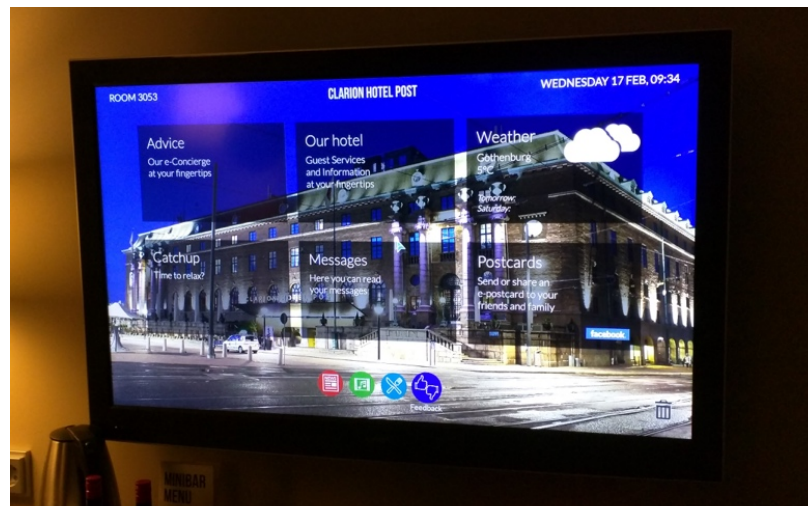
Observations in context are helpful for obtaining qualitative data in the early stage of the design process. This is an efficient way to study situations, including user behavior, interaction, environment, etc. As the Nielsen Norman Group (2002) stated in their research methods field studies should emphasize the observation of real user behavior. Due to lack the experience in this area, for this



project observation was mainly carried out in hotel room and in the hotel public spaces. The observations were conducted in order to gain more knowledge about TV usage and the hotel context. During the pre-study, three different hotels in Goteborg were visited. The public space in Clarion Post Hotel contained more guests to be observed, and coupled with the fact that People of Lava have a close cooperation with Clarion, this it was chosen as the target hotel for the field study. During observation, a hotel manager guided the author to show how their TVs work in hotel room. This was instead of real user behaviors in order to protect guests' privacy. Observations in the public space consisted of spending time in the public space and asking how visitors use the public TV and how they interact with each other.

### **Hotel room**

Each hotel room in the Clarion is equipped with an interactive TV. In addition to traditional TV watching, the TV provides a variety of features for guests. As can be seen from Figure 3, six widgets are displayed on the system's homepage: e-concierge, guests service, weather, catch up, messages and shareable postcards. Four other features are also positioned at the bottom of the page: news, entertainment, food and feedback. With this TV guests can easily get information, communicate with hotel, and gain access to a multitude of entertainment options and services.



*Figure 3. Homepage of interactive TV in Clarion Post Hotel*

### **The hotel public space**

Restaurant, bar, and lobby are all on the first floor of the Clarion Hotel Post. From observation, visitors individually like to use with their phones or work on their laptops in a relative secluded area. In groups visitors tend to sit together around a table and talk. Surprisingly, most of visitors sitting in the public space are not guests who stay in hotel overnight, but are often just meeting up with friends or colleagues in a comfortable place.

As can be seen in the Figure 4, only one TV was placed on the wall in lobby, but it was not observed to be used during any of the field studies.



*Figure 4. The public area in Clarion Post Hotel*

Other than the observations described above, questions were asked to understand hotel TV usage from the perspective of hotel staff and hotel guests. Another goal for talking with people was to understand the guests' behavior and their social attitudes when travelling.

In this session, I talked to three hotel reception desk staff and three guests in Clarion Hotel Post. For two types of talkers, questions were prepared with different orientations with regard to the goal. For hotel practitioners, questions were designed to have a general understanding about the hotel guests' staying and how the TV is used by hotels. While for guests, questions were plotted to get information about hotel TV usage by guests and their social experience in trips. These questions can be found in Appendix I.

By talking to hotel staff, it was found that the interactive TVs are not used widely in hotels. During the pre-study, only one out of three hotels had interactive TVs installed for their guests instead of traditional cable TV. For traditional TV, what guests mostly complained of was the bad signal caused by windy or snowy weather, while for interactive TV, it was the question of how to use it correctly that was asked most frequently. Also the issue of Wi-Fi in hotel was raised by nearly every guest, which showed that guests are prone to using their own devices during their stay. In public spaces, according to hotel staff, there were not many guests watching TV. Instead, they prefer to either sit alone to play with their laptops/phones or talk with their friends.

When interviewed, the guests exposed that they rarely watched TVs are not used widely in the hotel. During their travels, they used Facebook Messenger to stay connected with their friends or families remotely, even through direct phone calls. Some people like to express themselves by updating their status on social networks. In conversation with hotel guests, different attitudes towards social experience they had emerged. One guest said he was used to solitude when travelling. The other two guests said if they travel with friends or family, they prefer enjoying time with them and if they travel alone, they would like to meet new people but not on purpose. These results provide examples of views that what guests want to get from travel depends on their travel purposes and what people they are travelling with.

### **5.1.2 Context-based Social Interaction Exploration**

In order to explore more social possibilities for hotel guests, human-human interactions in the hotel context were analyzed as Figure 5 shows. As a result, six social interactions were explored.

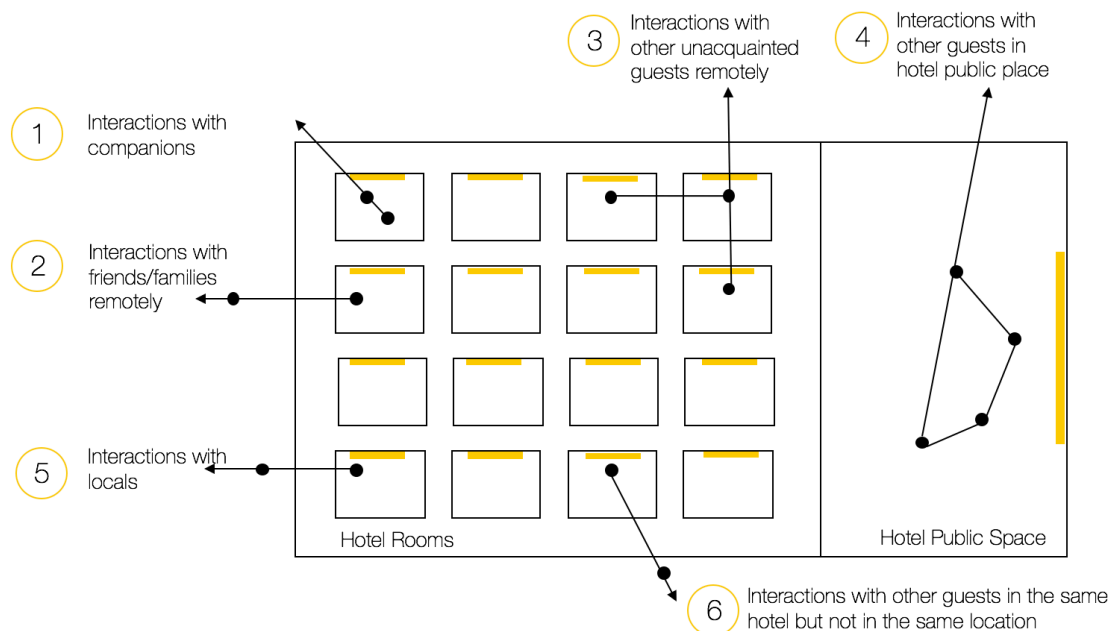


Figure 5. Context-based social interactions exploration

### 1. Interactions with companions

This implies social interactions in the hotel room with travel companions. For both business travel with colleagues and leisure travel with friends or families, what the hotel could provide for guests are some collective activities on TV to strengthen their relationship, making them feel good and being engaged in friend time or family time.

### 2. Interactions with friends/families remotely

Being away from home, travelers aspire to keep connections with their families or friends, which necessitates the support of social interactions between travelers and their families remotely. As we can see, several instant communication tools or social networks, such as phone call, messages, Facebook, etc., have entirely fulfilled this type of interaction.

### 3. Interactions with other unacquainted guests remotely

From the preliminary field study, it was found that during staying in the hotel, guests do not have many social interactions with other guests. Currently social interactions among guests are limited to reviews or comments about the hotel service on some travel-related sites. Hence seeking more opportunities for guests to have remote interactions with each other via the TV could be a way to support the social experience for guests.

### 4. Interactions with other guests in hotel public place

The hotel public space is a natural social place for guests. Here, guests are able to talk with their friends or get to know new friends. As observed in Clarion Post Hotel, people tend to be shy and communicate less with strangers. Friends or families talking around a table is the most common situation. In such a sociable place, a possible direction could be to investigate how to empower people to step out of their comfort zone and have active interactions with other guests.

### 5. Interactions with locals

Travel is an experience out-side daily grind. Experiencing different cultures and learning new things about the place you are visiting is what travelers expect. Interaction with local people is a good way to experience local culture.

### 6. Interactions with other guests in the same hotel chain but not in the same location

Some hotel chains have hotels in different locations. Taking the strength of location distinction, hotel could provide opportunities to share guests' travel experience through remote interactions and enable them to get to know different cultures. Even insights gained from other guests' travels would be an inspiration for the next trip.

### **5.1.3 Preliminary Interview**

At this stage, the requirements for social experience were still intangible. This preliminary interview was planned to enrich understanding for different types of travel and comprehension of relevant social activities. This section involved a visit Clarion Post and Scandic Hotel in Goteborg to interview guests encountered there. Since not everyone had time to do the interview, six guests were interviewed in total between the two hotels. In each interview, guests were asked a set of prepared questions (see Appendix II) and the time was attempted to be kept 20 minutes.

Two types of travelers appeared in these interviews, the business traveler and the leisure traveler.

#### **Business Traveler**

Most of those interviewed in hotels were business travelers. During a business journey, guests barely have free time because of their intense schedule. Instead, work occupies most of their time. Because of this, they are accustomed to use their own laptop rather than the in-room TV. When they have spare time, they prefer to relax by watching Netflix on their own computers or visiting a restaurant rather than put more energy in socializing. One interviewee, however, explained she would like to share a meal with other guests if she travels on her own, since she does not want to feel alone.

#### **Leisure traveler**

Compared to business travelers, leisure travelers have more options. In their minds, the hotel is only a temporary place to rest, hence they would like to explore the local area rather than spending time staying in the hotel. When leisure travelers travel with their friends or families, they desire an organized trip. When they get back to the hotel room, they like to prepare for the next day or do things together that accommodate everybody on the trip, such as playing games, watching sports, or watching movie.

The hotel public space for leisure travelers is a place for waiting, drinking and eating. What they pursue on their trips is enjoying time with their friends or families. People who travel alone have more freedom. They visit places, arrange their trips on their own terms without too many concerns. This type of traveler showed more motivation to communicate with other guests. One interesting comment from an interviewee was that if he stays in the Nordic countries, he probably will avoid talking with people, but if he stays in Spain, he would turn on his social ability switch. This shows that the external environment is an important factor affecting the social willingness of guests, and that curiosity is a strong motivation for leisure travelers to socialize. When it comes to social interactions, interviewees stated that they expect novel and different stories from other guests who came from different places. Also they mentioned that they would like to talk to people who has common interests with them, like sports, profession, etc.

### **5.1.4 Persona**

Cooper (1996) defined the persona as a precise description for uses and what users wishes to accomplish. In this goal-directed process, the persona is not a fully descriptions of real users, but instead emphasizes the goal of the persona using the service. From the interviews, business travelers and leisure travelers were found to be the main target guests of hotel. For each type, they were either traveling alone or traveling in groups. To increase understanding of guests and establish a tool to help in the concept process, four types of archetypical guest's personas were created. Based on data gathered from the previous study, these were to represent the different user types, their behavioral patterns and associated social interaction goals.

As Figure 6 and Figure 7 shows, Nancy and Jason are personas for business travel, while Helen and Joy are representatives for leisure travel. The difference between the two personas in the same traveler type is whether partnering with others or not. Each persona was elaborated with biography information, social attitudes, personal information, personality, preferred media channels and technical skills. Through these four personas, a clear vision about the target guests was established. At the same time, these personas were helpful to maintain the perspective of users during the design process.

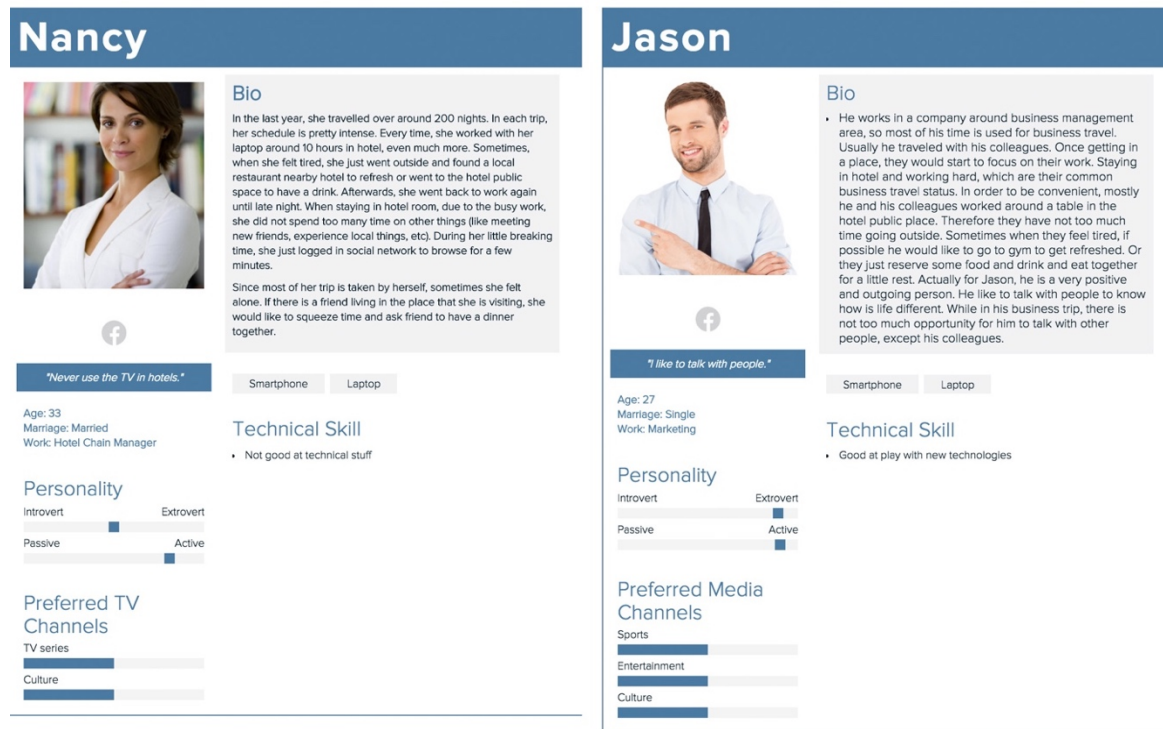


Figure 6. Business travel personas

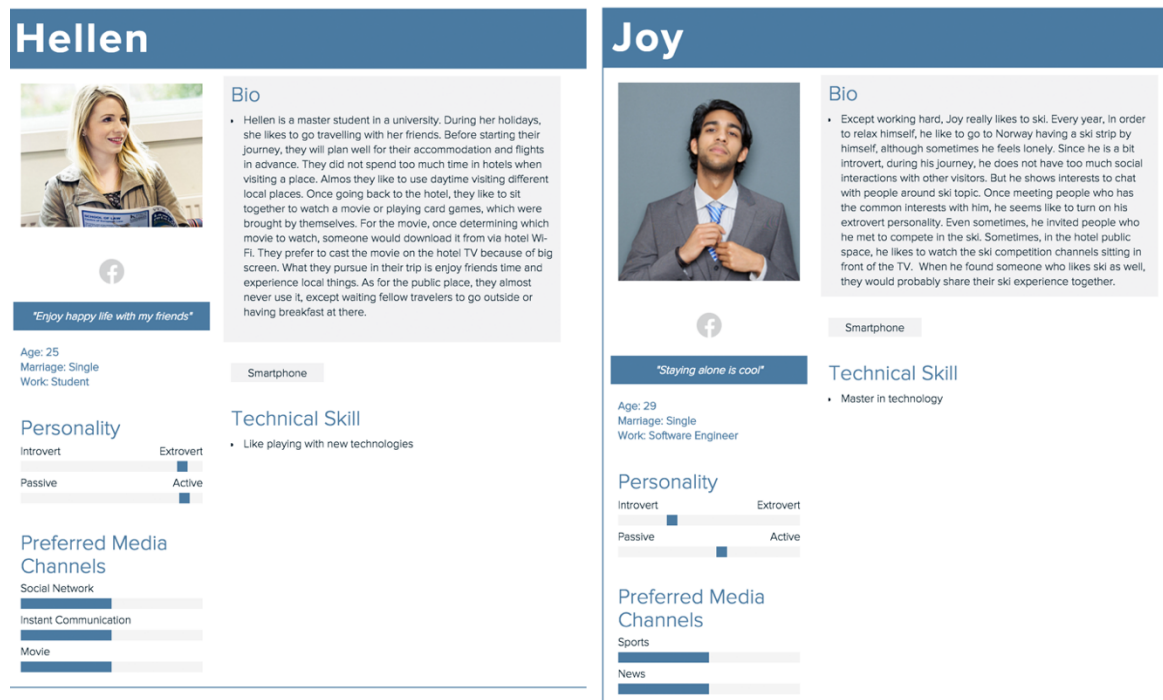


Figure 7. Leisure travel personas

### 5.1.5 Brainstorming Personas

A brainstorming session was conducted to come up with different social activities for established personas. As the figure 8 and 9 below show, personas were used as tool enabling the designers to keep the target user in mind and brainstorm for them. Each persona was limited to 30 minutes and each session began with problems arising from their trip, along with what benefits could bring for guests from social interactions. As per figure showed, for business travelers (Figure 8), several activities were brainstormed from the perspective of improving working efficiency, reducing stress, getting refreshed, being accompanied and experiencing new things. For leisure travelers (Figure 9), discovering locals, entertainment and memorable experience were explored instead.

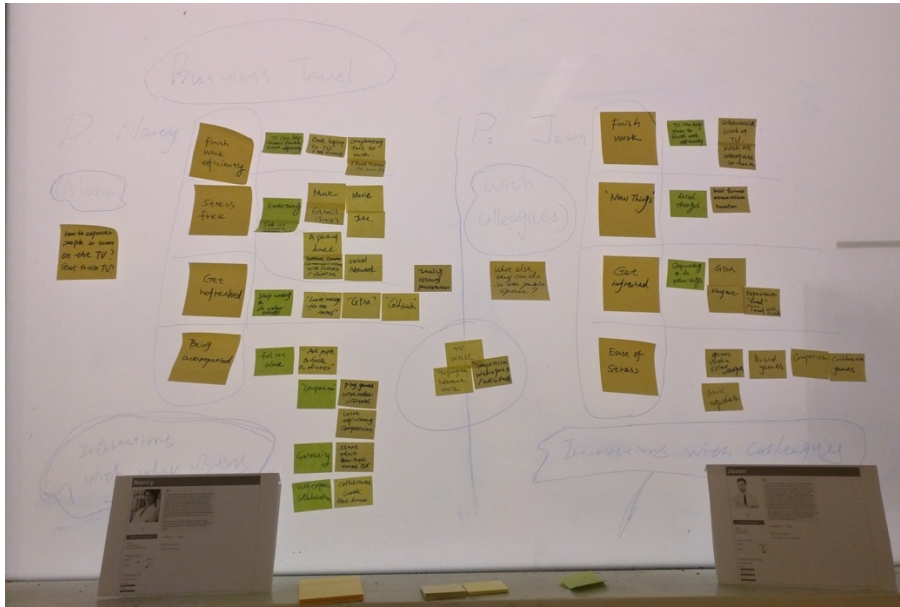


Figure 8. Brainstorming for Business traveler

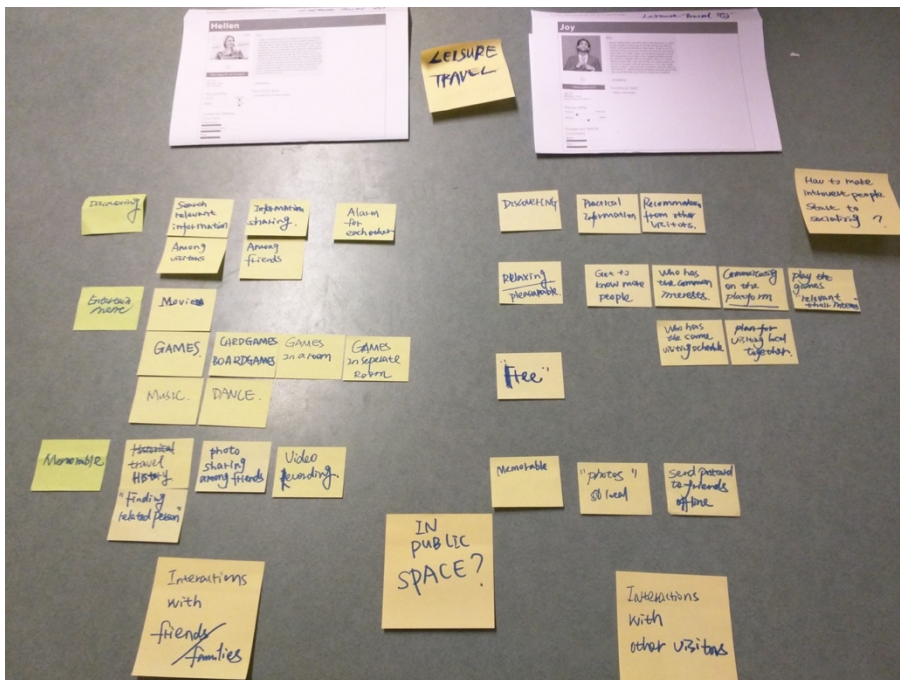


Figure 9. Brainstorming for leisure traveler

### 5.1.6 Scenario-based Interview

Based on the results from former study, this interview aimed to discover what the social needs for both business and leisure guests in different scenarios, and what activities guests would like to perform through social TV in the context of hotel. Two sets of interview questions were prepared for business and leisure travelers, which has slightly difference (Appendix III).

In order to ensure the interview ran smoothly, the questions were piloted on a pair of students to test the quality of the questions. The questions were prepared with questions for usage of the hotel TV both in hotel room and public space context. Interviewees were not, however, able to answer questions easily, which made them feel frustrated and lack of self-confidence. From the pilot study, it was realized that the setup of interview questions was the biggest reason resulting in its failure. It was hard for interviewees to directly propose what activities or what games they would like to have on the TV when staying in hotel.

To amend this, some closed questions, descriptive scenarios and mediating tools were incorporated into the interview plan. Each question set was structured alongside a set of scenarios:

- remote social interactions with other guests across in-room TVs when traveling solo;
- collocated social interactions with friends or families through in-room TV when travelling in groups;
- social interactions with TV in hotel public space.

Moreover, those questions were formulated in a semi-structure to guarantee that certain topics were covered, but the exact formulation was varied depending on interviewees' answers. Additionally, an image corresponding to each scenarios was shown to them as the mediating tool, in order to give interviewees a clear vision for the context.

Five business travelers and five leisure travelers were interviewed either in the Clarion Post Hotel or at Chalmers, since guests who stayed in hotel usually had little interviews and because of the scarcity of leisure travelers at the Clarion Post. For each interview, the aim was introduced to interviewees firstly and then showed scenarios and asked relevant questions in turn. Results were summarized as below.

### 5.1.7 Social Needs Exploration

Based on the data coming from the interview above, the results were briefly described in the Table 2. As for the detailed explanation, which were compiled in the text below.

	Reciprocity	Entertainment	Curiosity
In the hotel room	<p><b>Business traveler:</b> local practical information sharing, collaborative work</p> <p><b>Leisure traveler:</b> local travel information recommendation, background learning, tour pal finding</p>	<p><b>Remote interactions</b> <b>Business traveler:</b> video watching (e.g. sport, movie), game playing <b>Leisure traveler:</b> video watching (e.g. sport, movie), game playing</p> <p><b>Collocated interactions</b> <b>Business traveler:</b> movie/sports/video watching, game playing, collocated work, virtual sight-seeing <b>Leisure traveler:</b> movie/sports/video watching, photo sharing</p>	No
In the public space	Notice board	Quiz competition, Watching sports events, Puzzle games, etc.	Experimental discoveries

Table 2. Social needs in different context compiling

### **Business guests**

Most business travelers stated that they have no strong desire to interact socially with other guests. One reason for this is that their trip is usually filled with intense work, and after work they feel tired and have no more energy to socialize. Business guests have no special expectations from the current TV and only a few of them used the TV in past trips, because they thought they could do everything the TV can do on their laptop or other personal devices. For guests who used the TV, some of them used it in the morning as “background music” or to watch news after getting up, and others might watch certain entertainment programs on TV after finishing work.

#### **S1. Business Travel Solo Scenario**

In this scenario, social needs for solo business guests were ranked as reciprocity, entertainment, curiosity and being accompanied. Reciprocity was highlighted as the first priority in the case of visiting a place for the first time, otherwise entertainment was chosen as the most important social need. As for curiosity, only one interviewee expressed strong interest in it.

To be specific, what business travelers would most like to do with other guests through social TV is sharing local information if they do not know the place they are visiting well. Otherwise playful activities would be the first option for them to interact with other guests. Guests stated that it was good to include competition and cooperation mechanisms in playful activities. Watching movie/video collections is the second entertainment choice for guests when staying in hotel. As for other entertainment preferences, these have more to do with guests’ personal interests, such as watching sports, which only real-life sports fans mentioned. Surprisingly, four business guests showed great interests in communicating with other guests who had the same profession as them. They preferred to socialize with friendly and easygoing people.

#### **S2. Business Travel with Colleagues**

Entertainment is the highest social needs for business travelers accompanied by their colleagues. As for the order of the other two social needs, reciprocity and curiosity, there was no obvious evidence showing which one is preferred by this type of guests.

For social activities among colleagues through the TV, watching movie or video was favored the most highly. A small workout and playing games were the second choices. Only a small number of people showed interest in having a scenery tour about the local place on TV and exploring their common career connections. What grouped business guests desire for collective activities to make them feel relaxed and entertained.

#### **S3. Hotel Public Space**

From the interview, business guests’ social needs in the hotel public space were ranked as entertainment, reciprocity, curiosity, and being accompanied. Entertainment activities in the public space should have high involvement for guests and be able to be accessible by everyone, for example games. Other than a motion sensing game, a quiz competition game was warmly welcomed by most of interviewees.

### **Leisure guests**

Leisure guests preferred to explore local places until night-time and then went back to the hotel to rest. During their trip, Google Maps, Trip Advisor and Facebook are important tools. However, the TV usage in hotel is for them related to personal habits. Some guests said that they like to use the TV to watch entertainment programs and advertisement. Some guests used it in the morning as the background music accompanying with other activities (only turning on the TV but not actually using it). Some people did not use TV at all.



### S1. Leisure Travel Alone

Being accompanied and reciprocity are the top social needs for individual leisure travelers. They would like to have more interactions with other guests through forms of entertainment. In this part, social activities that interviewees chose were consistent with social needs they chose. As for being accompanied, what solo guests like to do is inviting others to visit the same location together. For reciprocity, what they mainly intended is to get local information from other guests. Most interviewees pointed out that they would like to find information instead of provide information, and they would not invite someone to visit places together, but probably like to join someone who posts the invitation. For entertainment, the reason for guests ranking it lower was that after one-day of tourism, they felt tired and without desire for putting efforts into more complex games. Hence light and simple games could be more appropriate. Especially for solo leisure guests, they were curious to communicate with people who have things in common with them, like society status, country, trip plan, travel type, etc.

### S2. Leisure Travel with Friends or Families

Entertainment and learnability are the two main social needs for leisure guests travelling in groups. Learnability means that friends learn local things and plan for next day visit together, such as buying ticket, arranging activities, etc. Actually some interviewees stated that they do not prepare much for their trips in advance. Therefore, planning their visit for the next day is often the main activity for them when staying in hotel. Curiosity in the interview questions was portrayed through the example of having a virtual reality tour about local famous attractions, which could actually fall under the learnability social need category, implying getting to know more knowledge about local attractions.

Other than learnability, what guests chose to do was watch a movie or play games together. In response to the proposed photo sharing activity, one interviewee showed great interest in it, while another interviewee who disliked taking pictures was less enthusiastic. One interviewee expressed that she would like to use it, but proposed that it is inconvenient to import photos into the TV and feel unsafe because of the privacy. Photos could hence be another main activity for leisure guests travelling in groups, but should be safe and convenient.

### S3. Hotel Public Space

Reciprocity and entertainment are the top two social needs for leisure guests in public space. Sharing information, quiz competition, puzzle and watching sports became the top four social activities in this context. These activities show high demands for social interactions, as highly participation-focused, playful and interactive atmosphere installations. Regarding social interaction in public space, one concern raised in interviews is how to make interactions not disturb other guests in the semi-social public space. Another concern is what the most intuitive way is to use TV for many guests in public space.

Then a fully-fledged framework of social needs in the context of hotel was illustrated, which can be seen in Figure 10. Each card was filled with relevant social needs for the different user types, which were listed based on the priority of interviewees' selection. Desirable activities were put under the corresponding social need. The user data obtained from interview was diagrammed as a framework of social needs, which was easy to understand and have a clear vision over social needs for different types of travels.

As Figure 10 shows, in the hotel context, reciprocity and entertainment were extracted as two main social needs for travelers, regardless of travel type. Under each social need, the corresponding activities were indicated as examples to illustrate it more concretely. To the social need of curiosity, attracted interviewees' attentions, but still needs to be evaluated in the future work.

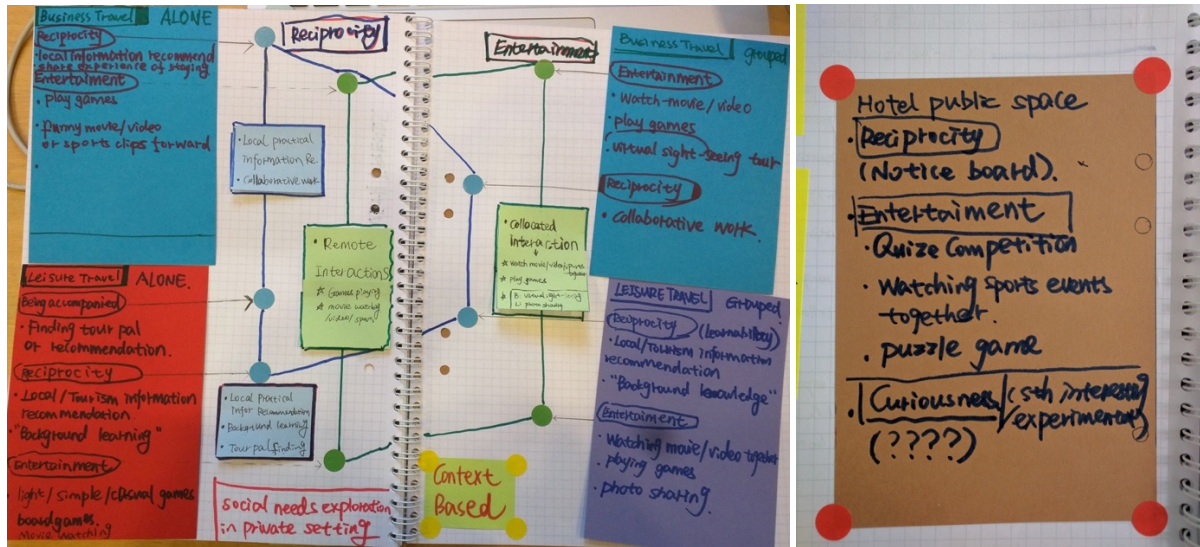


Figure 10. Social needs framework

### 5.1.8 Creating Opportunity Areas

The framework described above was used in combination with the Creating Opportunities method to translate the insights into design opportunities. According to IDEO, an opportunity area is a stepping stone to idea generation (HCD TOOLKIT), thus this was done in order to get more design ideas for each type of social needs. For different social needs, opportunities starting with the phrase “How might we support...?” were stated to suggest a mindset of design possibilities, which were generated for quantity not quality in a limited timeframe. Then opportunity statements were narrowed down by merging and deleting according to the desirability of the target guests. Afterwards, filtered opportunities were utilized as a starting point to develop initial concepts. The Figure11 shows opportunity exploration for reciprocity and entertainment social needs.

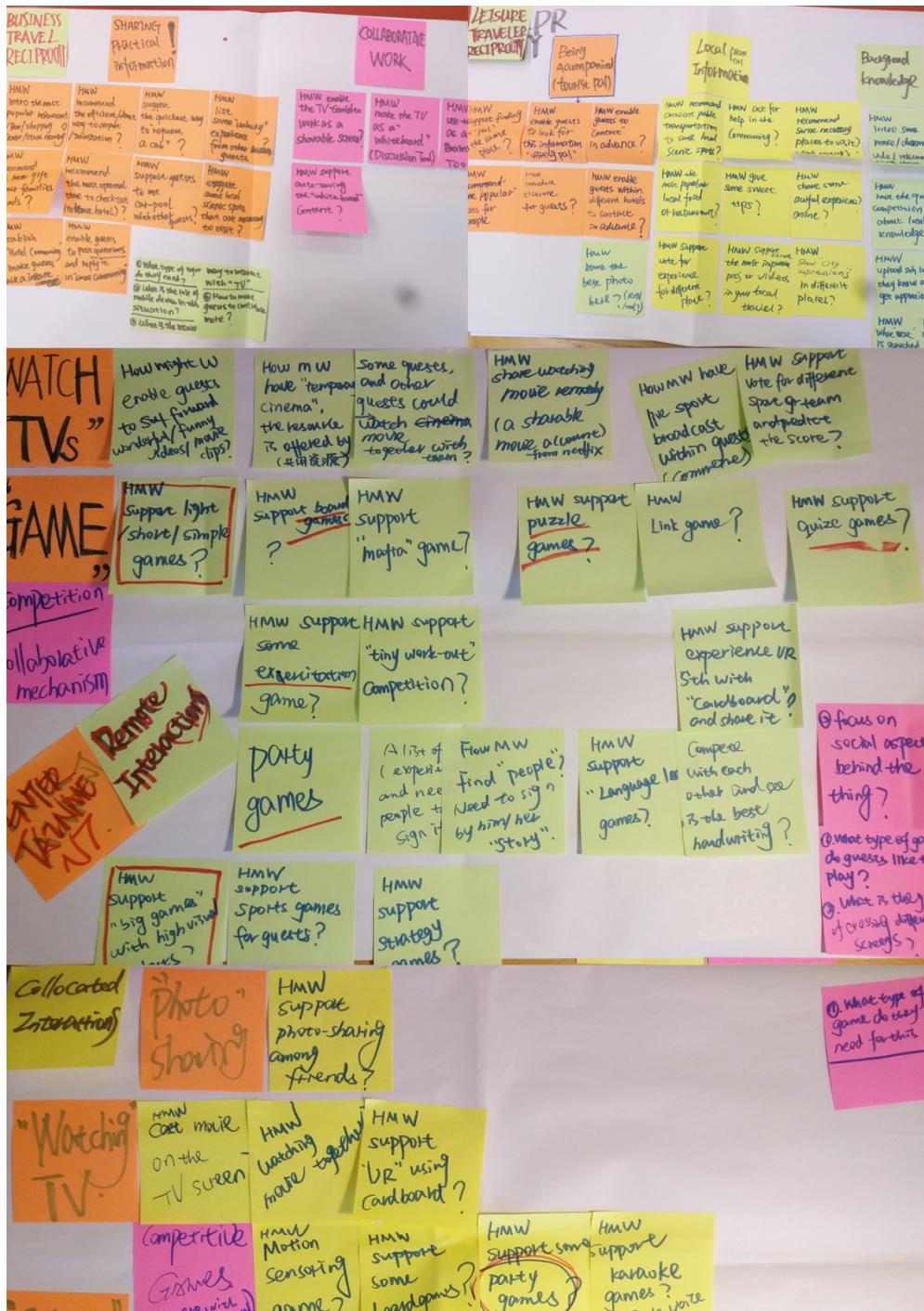


Figure 11. Creating opportunities areas

## 5.2 Transformation: ideation and evaluation of alternatives

Transformation referred to transfer identified insights into design opportunities. The goal of this part was to explore different possibilities that the social TV could have. At this point, several concepts were created on the basis of previous study within three iterations. Between each iteration, either user evaluation or internal evaluation were adopted to assess the strength and weakness of each concept. Although some concepts were discarded, they were useful to recognize the situation and know how to design social TV better. In addition, design considerations were realized along with the concept development.

One thing need to mention here is the later work was mainly focused on the leisure travelers. According to previous interview results, there were no big difference between business travelers and leisure travelers in respect to social needs, including reciprocity, competition and curiosity. Compared to leisure travelers, business travelers showed weaker attitudes to social experience in the context of hotel. They stated in previous user study that they have less interested in socializing with others, because of the over intense schedule in their trips and the lack of energy to do other things. Moreover, in the long run, the leisure travel is essentially a type of socializing activity. Henceforth, the project work was targeted on leisure travelers instead of involving both types. As for the final results, which was not dedicated in business travelers, but they could be users.

### 5.2.1 Initial Concepts

Based on the framework and statements described in exploration, several preliminary concepts, including innovative ideas and existing concepts, were brainstormed. This section consists of six different concepts, which focus on different social needs and different types of interaction. The first concept was the embodiment of reciprocity, next four concepts were designed for the purpose of entertainment through social interactions, and the last one was designed to from the perspective of fulfilling guests' curiosity. However, three types of interactions were elicited from these initial concepts, which were remote interactions, collocated interactions and social interactions in public space.

**Remote interactions:** interactions of hotel guests who stay in different hotel rooms via TV and mobile devices

#### 1-Exploration nearby and online hotel community

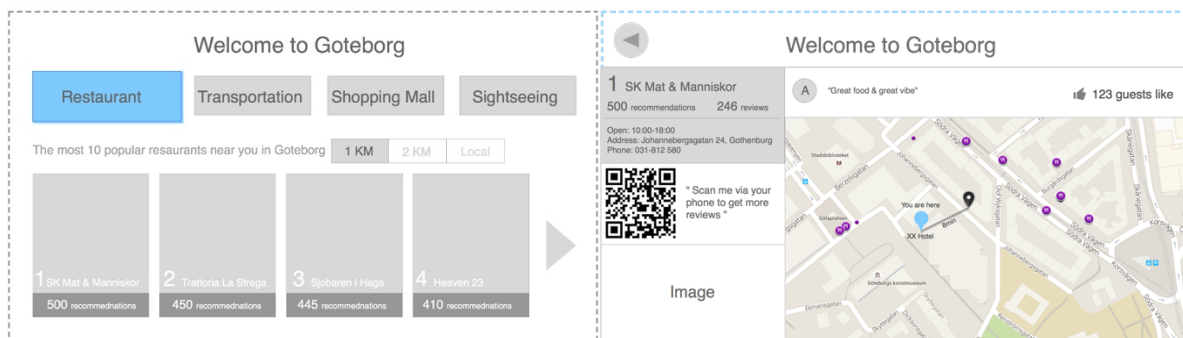


Figure 12. Exploration nearby

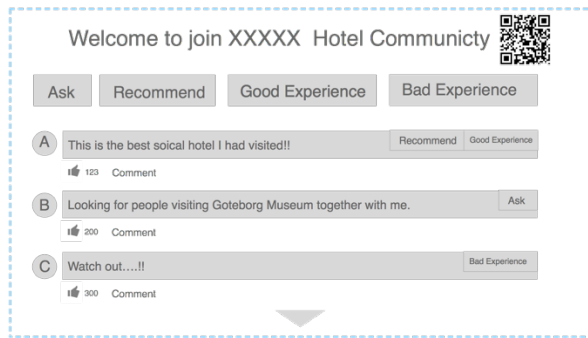


Figure 13. Online hotel community

Arising from the reciprocity social needs of leisure travelers, the way of creating a hotel platform was proposed to support guests' interpersonal interactions, which enabled guests to communicate with each other about travels with user-generated contents.

Exploration nearby (Figure 12) is a solution which recommends popular things around the place where guests were visiting. However, recommendations and reviews derive from hotel guests-generated contents. In this idea, the reciprocity was materialized with way of self-production and consumption. Online hotel community (Figure 13) is a concept that establishes online community for hotels, allowing their guests to share their travel experience, discuss and post questions.

**Who:** hotel guests who would like to explore local things and want to have a well preparation for their trips.

**When and where:** spare time, in the hotel room

**Why:** arouse and enhance guests' interactions through sharing travelling experience, recommending popular places, and helping with each other.

## 2-Interactive hotel cinema

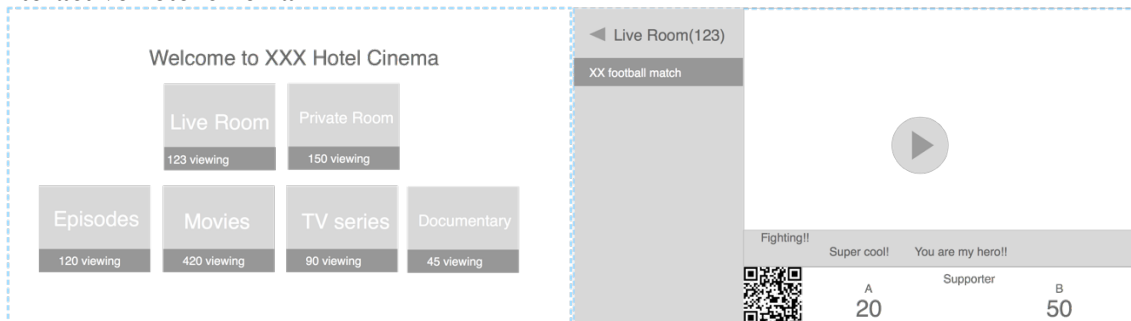


Figure 14. Interactive hotel cinema

As I got from previous interviews that currently plenty of guests had already give up the use of TV. Backing to the activity of watching TV, this idea aimed to entertain guests through watching TV and enhance their viewing experience through socializing with other guests.

Interactive online cinema (Figure 14) comprises abundant contents, including live program, movies, TV series, documentaries and private cinema room. Literally, under the live program, guests are able to watch live programs. Except this, viewers can interact with other simultaneous viewers through their personal devices, such as sending bullet screen, which is a typical feature for the streaming video website, allowing remote viewers to comment on the content simultaneously. The movie, TV series and documentary use the similar interactive ways as well, which have close relation with the content of the program. As for the private cinema, which means the movie room is created by guests personally. Three ways are available for guests to import their movie content to the private cinema,

including casting the content from personal device to the TV, plugging in the USB device, and logging in personal streaming video website. Once settle resource down, the host of the private movie room have an option to invite guests to watching the movie simultaneously online.

**Who:** hotel guests who would like to watch TV simultaneously but remotely

**When and where:** spare time, in the hotel room

**Why:** support viewing experience via interaction with unacquainted guests online when watching TV

### 3-Gaming

Except the way of watching TV, gaming is another playful way to enhance social interactions with other guests. In order to explore what types of game guests really like to play in the context of the hotel, five types of game (Figure 15) with its corresponding examples were brought forward. They were music game, exercise game, board game, puzzle game, quiz game, etc.

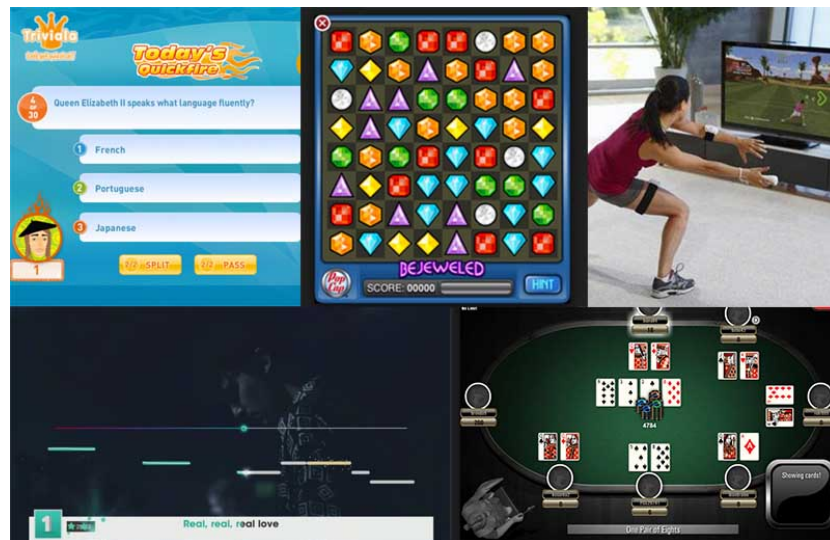


Figure 15. Proposed games

**Who:** hotel guests who would like to play games with guests through hotel TV

**When and where:** spare time, in the hotel room

**Why:** support playful interpersonal interactions for guests through game playing in a short time.

**Collocated interactions:** interactions in grouped travelers who stay in the same hotel room, such as friends or families.

### 4-Gaming with friends or families

Gaming is a good way enabling collocated friends or families to have immersive experience together. In this concept, the goal is to enhance collocated interactions through the way of gaming. To figure out which kind of game will satisfy acquainted guests, except games that were exemplified as before, two additional games were added in this case, which were multiple players game and party game.

**Who:** hotel guests who would like to play with their friends or families through hotel TV

**When and where:** after returning the hotel, in the hotel room

**Why:** support collocated social interactions for hotel guests with their friends or families and enables them to enjoy their happy time together maximally.

**Social interactions in the public space:** interactions among hotel guests happening the hotel public space, such as hotel lobby, restaurant, and the hotel bar.

## 5-Gamification activities

Four concepts (Figure 16) were come up with to enhance social interactions with unacquainted guests. “vote for the most impressive photo” which is an activity organized by the hotel, allowing guests to upload pictures that could represent the local impression and vote for the most impressive photo in a period of time. “Quiz game” is the game of competing answering questions around the topic of local city. “Ice-breaker” was intended for work as the icebreaker for unacquainted guests to start talking with each other in the public space. It is a common party game that each grid represents a type of experience, and the guest can sign with their name once they have the same grid experience as described. The three person who finished the grid in line firstly will be winners. “The jigsaw puzzle game” is to gather people to complete the jigsaw puzzle cooperatively. For these four concepts, the TV was attempted to be used as as a display screen showing information to guests.

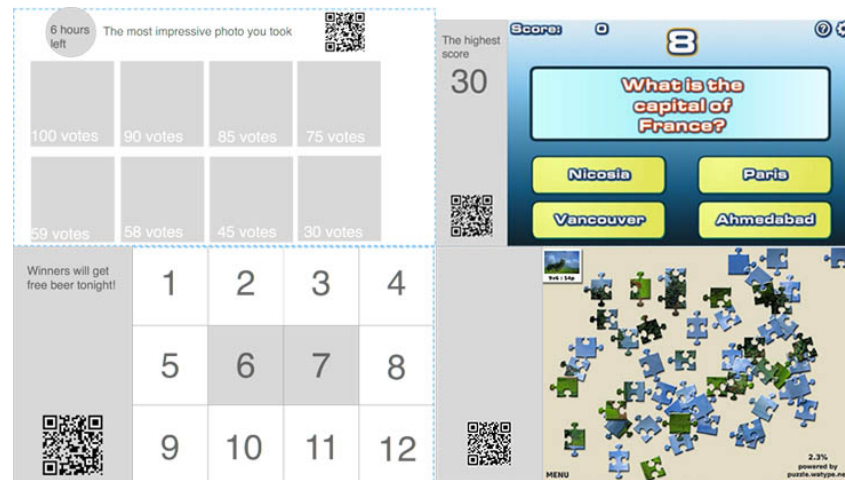


Figure 16. Gamification activities in hotel public space

**Who:** hotel guests who would like to get to know more new friends in their trips

**When and where:** waiting time, lunch time, after-visiting time, in the hotel public space

**Why:** facilitate guests to interact with each other and trigger their conversations through gamification activities

## 6-Experimental exploration

In the context of hotel public space, in order to support more social experience for guests, two experimental concepts (Figure 17) inspired by the curiosity social need were put forward. One is that the TV could work as an interactive hotel welcome signage. Once check in, guests could use their phones to input text “hi” with their native language. After many guests’ inputs, the TV will show “Hi” with different languages. The size of the text changes depending on the amount of guests who input the text on their phones. Another concept is for guests to leave message for each other with the way of QR code through personal phones. To be specific, there will have a card with QR code on each table situated in the hotel public space. Guests are allowed to read, reply and delete messages left by other guests or replace message with new one via scanning the QR code with their phones. Some interesting topic can be shared on TV in public space to inspire guests to explore and interact more. This concept intended to use this quiet and indirect way to catalyze guest’s interactions and provoke some interesting conversations among guests, thereby leave a memorable experience for guests.



Figure 17. Experimental exploration in public space

**Who:** guests who expect some attractive and novel social experience

**When and where:** waiting time or mealtime, in the hotel public space (lobby, restaurant, bar area)

**Why:** trigger communications among guests through small interactive participations in their trivia time

### Concept evaluation

Throughout the project, relatively little evidence of research on this topic could be found. Because of this, eliciting requirements and how to ensure concepts satisfy guests' real social needs became particularly important for this project. So the concept evaluation was carried out to collect informative feedback for initial concepts.

In order to deeply understand which concepts could be preferred by guests when they stay in the hotel, the evaluation was planned to use the verbalization method of interview. Compared with the observation, the way of interview not only reveals how they experience the design, but also provoke subjects to speak out more, benefiting for researchers to understand target audience more. For this informative evaluation, paper prototype was adopted to articulate and visualize design concepts to subjects clearly.

### Execution

**Objectives:** get feedback on design concepts that I had developed so far. The session was planned to know how is user feeling about various concepts and to help researcher to filter and develop ideas further.

**Participants:** 5 students from Chalmers

**Location:** group room in Chalmers and Visual Arena

**Duration:** 1hour for each person

**Paper prototype:** each concept was presented to subjects with paper prototype (Figure 18)

**Documentation:** Audio recording

**Process:**

- Introduce the hotel social TV for testers and the purpose of the evaluation. And declare for subjects that I welcome their authentic feedback no matter positive or negative inputs.
- Based on my framework, for each category, an assumed scenario was introduced to subjects and a relevant image as an intervention tool was shown to them.
- Ideas with the form of paper prototype were introduced for subjects.
- Questions were asked after concepts introduction.



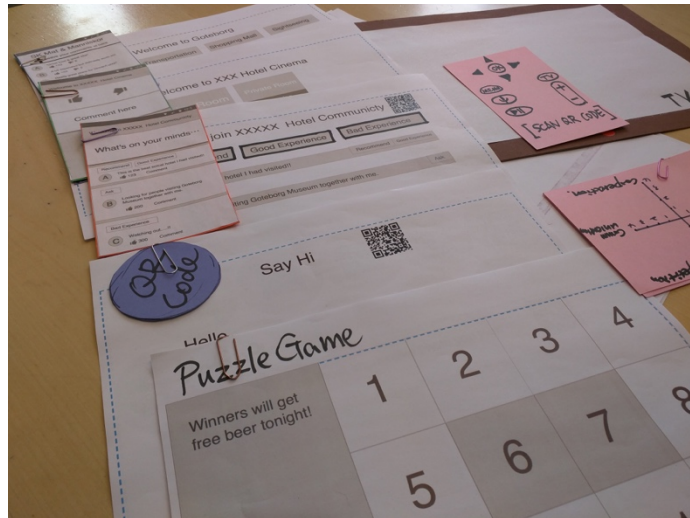


Figure 18. Paper prototype for initial concepts evaluation

### Analysis and design considerations

After evaluation, the audio content was written down with the form of transcript (Figure 19). Then those interview transcripts were analyzed through the way of list-reduce-organize: read through transcripts, list for relevant comments and statements, and then group according to different themes. Finally depending on different themes, user requirements, descriptions of problems, suggestions for design were compiled and summarized as initial design considerations to impact later work (Appendix IV).

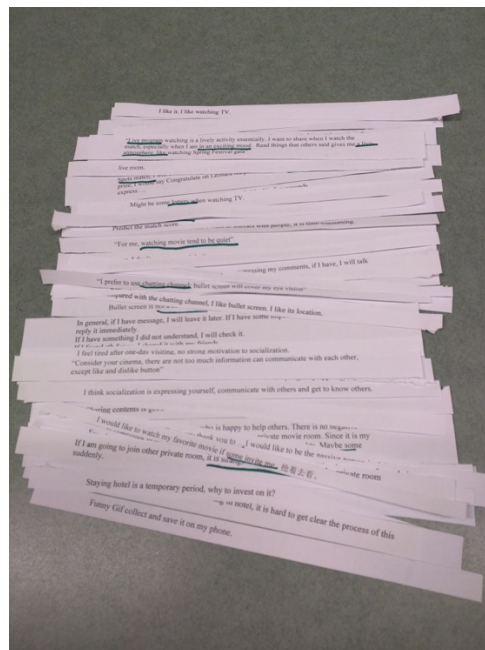


Figure 19. Transcripts

For each initial concept, the analysis work was described below with the structure of rephrased requirements for grouped transcripts, analysis, and elicited design considerations.

#### 1-Exploration nearby and online hotel community

As Figure 20 shows, a set of requirements were identified and categorized. These lists not only benefited me to understand hotel guests further, but also provided suggestions for the design work. In addition, some concerns were put forward to think in-depth for the project work.

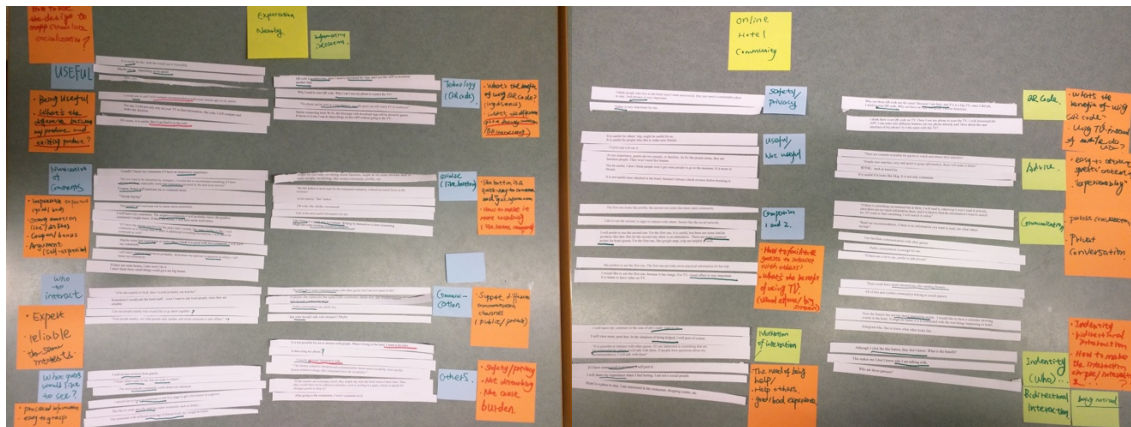


Figure 20. Transcript analysis for exploration nearby and online hotel community

### Useful

- The available information need to be useful for guests
- What's the difference between new concept and existing feature in hotel TV?

From interviewees' words, what they would like to get from the social interaction are useful information or something that makes them feel relaxing. Thus the content provided by the TV could be either useful or entertaining for leisure hotel guests. Another issue arising from the evaluation was how to make fresh things on TV platform instead of existing features that have already been on the personal devices.

### Safety/privacy

- Guests' safety and privacy is crucial

### Motivation of social interactions

- Impressive experience (good/bad)
- Experience with strong emotion (super like/super dislike)
- Coupon/bonus(Gift-giving)
- Argument (Self-expression)
- Being helped and provide help

Most of guests tend to have no strong motivation to interact with other guests, especially with strangers. Regarding these two concepts, testers prefer to get practical information instead of make contributions. But three potential motivations could trigger guests to interact with others for this concept. One is self-expression, which means guests would like to share their trips with strangers once being influenced with super good or bad experience. The motivation is accompanied with strong emotion. Another is that guests start to interact with other guests actively because of the need of being helped and providing help. The last motivation for guests' social interaction is extrinsic motivation, such as coupon or bonus from the hotel. Therefore, self-expression with strong emotion, reciprocity and gift-giving are important factors resulting in social interactions among guests, which could an important consideration for designing social experience for guests.

### Who to interact

- Expert in some aspects
- People they feel reliable (hotel staff, local people)
- People who have the same interests with them

In the context of travelling, what kind of people guests would like to interact with are experts in traveling, a certain of people they feel reliable, such as local people, hotel staff, and people who have the same interests with them. In order to trigger interactions, a clear vision about what type of guests are necessary. Moreover, to arouse conversation among guests, utilizing proper triggers could be an effective way to make people start to talk.

### **Interactions**

- bidirectional interaction: the interaction should be bidirectional. People would like to get responded if they start to interact with others
- different communication channel: public conversation and private conversation
- recommendation
- review (thanks, being useful, like, up-vote)
- experience sharing (good /awful experience)
- comments
- Like button is a quick way to comment and to get information

From the evaluation, interviewees showed in most cases, public conversation were enough for them. If they had some specific requirements, private conversation was required. Moreover, for people, once they start to react, getting responded is important for them.

### **Technology**

- Over scanning QR code is a bit inconvenient.
- What is the benefit of using QR code?
- What is the difference among using QR code, integrating all features on App, and putting all feature on TV?
- What is the strength of mainly using TV instead of using mobile device?

As for the technology (QR) connecting TV and mobile usage, interviewees showed different attitudes for it. Some of them stated it is annoying when scan the QR code overly due to the viewing distance of TV. Some of them tend to like it. Hence in the later work, the technology supporting TV and mobile usage need to be simple for user to use without causing inconvenience. As we know, the big strength for TV is its visual effects with big screen, while the power of mobile device is its mobility, personalization and easy-input feature. In this project, exerting the strength of TV and mobile is crucial to support guests' social experience.

### **Advice**

- Easy to attract guests' attention
- Some hot experience blog
- Processed information
- Easy to grasp

From the evaluation, testers showed they had not too much time staying in the hotel. What they desired to get from the product was something that easily attracted their attentions.

### **Others**

- Not disturb others
- Not cause burden for guests, especially for people who do not like socialization

### **Concerns**

- As the product in hotel, how the design stands out from existing travel products, especially in its features?
- How to facilitate guests to interact with others?
- How to make the interaction simple and interesting?
- What is the benefit of using QR code?

- How to make the user interface having more socializing, except recommend, review, share and comments?

## 2-Interactive hotel cinema

As Figure 21 illustrated, four categories were generated after analyzing transcripts of interactive cinema concept, which were content, interactions and concerns.

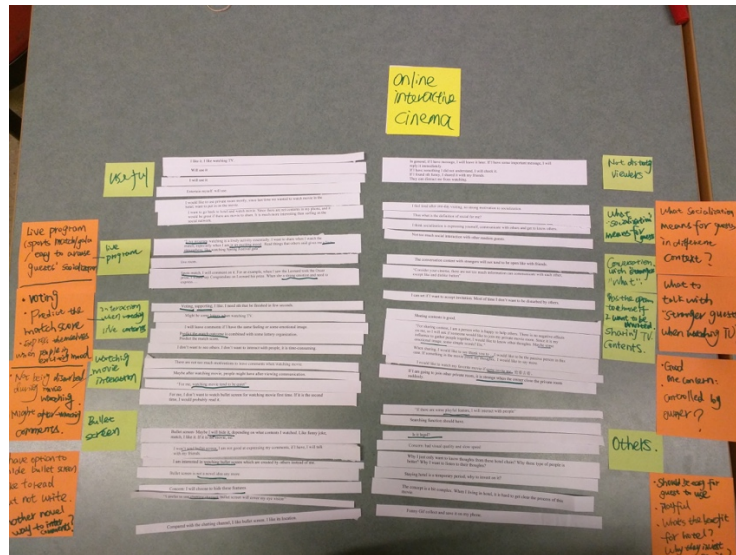


Figure 21. Transcript analysis for interactive hotel cinema

### Content

- Live program (sports, gala, music competition) are easy to catch guests' interests and trigger them to talk

### Interactions when watching programs

- Interaction when watching live program
  - Voting
  - Predicting the match outcome (score, winner)
  - Express themselves when people in exciting mood
- Interaction when watching movie/TV series
  - Tend to be quiet when watching movie, not being disturbed when they watch movie
  - Might share after-viewing thoughts
- Bullet screen
  - Have option to hide bullet screen
  - Like to read but not write comments
  - Might some other novel way to interact with other?
- Conversation with stranger guests
  - What to talk with "stranger guests" when they watch TV simultaneously?

This concept enabled the TV to back its original feature "watching TV programs". Compared with movie, TV series and documentary, live program is easy to arouse unacquainted guests to discuss and gather them together, which is an effective way to have a shared interest, hobby and topic of conversation. Especially during the live time, being influenced by the fantasy events, viewers are easy to express their affection and share their emotion. Subjects in evaluation expressed their favors for relevant interactions around the program content.

### Sharing TV contents

- Good

- One concern for this is the movie is totally controlled by the owner, if the owner suddenly closes his/her private room without any notification?

In the online cinema concepts, sharing movie resource with other guests was welcomed by interviewees. But its illegal issue was realized.

### Concerns

- What is the benefit for hotel if they do like this? Why they want to invest on this?
- What socialization means for guests in the context hotel?

### 3-Gaming

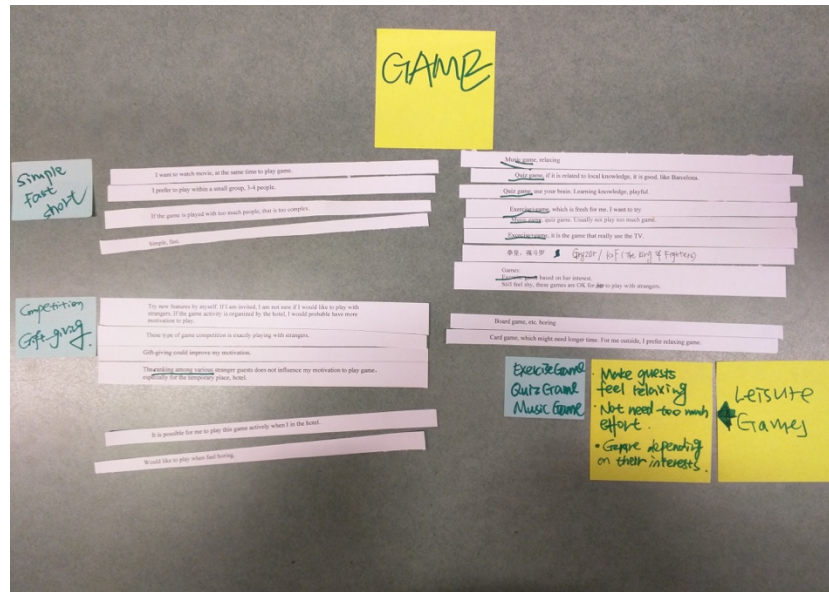


Figure 22. Transcript analysis for gaming

- Feature: Simple/short/fast
- Motivation: feel boring and want to be relaxing, competition and gift-giving
- What they most like are these three games: exercise game, quiz game, and music game. There is no specified preference, depending on their interests.

In the game list, quiz game, exercise game and music game were preferred by subjects in evaluation. Form the Figure 22, it can be seen guests would like to relax themselves through playing simple, short and fast games after one-day visit. No matter the game playing mechanism is either competition or cooperation, it was preferred to be played in a small group.

### 4-Gaming with friends or families

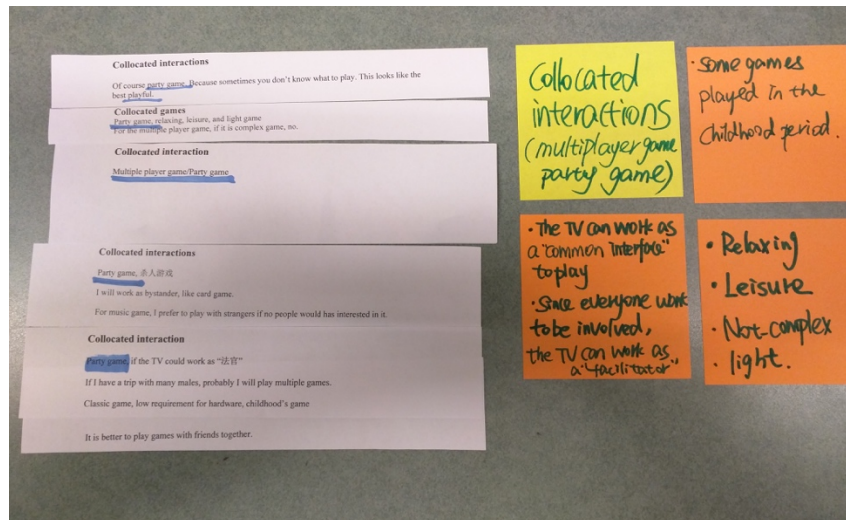


Figure 23. Transcript analysis for gaming with friends or families

From the Figure 23, it can be seen as follow:

- What guests like to play are party games and multiplayer games with light, simple game-playing.
- The game need to be relaxing and leisure-oriented.
- It is better to involve all the friends or families.
- The TV can work as a common interface for guests to play .
- Since everyone need to be involved, the TV can work as a game facilitator.

## 5-Gamification activities in hotel public space

Voting for different guest-generated pictures

- Self-expressing
- Surprise
- Memory
- Tailor tourists

Quiz Game

- Competition
- Learning

Puzzle game

- + can be played grouped, thus could work as an icebreaker
- -time-consuming
- -long

Games guests want

- Without too much effort
- Simple
- Quick
- Easy to join in
- Accommodating multiple players

From the evaluation, what guests would like to have are simple and short activities, which also need to easily join in and accommodate multiple people. In this context, these activities could work as an icebreaker to support interaction with unacquainted guests. At the same time, gamification plays an important role motivating guests to take part in activities. One problem here is the public space means

differently for hotels, such as a sitting-lobby or a big public space with a bar. Hence social activities in public space should be context-based.

## 6-Experimental exploration in hotel public space



Figure 24. Transcript analysis for experimental exploration

### Attitude

- like, surprise, interesting, bonus
- Unique
- Self-expression
- Feel-socializing

### “Hi”

- feel not happy if the size of hi with his/her mother tongue tend to be small

### Comments for “leave message”

- Good comments: “the second design I will use when I have a eat at there to pass time”  
“Maybe next time I will change another place to sit”
- Mystery
- Uncertainty
- Conversation
- Trigger

### Negative comments

- What they bring for hotels?
- Is the second idea socialization? How we define it?

### Advice

- Maybe share some interesting conversation on the TV
- Too many QR code
- It is stupid to scan the QR code on TV in public space

### Concerns

- What the two concepts bring for hotels?
- Harassment issue would be raised because of free conversation in the second concepts.

For the last two experimental concepts, the results were analyzed as Figure 24. During the evaluation, interviewees showed great interests in them. They thought these two concepts attracted their curiosity and made them to have a self-expression in some ways. Although the concepts did not bring direct interaction, they gave interviewees a sense of socializing. Those two concepts attempted to elicit conversations among guests through saying Hi and leaving message, which exactly utilized the curiosity and uncertainty triggering guests to interact with strangers.

**5.2.2 2<sup>nd</sup> Concept Iteration**

After the initial concepts evaluation, what social experience hotel guests desire to get were elicited and understood, and what issues need to be considered in the later work were realized. Based on those findings, idea alternatives were brainstormed or modified in this part. The work here was still being kept on idea probes to generate desirable concepts. With the rapid attribute, prototypes are powerful tools used in the process of concept development, both to validate ideas and to help generate ideas (Michel 2002). So rapid prototypes were built to express different ideas, and then used as a medium to communicate with the stakeholder representative in idea internal evaluation, which unveiled truly inspirational solutions the later work should focus and revealed concerns the later work need to consider.

**Idea probes for remote interactions in hotel room  
1-Hotel online community**

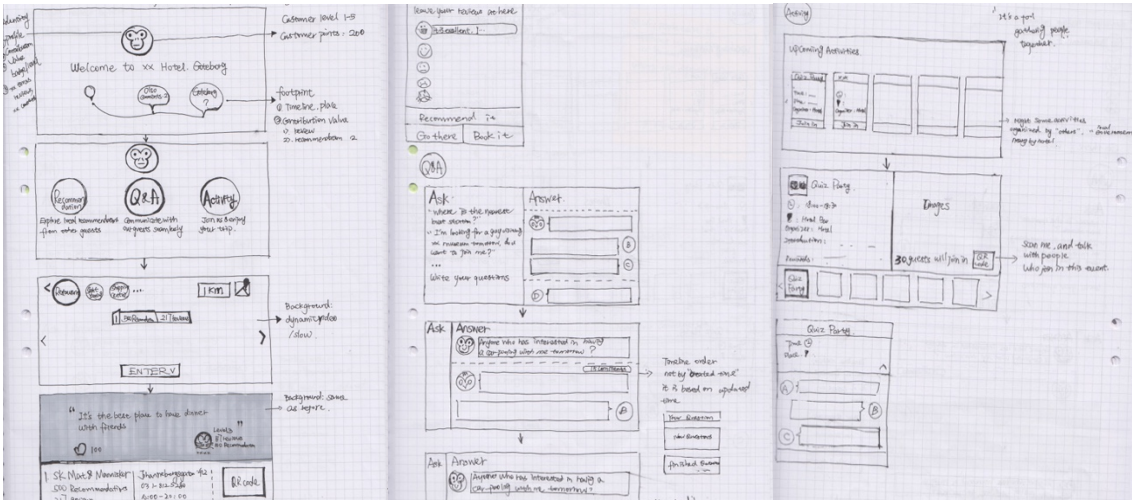


Figure 25. Hotel online community

Inspired by the concept of “exploration nearby and online community”, this concept (Figure 25) aimed to create an online reciprocal platform for hotel guests. Recommendation, Q&A and activity were designed to satisfy guests’ reciprocity needs. Through recommendation, guests can get top local recommendations from other guests, which helps them experience local places with high reputation. Q&A is an online port for guests to ask for help and provide help, which was mentioned frequently by interviewees during the initial concepts evaluation. The activity feature works a tool gathering guests together at their own will.

After including stakeholder touching the concepts, some constructive opinions were given. From the perspective of People of Lava, the feature of local recommendation has already existed on their product. Obviously it was pointless to keep this in the design concept from their perspectives. But it turned out that trips are basic common grounds for guests to talk. Another issue raised by the company, as the hotelier, tourist harassment is a critical thing that they need to consider when providing service for guests. But for the feature of Q&A, due to the freedom of editing contents online, guests are easily to be attacked by harassment.



## 2-Online interactive cinema

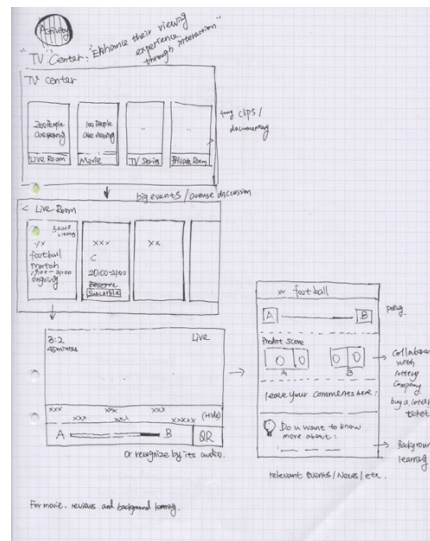


Figure 26. Online interactive cinema

As Figure 26, the interactive concept was kept because of most hotel guests got used to watch videos or movie when staying in hotel. Except live program, this concept was gone further with focusing on interactions of other three programs. For instance, guests can leave reviews and have background learning for movie. While one important thing reflected in the internal discussion was what is the value for the hotel through establishing online interactive cinema compared to other online streaming videos.

## 3-Games

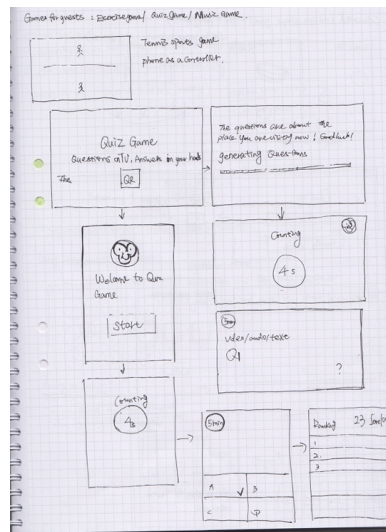


Figure 27. Exercise game and quiz game

Based on the feedback from last session, exercise game and quiz game (Figure 27) were the most welcomed games for hotel guests. For exercise game, some light motion sensing games can be a good choice for hotel guests through connecting their personal phone with TV. Personal device can be worked as game controllers to recognize if players finish the task. In this way, the exercise game benefits guests because of shallow physical relaxation in trips. Besides, quiz game, a type of trivia game, was designed to help guests pass their time without putting too much effort. Moreover, as interviewee said before they liked to get knowledge through playing. The competition mechanism

works as the catalyst enabling guests to interact with others, either competing with another player simultaneously or striving for the top player through ranking. These two games were intended to bring playful interactions for guests, especially for them who inclined to not socialize with others face-to-face.

**Idea probes for collocated interactions in private hotel room**

From the last concept evaluation, interviewees adopted favorable attitudes towards party games, which usually are played as a part of a party, to facilitate interaction and provide entertainment at social settings. In party games, player-elimination is rare, which exactly fit the situation of grouped playing. In most of cases, party games work as icebreaker in a social setting, while for acquainted guests, it is a joint connecting friends or families together. For instance, the collocated mode of quiz game (Figure 28), once connecting TV and personal device successfully, questions pop up on TV while players answer on their personal phones. In a limited time, players can compete with each other who is the most knowledgeable person. In this game, the TV works as a common interface gathering people together. Compared with traditional quiz game, there is no need for one player acting as the game facilitator in this game, which supports all the players enjoying their amusing time with highly involvement around the TV.

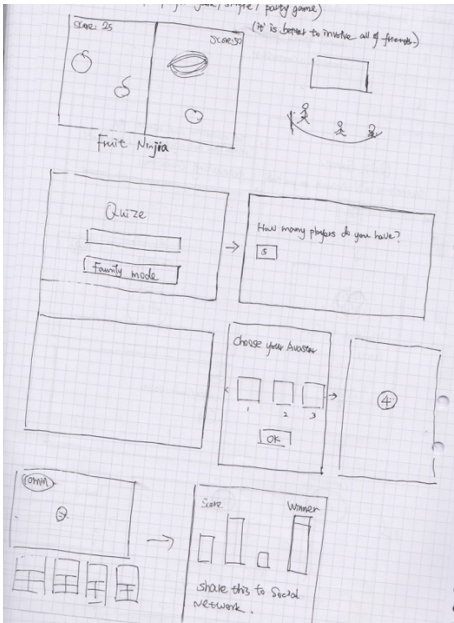


Figure 28. Exercise game and quiz game

**Idea probes for social interactions in public space**

Inspired by the quote from the evaluation “I would like to share my impressive experience with other guests no matter it is good or bad”, the experience board concept was designed to trigger conversations among guests who had the similar experience. View Figure 29, the experience pool on public TV, which was driven by user data. Specifically, guests can send their good or bad travel experience with text or image through their phones to the TV. Then the pool will change with the quantity of guests-generated contents. Moreover, guests are allowed to find if other guests who have the similar experience with them through shaking their phones in close proximity with the TV. This concept was aimed to make guests start to talk with each other through finding some common grounds between guests. But retrospect to concepts that I already have, it can be seen that the TVs in public space play the role of big screen, enabling guests to have a sharable experience, while personal devices work as the personal data input device. A few of concerns were pointed out during the discussion with

stakeholders, which still were the harassment aroused by the free text input, the value for hoteliers, and the uncertainty of sparking conversation among guests.

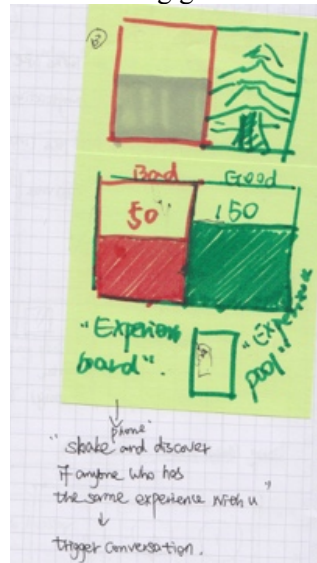


Figure 29. Idea probes for social interactions in public space

### 5.2.3 3<sup>rd</sup> Concept Iteration

After the 2<sup>nd</sup> idea iteration, corresponding to the research question the project was still kept on an extensive framework. Under this framework, there were still various branches to go with the design work. Therefore, in order to dig research questions deeply instead of touch it in wide coverage, a decision focusing on providing interpersonal interactions among hotel guests who don't know each other (strangers/acquaintances) was made for the later work. As a result, the design was decided to move toward two directions: remote interactions in private hotel room and collocated interactions in hotel public space. Thus collocated interaction with friends or families in private room setting will not be included in the later work.

The 3<sup>rd</sup> iteration was purposed to refine concepts and develop chosen concepts deeply. Within this part, idea iteration was made along two directions as being mentioned before. Remote interactions, which means guests could interact with each other remotely at their own hotel rooms. Collocated interactions in public space, which implies triggering conversations among strangers in hotel public space through the design. In this iteration, developed wireframe and storyboard were used to get a detailed visualization of concepts, and to be presented in the internal critique-session where a certain of concerns were identified.

#### Remote interactions in hotel room Meet

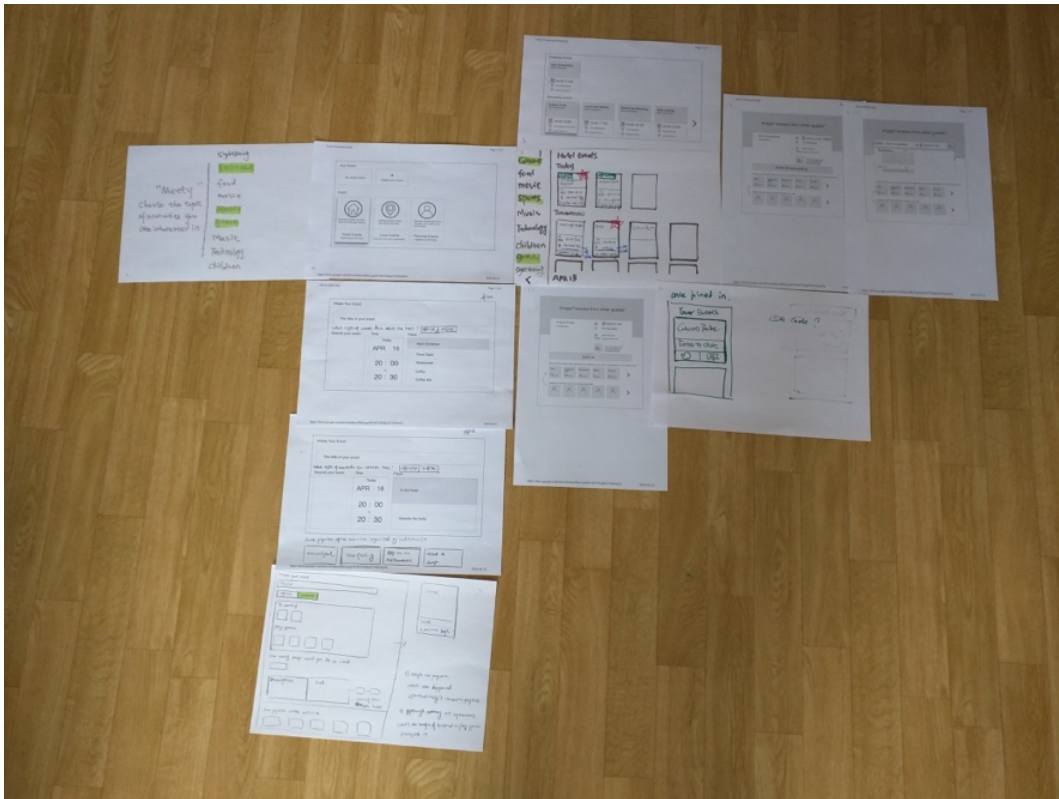


Figure 30. Meet wireframe

Meet (Figure 30) is an TV-based application providing local events information for hotel guests, including hotel events and local events. Actually after internal evaluation, “activity” was regarded as a promising feature to support social interaction for guests, which built the ground for Meet concept. What Meet emphasizes is scaffolding guests to gather together in their trips through different events. Except participating different events, guests are able to create their own events, such as inviting someone to visit local places together.

In order to get the design deeper instead of staying on the surface, this concept was developed with internal multi-iterations. In this system users were able to scan different events categorized by its organizer once getting into it. The design was adopted in this way because it would be easy for users to read events with purpose. Once entering into the specific page of each category, events with ongoing and upcoming headlines were shown to guests. For upcoming events, the detailed page appears after guests choosing one event. On the detailed page, the specific event information, including event introduction, time, location, image and reviews from other earlier guests, were shown to guests to help them make decisions. In addition, recommendations were made to stimulate guests to join in more social events, such as events recommendations for their next trips and people they may know who joined events before. For guests who are not able to join in or have no motivation to join, they still have chance to participate in the event with the role of bystander, which is a common phenomenon in social interactions. Thus the broadcasting feature was designed to make guests see what is happening on site.

Regarding this concept, several questions were identified through internal discussion with the stakeholder representative and the teacher as below.

**For hotel guests, is the design easy to be used in the context of looking for events?**

Take the use flow into consideration, the design tends to be complicated. In the case of looking for events to participate in, hotel guests were required to step over three steps, which were event category

navigating, upcoming and ongoing events browsing, and then event digging. Moreover, the event category was made by the logic instead of scenario, which lead to the design result without fitting its actual usage. Furthermore, the proposed way of showing events to users was strongly opposed by the stakeholder because of edge case. Hence simplify the use flow, reduce the usage redundancy and make the design adapting to its context were recognized to be done in the later work.

### **How to design for inactive users and inactive hotels?**

From the stakeholder experience, hotel guests behave inactive when socializing with other guests, which was informed from the earlier interviews as well. Most of interviewees stated that they preferred to take passive attitude when socializing with other strangers in their trips. Therefore, how to mobilize inactive guests' social positivity became vital for this concept. It can be seen from this concept that the main function is providing opportunities for hotel guests to meet in different events, being established on the assumption of guests hold active attitude for socializing. So encouraging hotel guests to participate in different events is a way to make guests really get to use the social TV.

What is more, most of the hoteliers keep inactive attitude for inputting new IT service for their customers. View what factors drive hotelier to make some changes, they probably are revenue firstly, brand improvement and customer loyalty improvement. Thus another point should be taken into consideration is emphasizing hotel value in the design process.

### **How the hotel guests get to know about the available features and benefits provided by the design?**

From my interview, most of the interviewees showed they had given up the use of TV in hotel room. According to their words, there are too many cool things in their personal device instead of TV. Moreover, a big bulk of Apps were included in the interactive TV. Facing the hotel TV that they use for the first time, hotel guests are hard to know what features the hotel TV exactly has, not to speak of actually using it. The process of helping people get started to use the product is called onboarding (Crumlish, C. 2009) and it is crucial that you give it the attention it deserves. One interviewee stated if there were some instructions in hotel room illustrating the new feature, she probably would use the TV. Thence considering the first-time use scenario to make guests start to use hotel TV is essential.

### **How should we manage edge cases?**

The design concept was established on the assumption that hotel guests behave actively. In fact, as stated before, due to inactive guests and inactive hotel, the original Meet design solution easily lead to edge case, which means a problem or situation that occurs at an extreme operating parameter. In fact, there are not too much events created by hotels and guests. According to the solution, detailed event categories easily result in empty event display. Imagine the first-use scenario, hotel guests probably feel frustrating once get nothing when attempting to look for events, which absolutely hinders guests to use the product again. It is common that most designers focus exclusively on the core interactions that uniquely define a product. But infrequent edge cases can contribute significantly to the overall user experience and ultimately user loyalty for a product (Luck, 2007)

### **Should and how the design harvest additional experience (positive experience) such as new contacts and Facebook?**

Think about the Meet concept, which is a way being provided for guests to establish temporary relationships with other guests during their trips. In concept iterations, I tried to extend the temporary relationships into longer through adding other guests as new connections on Facebook. In fact, real-life relationships are complex, which might be different depending on how guests interact with each other in events. Because of the dynamic social experience, the concept supporting adding new contacts tend to be intangible.

## Quiz

Quiz game was designed with the remote mode and free mode, which can be seen from Figure 31. Remote mode means two players in different hotel rooms compete with each other simultaneously through answering a certain of questions around local knowledge in a limited time. The player who gets higher score will be the winner. In order to entertain guests more in their trivial time, free mode was designed in the game. Beyond hotel private rooms, guests are able to play the quiz game in public space, such as the elevator, restaurant, and lobby. Different QR code cards with different quiz questions can be scattered in hotel public space. Guests are allowed to answer the question through scanning the QR code with their personal phones. Corresponding points will be added into their game profile. For the free mode, the more questions players answer correct, the more score they will get.

This concept aimed to provide a competitive way for hotel guests to interact with others online. In order to establish the competitiveness in this game, a reputation system was required to design. In this concept, hotel guests were designed to share the same goals, but must compete against each other to become the winner. Hence showing a player' timely accomplishment (score) was emphasized in remote mode to ensure another player is well informed about the performance of opponent. Using this type of reputation to make guests engage deeply in gaming. In free mode, guests were reward with small gift or customer points through the way of collectible achievements ranking in a period.

But two challenges regarding this quiz game were posed. One is the easy of play for this game. Facing different modes, players might be confused when playing the game for the first time. It would take times to figuring out what two modes exactly means. Another challenge was that how this game makes use of the strength of TV and personal device, and what are roles of TV and personal device in this game.

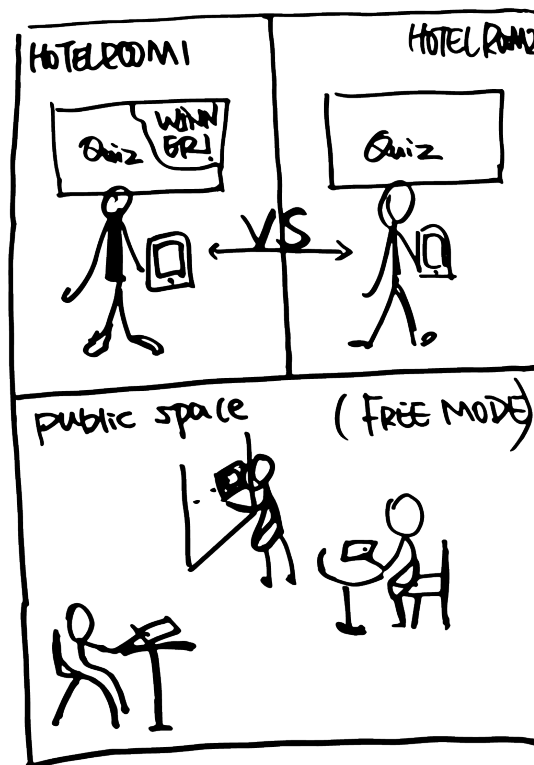


Figure 31. Quiz game storyboard

**Collocated Interactions in Public Space**  
**Seeking Common Connection**

Inspired by the curiosity social need, this data driven concept (Figure 32) was proposed to spark conversations among unacquainted guests in hotel public space. For strangers, icebreaker is needed to start a conversation. This concept intends to provide icebreaker for guests through common connections exploration. Specifically, the personal data on guests' personal phone will be streamed into the TV through docking their personal phones on the device connected with the TV. In this way, the TV will show a visualization of common connections in those aspects. As the stakeholder said, this is an experimental way to trigger guests' conversation. But one important thing need to be considered is guests' privacy. Another is how to deal with the case of no data for data driven concept.

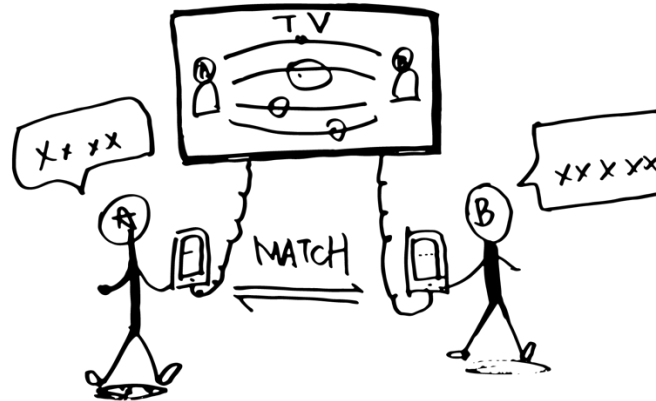


Figure 32. Seeking common connection storyboard

**Parameters to consider in designing social TV**

In the third iteration, different challenges were recognized from different idea through internal evaluation, which were described as before. And on this basis, different sporadic points were summarized in a structure way. As a result, six parameters (Figure 33) were captured to provide the insights of social TV design. Corresponding design considerations were deduced and enriched based on these six parameters (Appendix V). Compared with the considerations in first iteration, these design considerations were represented with well structures and turned to be specific.

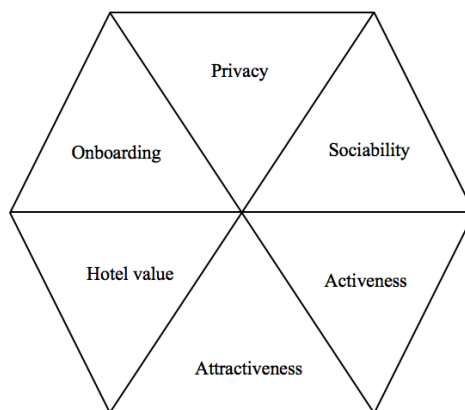


Figure 33. Parameters to consider in designing social TV

- **Onboarding:** the guidance of helping guests to start using the TV

- **Attractiveness:** the quality of attracting guests' attention
- **Activeness:** the motivation of guests to socialize with other guests
- **Sociability:** the amount and the way of interpersonal interactions
- **Hotel value:** the consideration of stakeholder value
- **Privacy:** the guests' privacy protection

## 5.3 Convergence

### 5.3.1 Design Directions

After three iterations, the territory of the research question was narrowed to ***“How can personal devices be integrated with the hotel TV in ways that support the interpersonal interactions for unacquainted hotel guests”***. Retrospect to the findings and result from previous steps, the focus of research was narrowed to a more practical and tangible level. To be specific, question boundaries were fixed, variables were identified and constraints were recognized. But one critical problem emerging from the transmission phase was that regarding the research question, those design practices tend to be a bit disordered without respective focus. Thus in the convergence phase, defining design directions was absolutely necessary for this step. Based on the narrowed down research question, the design direction was rephrased as “Design interpersonal interactions for unacquainted hotel guests through the use of TV and personal device”, which was illustrated in Figure 34. For these interactions, two types of interaction were considered in design, which were remote interactions in different hotel rooms, and collocated interactions in the public space. See their materialization in the result part.

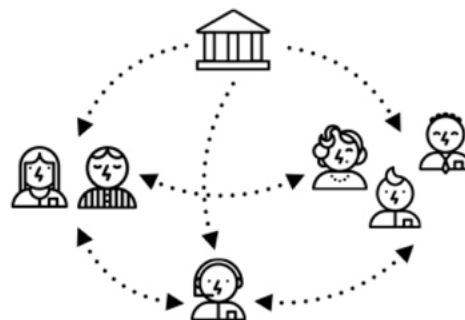


Figure 34. Design directions

### 5.3.2 Social Strategies for Hotel Guests

As work performing, I realized that it was important to figure out what are motivations for people to have social interactions when designing social experience. From the divergence (exploration) and transformation (concept development) phase, reciprocity, competition and curiosity were noted as important triggers motivating hotel guests to interact with other hotel guests, which also worked as important factors guiding the design practice moving forward. In other words, these three aspects can be the important social strategies for hotel guests.

#### Reciprocity

Broadly speaking, reciprocity is always a return-action in a broader context of exchange, where an initial giving necessitates a return (Pelaprat, 2012). In the earlier stage, reciprocity motivation was identified from many ideas. The most obvious one was that interviewees showed they have no big motivation to interact with other guests, except the case of being helped. In addition, when planning for their trips, most of visitors prefer to get recommendations from other visitors, while some guests would like to write some review and recommendations as returns. These social interactions were formed through the lens of reciprocity. Hence reciprocal information change is a good way to motivate hotel guests to start socialize with others.



## Competition

Competition is one of most widely adopted social interaction strategies, which usually appears in games or gamification activities. It occurs when two or more people oppose each other to achieve a goal that only one can attain. Through the competitive way, players are forced to have more interaction with each other. No matter games or activities, as interviewee stated they were easily driven by gift prize given by hotels to take part in.

## Curiosity

Curiosity is a one of motivators for human behavior. As Figure 35, D. E. Berlyne (1960) identified two dimensions of curiosity one extending between perceptual and epistemic curiosity; the other spanning specific and diversive curiosity. In the context of leisure trip, guests are curious about novel and different experience form other guest. From here, the curiosity of this project mainly stay in the first quadrant in Figure 35. Five main principles (Figure 36) for evoking curiosity: novelty, partial exposure, complexity, uncertainty, and conflict, were summarized by Tieben, R., Bekker, T., & Schouten, B. (2011). Take the design of leave message in initial concept for an example, it was the uncertainty underlying in the concept that aroused interviewees' curiosity to start to interact with other guests through the way of leaving message. Another case in the seeking common grounds concept, which utilized novelty interactions and common points exposure to evoke guests' curiosity. So when designing the social interactions, these principles can be advisable ways to take.

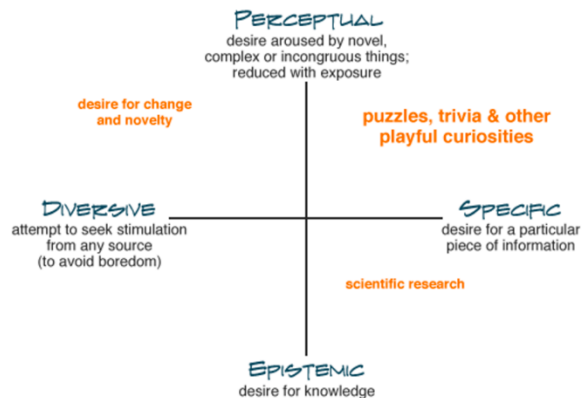


Figure 35. Dimensions of curiosity

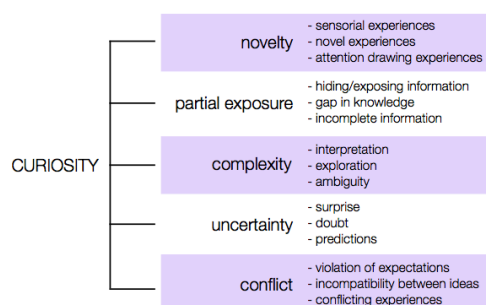


Figure 36. Five main principles of evoking curiosity

So around the narrowed research question, the design practice will also be redirected at using these three motivations to evoke interpersonal interactions for guests. That is to say, final design results will be exemplified with different social motivations, including reciprocity, competition, and curiosity (Figure 37).

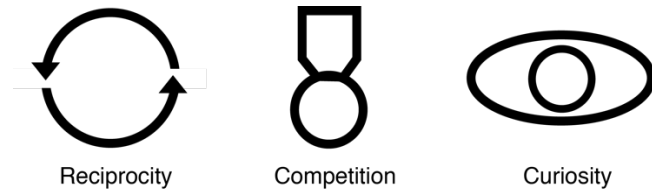


Figure 37. Social motivations

### 5.3.3 Finalize Design Guidelines

Several insights and design considerations were gained within the work, which were transformed into guidelines after several rounds iteration. From the initial concept part, considerations were summarized after transcript analysis. Then parameters to consider in the design of social TV were reflected through the last two concept iterations. On the basis of those findings about how to design social TV, guidelines were finalized through twice expert evaluations and the fishbone analysis.

The first-time expert evaluation was conducted with the stakeholder representative and one expert in interaction design. During the evaluation, different categories with detailed guideline were viewed item by item. As a consequence, problems of not-direct-to-the-point, overlap, difficult to understand were pointed out.

Afterwards, in order to make the guidelines have a good structure and minimize the overlap, the fishbone diagram (Figure 38) was used to have a cause-and-effect diagram analysis for existing guidelines, which helped to identify the relevant relations among guidelines. As it can be seen from the Figure 36 that different categories were outlined as main points that influence the social interactions among guests. Under each category, the relevant useful suggestions were mapped as its branches. If there were more detailed information, the deeper branches were illustrated. Through this diagram, guidelines were stated with a structural and explicit way.

Being followed the analysis, the second expert evaluation was done with the same people. In this session, only few tiny points were criticized by experts, such as the statement of guidelines. On the whole, they showed satisfaction to the final guidelines.

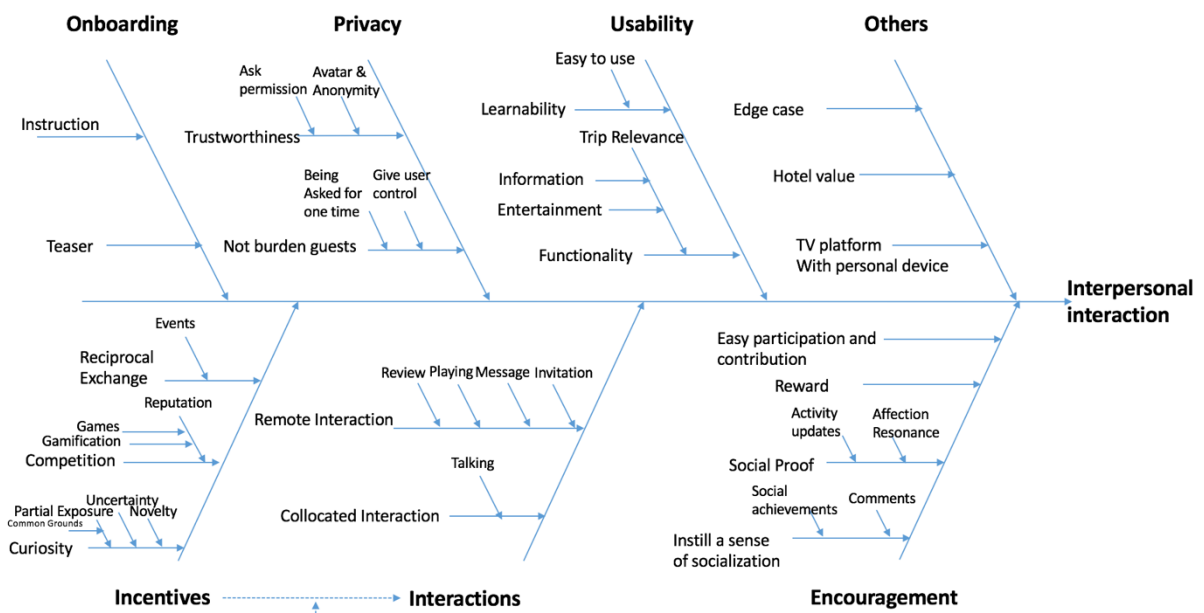


Figure 38. Fishbone diagram

## 6. Result

The whole process including exploration and three iterations lied as a base for the final results, which comprised two parts: (1) final design concepts and (2) guidelines for designing social TV for hotel guest. In short the fruit of this project are design concepts representing different sociability ways in hotel room and in public space, offering hotel guests the possibilities to have social interactions with other guests. While based on these concepts, relevant design considerations were formulated to guide the design of social TV.

### 6.1 Designs

The results were illustrated with four different design concepts as below.

#### Meet

Meet, a TV-based application, provides hotel guests opportunities to reach other guests. The implication of the name 'Meet' is providing social opportunities for guests through different events. Another reason for designing this application is because of its trip relevance. What guests can use the application for planning itinerary as well as for getting inspirations for trips.

In this app, guests easily get to know what events local have and make their choices based on personal preferences. The homepage is depicted in Figure 39: the first page users encounter when they start to use this application. What guests can see on this page is the event overview within one week. Navigated by the timeline, event cards with the image preview, title, time and join in button are presented to users. To differentiate the event, each card is marked with the theme tag. Important to emphasis another feature for this application is that users can initiate their own events through this application. Figure 40 shows the page of creating personal events in four steps after clicking initiate your event button.

In social experience design, user identity and the ability to control its presentation is a core element of building a social website (Crumlish,C. 2009). The top part in Figure 39 shows the identity of hotel guests, which contains the avatar, room number and customer points.

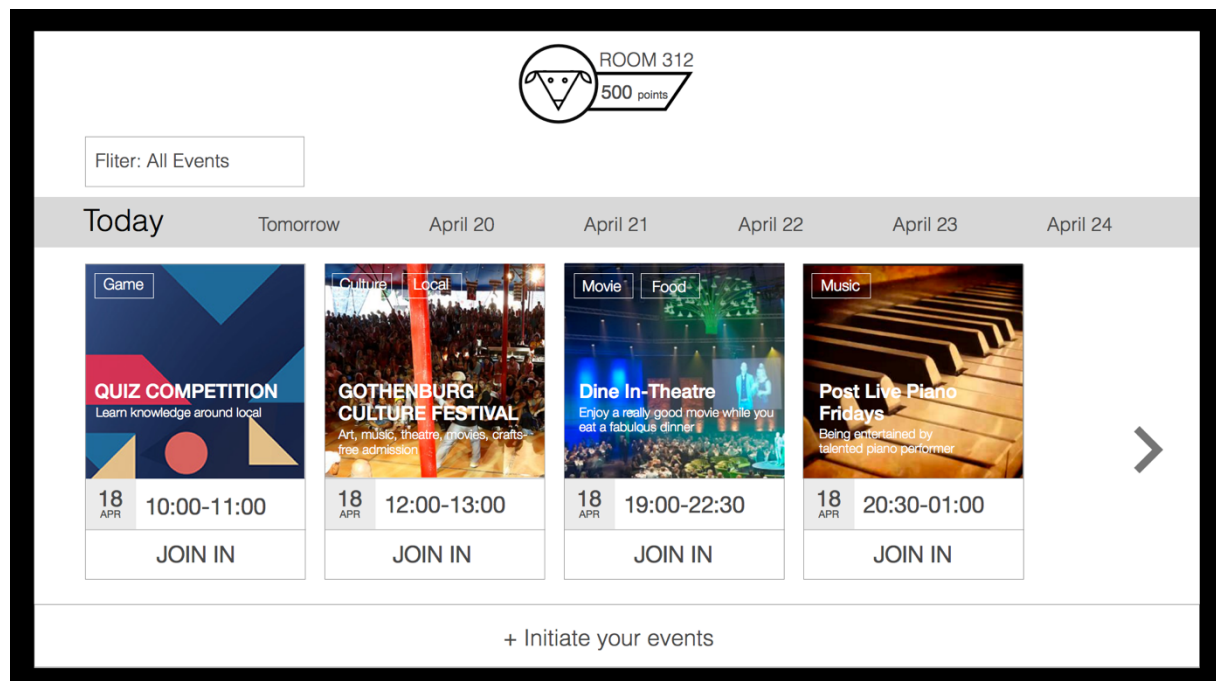


Figure 39. The homepage screen of Meet

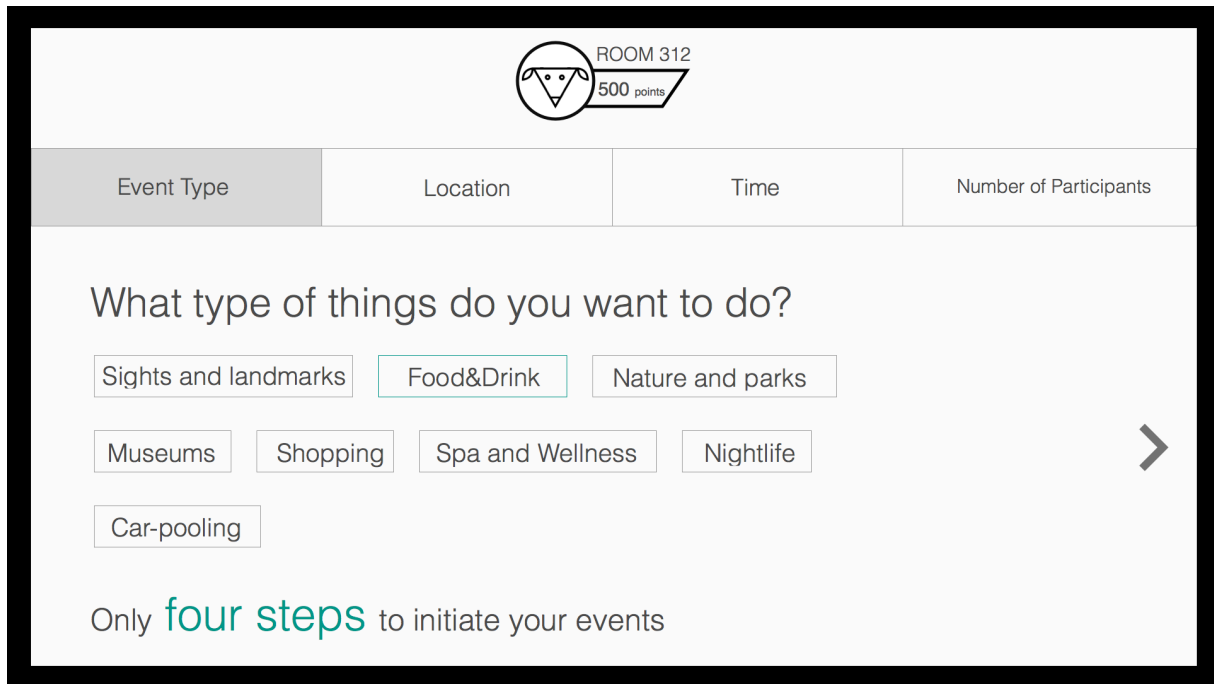
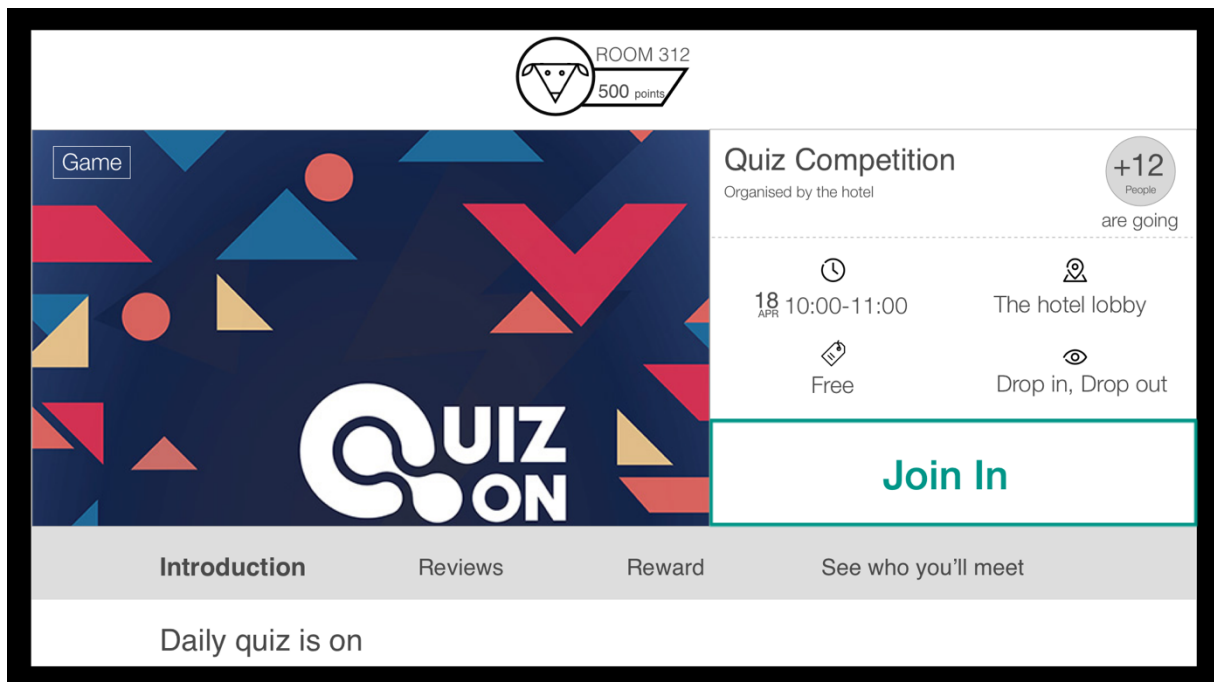


Figure 40. The page of creating event



It is a quiz game around local culture and our hotel.  
Do you want to fight for a knowledgeable person today?

Join us freely

[Contact Event Organiser](#)

Figure 41. Event details page of Meet

Figure 41 displays the event details to help guests know more details about the event. As it can be seen from this Figure that the left part is mainly occupied by the vent image, being utilized to attract users’ attention. The right part is constituted by the primary information of the event, including the event title, organizer, the number of participants, time, place, fee and notes. The big button below was set to give a hint to encourage guests to join in the event. The downside of Figure 41 shows four tabs with secondary information about the corresponding event, comprising event introduction, review, reward and see who you’ll meet, which were also explicitly designed to encourage users to take part in.

The Meet has seamless connection with the hotel official application on personal mobile devices. As Figure 42 shows, once guests join in an event, the corresponding event will be added into their event list on personal device. It is convenient for guests to check or cancel the event when they are not in hotels. Besides, on the personal device, guests have opportunities to direct communicate with events organizer who they feel reliable. In this concept, the mobile device makes up for the deficiency of TV in hotels through its instant communication and mobility.

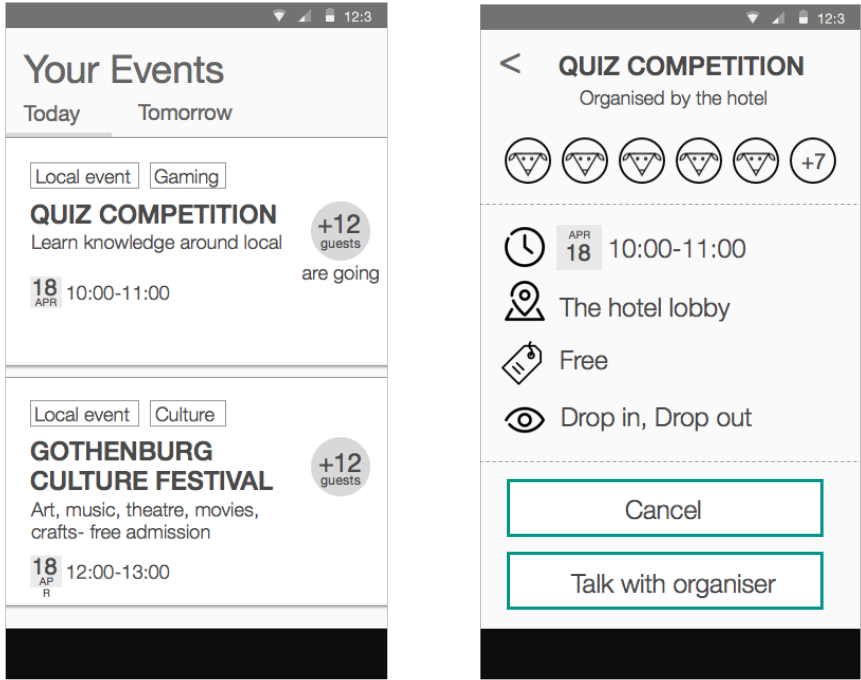


Figure 42. Meet on mobile device

**Light-Off Game**

The game of Light-Off aimed to provide social interactions through competition and collaboration game playing. This game was one of proposals created in the design process, being heavily inspired by the social incentive of competition. Except interactive playing, what the design intend to transfer a mind of sustainability for guests, and then facilitate them to behave in green ways when staying in hotel. Based on previous study, the game need to be short, quick and easy accessible. Figure 43 shows how the game looks like. Basically Light-Off is a two players turn-based game. The game utilizes the hotel as the playing field bounds. At the starting, a sequence of “hotel rooms” fall down with the avatar. A random number of rooms’ lights are on among these falling down rooms. The objective of the player is to make the lights off, by pressing luminous hotel room. Once a certain number of lights are off, the row of “hotel rooms” will disappear in the playing field, otherwise the “hotel room” block will be left in the playing field. With game playing, when a stack of hotel rooms reaches the ceiling of the hotel, the game is over. For this game, the ranking is determined by the number of lights two players turned off. Once entered into the top 5, the hotel will give small prize for players.

In addition, in order to make the game easy, two players are matched randomly. Once finished one round, the new players will be assigned by the system. Another thing to highlight here is using this uncertain way to bring surprise for guests playing. Furthermore, top five players have possibilities to send messages to each other. The reason for blocking out of top 5 players' communication is to reduce the blame and harassment.

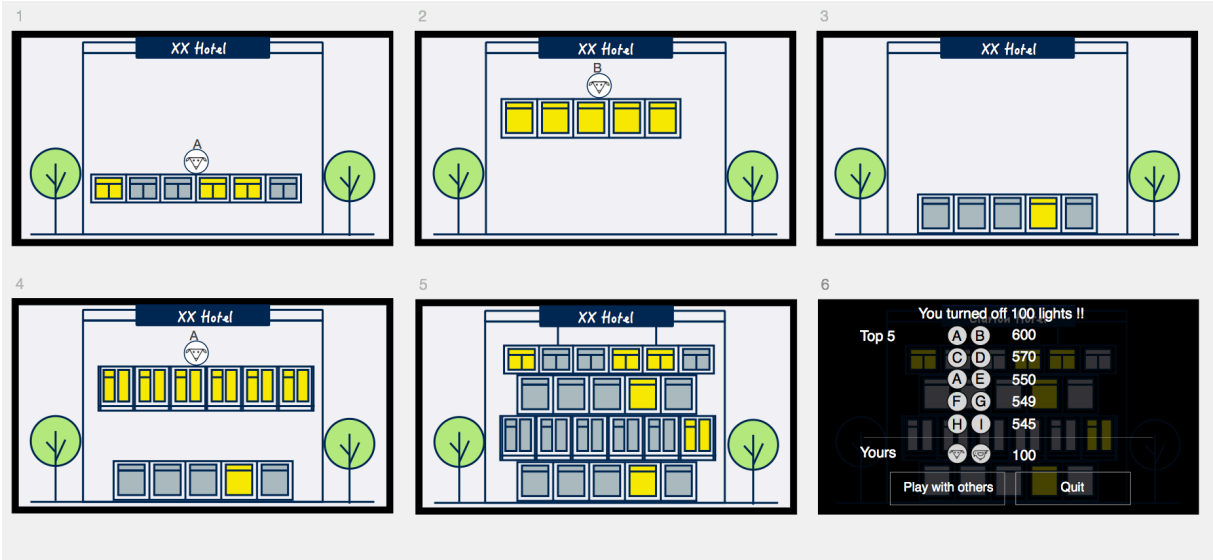


Figure 43. The interface of light-off game

In Light-Off game, the personal phone works as the game controller (Figure 44). After connecting personal phone with TV successfully, the row of hotel rooms will be shown on personal phones. Through pressing the luminous rooms on personal phones, the lights will be turned off. In addition, the personal phone could be a communication tool in this game for top 5 players.

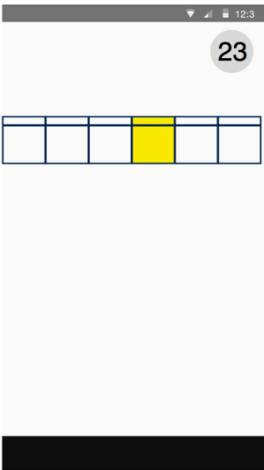


Figure 44. The Light-Off game controller

**Quiz Game**

Quiz game has three modes to satisfy different user needs, including remote mode, collocated mode and free mode. In order to make guests easy to start playing, instead of spending time on figuring out what different modes mean, the game was designed to guide players to make their choices, which can be seen from the Figure 45. After selecting quiz up on TV, the game will guide guests to connect their mobile

devices with the TV. If there are multiple devices connecting with the same TV, connected opponents option will appear on the interface, otherwise there is only remote random opponent option available. No matter playing with remote opponents or with collocated opponents in public space, the game interface is shown as Figure 46. In a limited time, the player who get the highest points will be the winner. While for quiz up through QR code, which can be played by guests during their waiting time in public space.

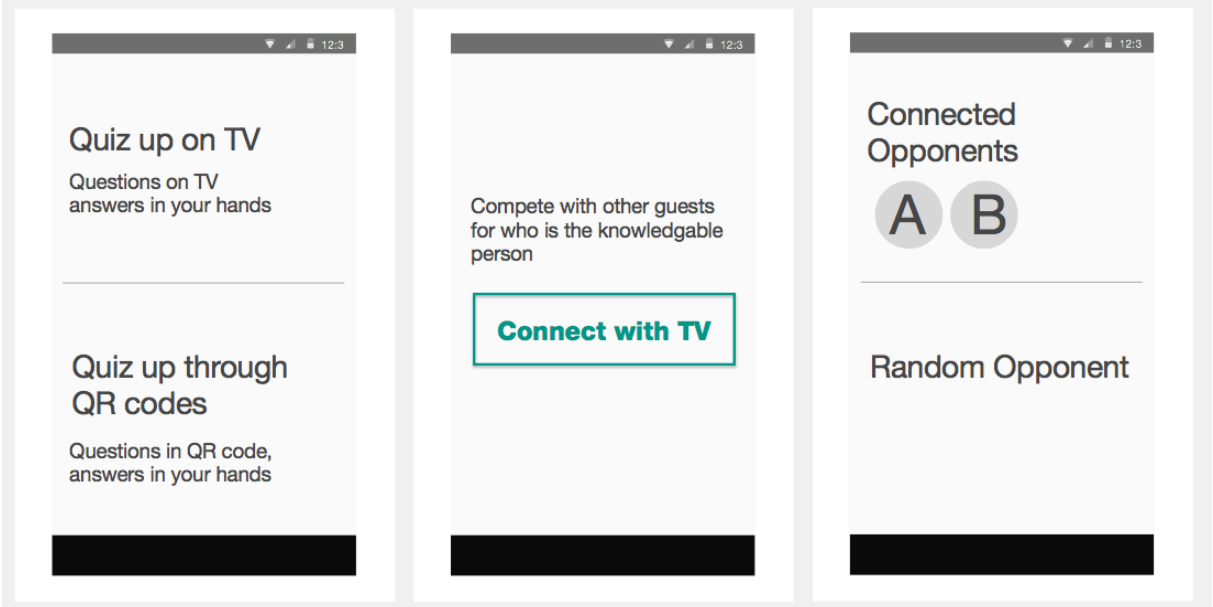


Figure 45. Guide guests to make their choices

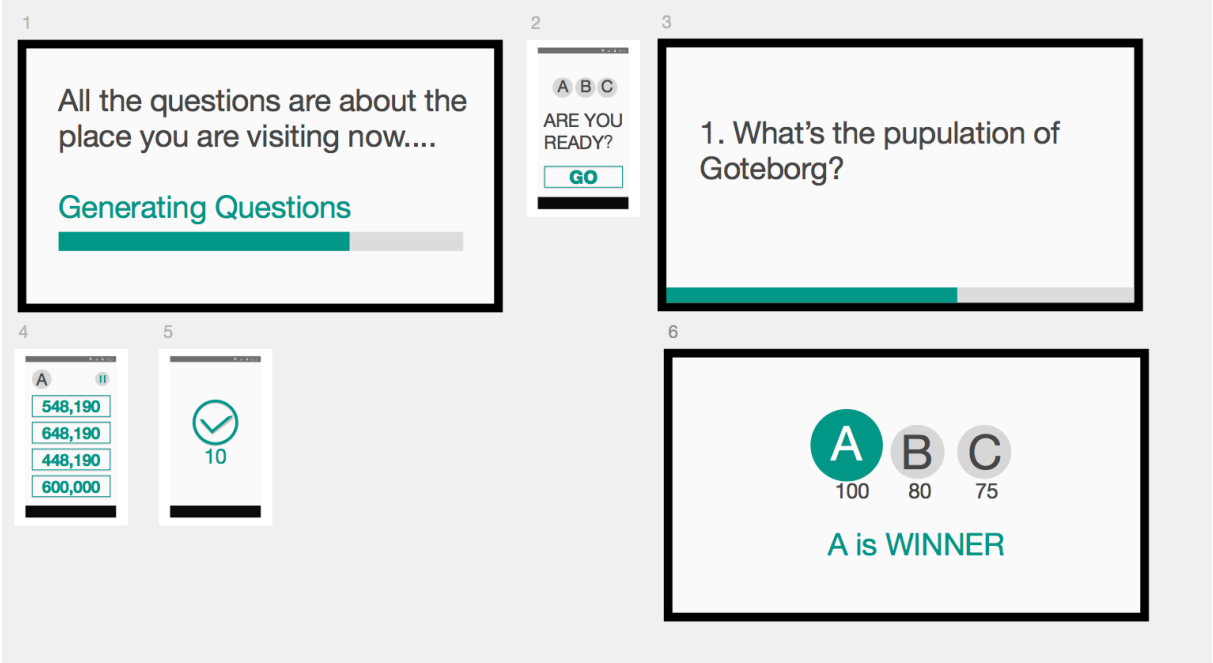


Figure 46. Quiz game playing

### Seek Common Connections

This experimental concept was designed for TV in the hotel public space, triggering guests to have more collocated interactions with other guests through utilizing the curiosity social incentives. As Figure 47 shows, a “teaser” is showed on the public TV, which is used for attracting guests’ attention, but also for guiding guests how to start seeking. Actually two docking devices are connected with the TV. Once users put personal phones on the docking device, their personal data will be streamed into TV with permissions. The TV instruct users to move their phones close to finish the seeking process. Once finished, common grounds in six aspects, including citizen, friends, occupation, interests, joined events, played games and visited places, will be displayed on screen. The first three are personal data could come from social networks and the last three are trip relevant data coming from hotel. Through matching their persona data, the design purposed to find icebreaker for guests to make their conversation have a good starting point. As the Figure 47 illustrates, user can move their devices further as extending the strings on the screen, then more detailed contents will display.



Figure 47. The interface of seeking common interactions

## 6.2 Guidelines for the Design of Social TV for Hotel



Referring back to the process, several design considerations were summarized as guidelines aiming at answer the research question for this project. As the outcome of multiple iterations, these guidelines were produced with attempting to support designers who is going to explore possibilities and design social experience within hotels. Each guideline below was presented with short content, explanation and examples appeared in either this research work or other works.

### **Onboarding**

- **Provide onboarding ways to instruct or teach guests in the use of all functionalities of social TV.**

Onboarding is a critical step to familiarize the first-time user with the product. As being mentioned before, guests stated that they need some instructions to be aware of the available features and benefits from the hotel TV. Furthermore, social TV is a novel concept for most of guests. For the first-time users, instructions are necessary for guests to know what it is. These reasons necessitate onboarding process as a key design consideration when designing social TV. In the context of hotel, many ways could be adopted by designers to onboard guests to use TV, such as the handy leaflets with TV feature introduction, TV screen saver with new TV usage guides, etc.

### **Privacy**

Hotel is a temporary place for guest to stay and make them feel like at home, which highlights whatever service provided by hotel have to ensure guests' security and privacy. As interviewees showed they really care about the privacy either when use the public device or when have some social interactions with strangers. Hence in order to make guests feel trusty to use the service, establishing trustworthiness on the product is indispensable to the design of social experience for hotel guests. The design can communicate trustworthiness in three ways:

- **Consider avatar and anonymity when managing user's identity.**

When establishing hotel guests' identity in social products, using avatar and anonymity is an appropriate way to reduce harassment. Instead of exposing oneself in public, this way efficiently reduce the latent dangers aroused by the transparent identity. Additionally, avatars and names are good to formalize social distinctions online (Adrian, 2012). View Figure 48, different animal avatars will be assigned to guests instead of using real names and photos once guests start to use the relevant service.



*Figure 48. Avatars for hotel guests*

- **Ask for permission when accessing user data, but keep the time minimized.**

Sometimes the hotel need to access customer data to provide personalized service for guests. In this case, ask for permission is an action of showing respect for guests, otherwise they will feel their privacy are violated. Referring back to design of seeking common connections, before streaming personal data into TV, prior consent from guests is essential. In order to make guests get to know what is going on, the service should clarify the reason for each permission request, which also was summarized as a guideline by google design. Except this, in the permission dialogue (Figure 49), provide options of allow always for guests to not make them feel boring, especially for returned guests.

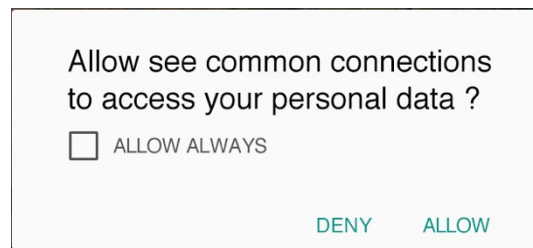


Figure 49. Ask for permission and provide option of allow always

- **Give the user appropriate controls over settings.**

User control and freedom is an important usability heuristics pointed by Nielsen Norman Group (1995), which implies user have the freedom to leave the unwanted state . Likewise, the social experience design still need to respect users and give them appropriate controls to the system settings. In the interview I conducted, a few of interviewees expressed they have not strong willingness to socialize with other guests. And they do not want to be disturbed suddenly. Hence in order to support this, users should be able to change the system settings based on their personal preferences, such as receiving messages from other guests through social TV.

### Usability

Usability is about making the product easy to use and enabling products to satisfy users' requirements. For products supporting social experience, there is no exception.

- **Be simple to use.**

Social TV is not only about providing social aspects for hotel guests. As a product being designed for users, ease of use is the basic principle that guarantees users spend time on the product. Contrarily users would easily give up using it. In the Meet design concept, efforts were taken to make sure its simplicity. Take the homepage as an example (Figure39), showing events preview within one week instead of all events on one screen, which not only makes the interface simple but also grasps what guests really want. Because guests usually stay in a place no more than one week.

- **Consider the interaction between users to provide information and entertainment.**

Consider the functionality of the social TV, information providing and entertainment are good points to support interactions between users. Take the tourism scenario into consideration, what guests desire for are exactly trip relevance information and entertainments. So when designing social experience, these two requirements are good choice for designers to carry social interactions for guests. In existing hotel room infotainment systems, hotel guide and entertainment service were provided already, but they were used by guests passively without any social interactions among guests. View the Meet and Quiz game, what they support social experience for guests through the way of providing local event information and playful games perceptively.

- **Minimize the use threshold.**

Inclusive design is to understand user diversity and then to include as many people as possible. ISO 20282 (2006) emphasizes the ease of operation when designing everyday products to keep the design is universal for everyone. In the exploration part, the majority of interviewees indicated that they do not belong to game fans, but they like to play small games. In order to make more guests being included in TV service provided by hotel, minimizing its use or play threshold is needful. In my design concepts, seeking common connections tried to minimize users' operation and make the simple matching process.

- **Note the value for hotel.**

Another role hotel plays in this project is the end-user. According to stakeholders' words, hoteliers show different attitudes for the hotel technology and social experience for guests. Some of them tend to adopt conservative attitudes for new things, while some others would like to attract and retain their guests through bringing in new services. Therefore, in order to intrigue hoteliers, for hotels' inactive attitude for the technology and social experience, involving the hotel value in the loop is an important consideration when designing for social TV. For instance, in the Meet design, hotel can provide extra service for guests through hosting some attractive events. Another example is Light-Off game, which was designed to make guests reflect on energy usage when they stay in hotel. Energy is among the top three largest costs (Terry, 2016), so efficiency effort is a valuable proposition for hotels. No matter revenue or energy saving, which are important parts for increasing values for hotels.

## **Sociability**

Sociability here refers to the way and the amount of social interactions between hotel guests. Guidelines below stated how to support and what ways could be adopted to support social experience for hotel guests.

- **Incorporating identity into the social TV.**

The important goal for the social TV is to support social interactions among guests. In a social context, it is important to know who you are interacting with. According to Christian (2009), user identity and the ability to control its presentation is a core element of building social website. Similarly, in social TV, incorporating identity is necessary for users to be aware of other guests. It is a way of portraying users through utilizing several relevant items, such as avatars, customer points, reputation, joined events, etc.

In four concepts being raised from the project, identity designs were used to ensure the social awareness of guests. Based on different concepts, the identity appeared slightly different. For Meet, what make up an identity for the user are avatar, nickname, joined events, etc. For Light-Off, avatar, nickname, ranking and the number of lights-off. But as mentioned before, it is very important to consider the avatar and anonymity in the social TV to protect guests' privacy.

- **Consider reciprocity, competition, and curiosity as incentives when designing social interactions.**

As design proposals created in the process, various social incentives in the hotel context were found to motivate guests to start socializing with each other. Such incentives are reciprocity, competition and curiosity. The design of Meet exemplified the reciprocity incentive in several parts. Through initiating personal events, guests could get things to do together with unacquainted guests. Also other guests can find events that they have interested in to participate in. Chen (2015) described competition is one of the most widely adopted social interaction incentives. Both Quiz and Light-Off game utilized competition as core game playing to facilitate guests to have playful interactions. Moreover, reputation system tends to be important along with the competition, enabling guests to struggle for the small prize. For competitive games, if there were small gifts for winners, guests showed great motivation to play in interview. As for the curiosity incentive, which was strongly utilized by the concept of seeking common grounds within strangers.

- **Support remote interactions as well as collocated interactions**

Two types of interactions were elicited in the social TV design, including remote interaction and collocated interaction. As the exploration showed, guests have different social attitudes with strangers in their travels. In order to satisfy varied guests' requirements, the social TV should have the ability to accommodate remote interactions (in different hotel rooms) as well as collocated interactions (in the hotel public space). This was also regarded as one sociability heuristics guideline for interactive television (Geerts, 2009). For remote interaction, guests could play games remotely or leave reviews for events they joined on TV. For collocated interaction, which can be face-to-face talk through

uncovering common grounds.

- **Allow both synchronous and asynchronous use**

View the social use of traditional TV, viewers can either talk about TV content when watching TV or afterwards. Social TV, as a device supporting social interactions, both synchronous and asynchronous use should be included. As for synchronous use, guests could have options to have instant communication or interactions, such as playing games, while for asynchronous use, guests could use the TV depending their personal situations. But during their using time, some indirect interactions are complement to support their communication, such as leaving review for events they joined.

- **Consider utilizing the design to elicit different interpersonal interactions among guests**

There are different levels of interpersonal interactions among guests. When designing social experience, it is important to consider use the design to bring or elicit interpersonal interactions for users. In this project, proposed concepts provide different ways to approach other guests and enable guests to have different social interactions. Such ways are gathering guests together offline through joining in events, gathering guests online through playing games, sparking conversations among guests via seeking common grounds, leaving reviews, sending messages to the owner of the personal event, inviting nearby guests to take part in the event, etc.

- **Allow private conversation and public conversation**

In social products, both private conversation and public conversation are needed depending on the social context. In previous study, interviewees showed in most cases they would like to have public conversation with other guests, but if they have a specific request for someone, they probably wish to keep the conversation in private. Take for an example, in the Meet design, guests have equal rights to read reviews left by other guests. But in the case of personal events, if someone join in these events, the social TV will allow them to contact with each other through internal messages.

- **Allow the bystander role in interpersonal interactions**

Bystander role in social interaction was realized in the idea evaluation part. Many interviewees said they like to observe what other people were doing instead of really joining in some social activities. This also can be found in many social networks. A lot of hidden users would rather see updates from their friends than post things to keep active. Apparently in the social TV, forcing guests to socialize should be banned. On the contrary, allowing bystander role in social TV is a good to give respect for guests and make them not feel stressful when using the social TV. In fact, in the design of Meet App, the bystander role was emphasized on the design through the feature of broadcasting, which was subjected to discard finally to keep the design simple. But it is still an important consideration when designing for social TV.

- **Consider appropriate ways to encourage guests to take part in social activities**

Most of guests took inactive attitudes for social interactions with unacquainted guests. Nielsen (2006) reported that in most online communities, 90% of users are lurkers who never contribute, 9% of users contribute a little, and 1% of users account for almost all the action. In order to overcome participation inequality, how to encouraging guests to take part in those social activities brought by social TV appeared especially important for the research. Several ways were put forward for this project.

**Firstly, simplify participation and contribution process.** For example, in the design of how to initiate events, let users build their contributions by modifying existing templates rather than creating complete entities from scratch (Nielsen, 2006).

**Secondly, reward hotel guests.** Extrinsic rewards were mentioned by interviewees as big motivations to start socialization. In event case, reward for their participation with customer points. In the game cases, reward top gamers with small prize.

**Thirdly, utilize social proof driving guests to be active.** Social proof is a psychological phenomenon where people reference the behavior of others to guide their own behavior. Nielsen (2014) also summarized that use actions, beliefs, and advice of other people in design to influence users. To be specific, the presenting of the number of participants in an event and the revealing of guests' activity status are good examples utilizing this guideline.

**Fourthly, present social achievements.** In Meet, under each event, visualizing how many guests did you meet and how many people you will meet in the upcoming event were adopted to evoke guests' interest to participate in events (Figure 50). The similar way appeared in some social networks, such as the Facebook's friendship anniversaries, which provoked users to contact with their friends.

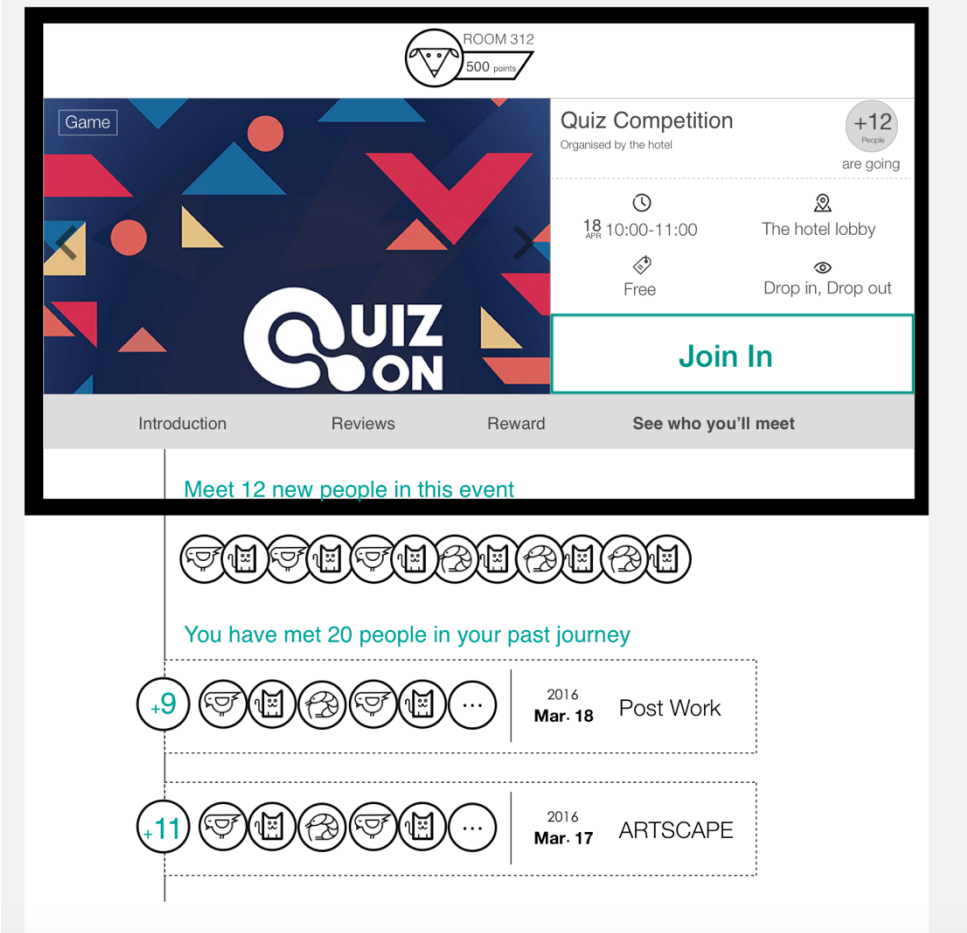


Figure 50. Social achievements in Meet

**Fifthly, consider learning through social activities.** Guests narrated they would like to spend their spare time in learning through playing games. Accordingly, when designing social experience, consider carry learning purpose in social interactions is an appropriate way to attract guest attentions.

- **Manage edge cases**

In the design of social TV for hotel guests, the importance of edge cases was realized. View Figure 51, the case of empty event in a day, which might influence guests to stop using the product to some extent. In order to solve this problem, as Figure 52 shows, inspirations, trip relevance recommendations or hotel promotions are alternatives being considered as the backup. Another edge case shown in seeking common grounds concept, which is no common data displaying on the screen. Imagine in this case, guests will feel a bit embarrassed and have no words any more. Facing this situation, presenting personal data respectively instead could be used to give additional icebreaker.

Hence to prevent the social TV getting into the dead end, designers need to be aware of edge cases and learn to deal with them in proper ways.

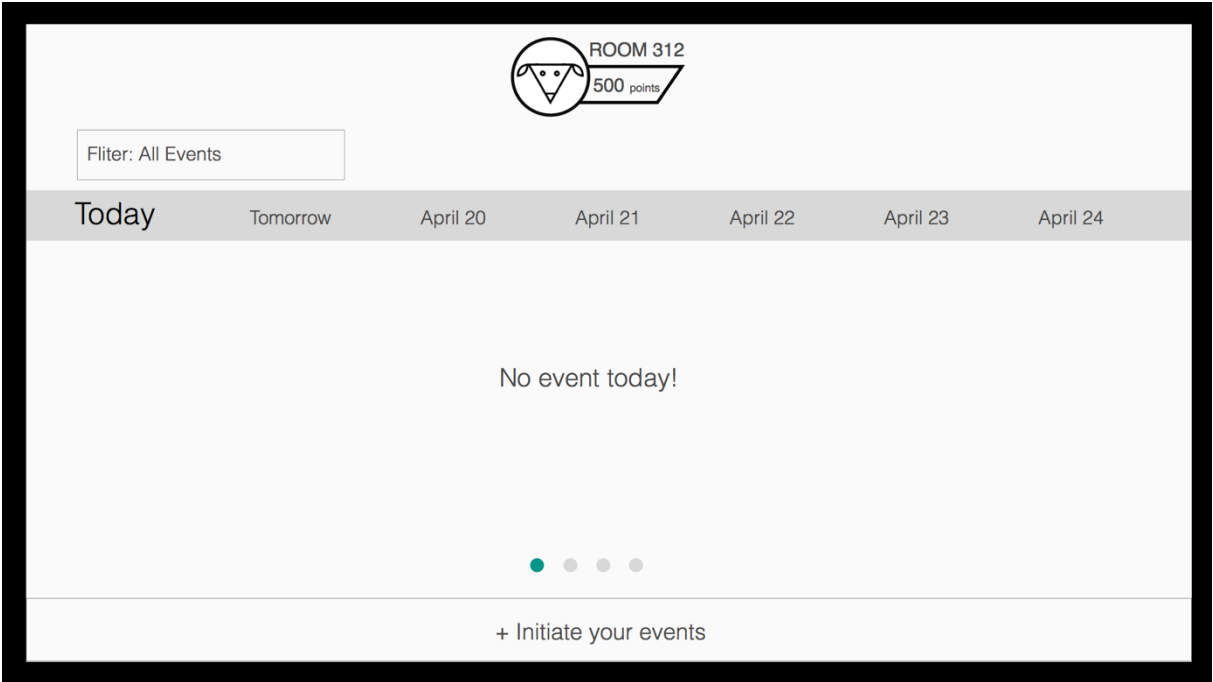


Figure 51. No event case

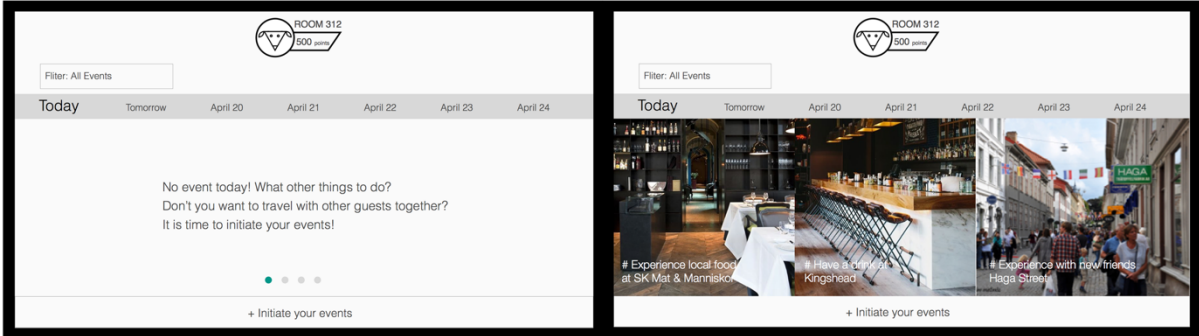


Figure 52. Design for edge case in Meet

## 7. Discussion

The discussion chapter is organized into three sections. The first section is about the proposed concepts discussion. The second section introduces about the process discussion which shows insights gained from the process and some reflections around methods used in research. The last section is about giving possible suggestions that can be done further in future.

### 7.1 The Result

The exploration work in this project have found different interpersonal interactions for hotel context. With the work proceeding, the territory of the work was narrowed to support interpersonal interactions among unacquainted guests. Four concepts were ultimately selected as the project design results, which example design possibilities that can be done regarding to the research topic.

Being inspired by the reciprocity social needs, Meet was conceptualized to help guests get more opportunities to socialize through providing local events information. Useful and associate relationship (Dezful, 2011) was shaped through this social TV application. But one negative outcome could be brought by Meet is that guests might not start to socialize with people in events. Another unavoidable outcome from the use of the Meet is harassment that could be occurred in the communication with unacquainted guests, being regarded as a vital consideration for hotel industry.

Light-Off and Quiz were designed as trivia games for guests to compete or cooperate. These two games aimed to facilitate guests to have more interactions in game playing. Consequently, “fun” relationship was expected to be aroused among guests. However, for the Light-Off concept, the hotel value of sustainability was attempted to be addressed, but the influence on guests’ behavior would be hard to predict. As for Quiz game, different playing modes were provided for guests depending on their context. Apparently, both random opponent playing and collocated opponent playing support social interactions between players. But the free mode, allowing guests to play games in trivia time through accessing QR code with personal device, which is challenging to make guests socialize together.

When it comes to seeking common connections, the curiosity social incentive was reflected vividly in this concepts. Conversations are evoked through exposing common connections between two strangers. But due to utilize the personal data for matching, privacy could be the strong reason leading guests not to use it.

According to Cesar (2011), social TV is connecting remote viewers to interact with each other through TV and personal devices. The social TV phenomenon was originated with an increase in social media use, which enables people to share their TV experience with other viewers. In the work process, similar concept was proposed, such as the hotel interactive cinema, which was designed to enhance viewing experience through voting for different sport teams. But the relevant interactions have close relationship with provided programs on TV. View final four concepts in results, strictly to say, which were not designed for program viewing experience. But they are enablers of social interactions for hotel guests through the use of interactive TV and mobile devices. They are explorative examples for social TV designs in other ways.

In addition, guideline is another part of the results, which were formulated with the concept development. In this project, these guidelines were not accomplished in one step, which went through several iterations, being realized in the process of design, analysis, and evaluation. Throughout the guidelines, the usability and sociality categories provided the social TV design suggestions ranging from the functionality, easy of use, ways of eliciting interactions to the ways of interaction. Except this, some attentional aspects in the hotel industry, such as privacy and edge cases, were emphasized in the guidelines. From the expert evaluation, the experts showed satisfaction to the summarized guidelines. As they said, it was helpful for them to know what factors need to be considered when designing

social TV. Although these guidelines are targeted at mainly social TV for hotel, the applications of these guidelines could be extended into the design of social experience in general. These guidelines are expected to give constructive suggestions for designers who work on relevant areas.

## **7.2 The Process**

### **7.2.1 Decision Making**

Before starting the practical work, the research question was decided as “how to support hotel guests’ social experience through the usage of TV and personal device”. Beyond my anticipation, the work was expanded with the evolution from divergence into transformation, where more research options and wider framework started to make sense within the research question. Accordingly, many possible ways were available to achieve the goal. However, as opportunities were created, eliminating options were done as well. Therefore, the research question was gradually narrowed down to support social interaction among unacquainted leisure travel guests. In this fuzzy process, decision making was mainly driven by design, such as interviewing for different target group, using concrete prototype to uncover new things. But turn back to the process, keeping a high sensitivity to the project and making decisions timely would reduce abundance work probably. For instance, as described, the 2<sup>nd</sup> iteration concepts were done around providing remote interactions across rooms, collocated interactions in room and interactions in public space, which made the project still in a relevant loose and wide stage. From this, in order to make sure the compact project without too much irrelevance, looking back the work done already and keep a sensitive mind in the process was realized. Practically when tackling the ambiguous, wide and abstract challenges, keeping sensitive attitude and consistent mind in the work benefit researcher to make proper decisions.

### **7.2.2 Use the Method Flexibly to Fit the Project Development**

View the social experience design, there are little well-developed work around this topic. From the literature study, few existing systematic methods were proposed for the social experience design. Instead in this project, the design thinking of divergence-transformation-convergence and Human Centered Design were used to drive the whole process. As we know, there are a number of methods available within these two approaches to understand target audience and get ideas. Hence it is easy to plan what methods could be used and how to apply it in research. But in the practical work, various methods were tried out. Sometimes the outcome was not valuable for the project. For an example, the method of experience map was adopted in the project as the original plan. The aim of using this method was to design a consistent and holistic social experience for guests. But view the framework that was outlined in earlier stage and the focus of the project work, this method drifted the result to another way. Hence it is important to keep trying attitude and remember to discard what is not valuable in the explorative project. At the same time, looking back to the research question and checking if the project is still on the right road is necessary to prevent researchers from getting lost in the project.

Another insight gained from the process is making proper adjustment on the method or its usage depending on the context of the project. When it comes to the method application, there are many ways to do it. It appears that some methods might not lead to the result as researcher anticipates. Take the interview as an example, in its pilot study, interviewees expressed the prepared questions were hard to answer. After careful analysis, factor resulting in the difficulty was the setting of questions. To improve the quality of questions, original open questions were replaced with structured and semi-opened questions with different scenarios, which enabled me to realize that proper method usage adjustment plays an important role in getting satisfying results. Furthermore, in order to tailor the development of project, adjusting methods selection is essential. In this project, as the early plan, additional user evaluation would be carried out to evaluate the final design concepts where embody design considerations. Then guidelines would be reflected and finalized through the user evaluation. In fact, at the end stage, time got tightly and the planned way was not an indirect way to evaluate guidelines. So instead, the expert evaluation was adopted with its direct and efficient attributes.



Consider these facts, keeping the mind of applying methods in flexible ways is definitely important for the project development.

### **7.2.3 Other Reflections**

Reaching guests and hotel practitioner was incredibly valuable because they gave me knowledge about the hotel staying. But in the practical work, it was a tough process to reach them. In order to interview guests in hotel, I had to interrupt guests to ask if they would like to be an interviewee. Beyond my expectation, most of guests tend to be in a hurry and have less time for my interview, which showed a time-consuming work when reaching them. Another challenge for me within the work was highlighted because of being unfamiliar with the hotel context entirely. In the concept development, the fact of edge cases and inactive social attitude of guests were neglected. Well finally this issue was resolved through timely communication with the stakeholder representative who has worked in hotel TV area for years.

### **7.3 Future Work**

There are several parts that could be explored further in the future. Back to my work, the 2<sup>nd</sup> and 3<sup>rd</sup> concept iteration were evaluated through evaluation with stakeholders. In order to get more feedback from guests' perspective, additional user evaluation can be conducted for the final concepts. Moreover, social experience is hard to measure. And in the previous concept evaluation work, interviewee expressed it is hard for them to talk about their feeling specifically when they face with a paper prototype. Then they were not able to imagine what social interactions they could have. Hence in the future work, to evaluate the interpersonal interactions that could be brought by designs, workable prototype can be involved in the evaluation process. Moreover, to collect authentic reactions of guests, the evaluation context should be very close to the real usage. Furthermore, the workshop of applying guidelines into designing social TV could be organized in future work to validate guidelines and its impacts on the design.

## 8. Conclusion

The goal of this master thesis was to explore how hotel TV and personal device can be used to support social experience for hotel guests during their stay. In the whole process, Human Center Design was applied to drive the project proceeding from divergence, transformation to convergence. With the work carried out, the focus of research question was narrowed down from variables to support social interactions among unacquainted leisure guests through eliminating options and reasonable decision-making.

In order to figure out social opportunities for guests, a number of methods were utilized in the process to move the project forward. In the exploration part, field study, interview, persona, brainstorming and create opportunities areas were used to understand the behavior of travelers and what activities could support their social experience. In the concept iteration part, things got from the exploration part were transformed into different design opportunities. Through user evaluation and evaluation with stakeholders, some inspirational designs were collected. Afterwards, design directions along with different social strategies were decided and corresponding guidelines emerging from the idea generation were summarized in the convergence stage.

Overall, the work done in the thesis produced two main results: four concepts that providing social opportunities for guests either online or offline and a set of guidelines helping people who work in the similar circle of designing social TV. The four concepts are examples representing different possibilities that can be used to bring social interactions for hotel guests through TV instead of absolute solutions. Different social incentives of leisure travel guests, including reciprocity, completion and curiosity, were hidden in these four concepts.

Additionally, guidelines were summarized with the scope extending from onboarding, privacy, usability to sociability as another important result:

### Onboarding

- Provide onboarding ways to instruct or teach guests in the use of all functionalities of social TV

### Privacy

- Consider avatar and anonymity when managing user's identity
- Ask for permission when accessing user data, but keep the time minimized
- Give the user appropriate controls over settings

### Usability

- Be simple to use
- Consider the interaction between users to provide information and entertainment
- Minimize the use threshold
- Note the value for the hotel

### Sociability

- Incorporate identity into the social TV
- Consider reciprocity, competition, and curiosity as incentives when designing social interactions
- Support remote interactions as well as collocated interactions
- Allow both synchronous and asynchronous use
- Consider utilizing the design to elicit different interpersonal interactions among guests
- Allow private conversation and public conversation
- Allow the bystander role in interpersonal interactions
- Consider appropriate ways to encourage guests to take part in social activities

These guidelines with clear structured sections and relevant design examples were intended to answer the proposed research question. They were aimed at supporting designers, hotel TV manufactures, hotel managers who wish to explore opportunities for the design of social TV in the hotel context. Expect offer guidance for designers, guidelines can also be used as evaluating tools for social interaction.

The project has been done as a master thesis. To go further, some additional evaluation work and workshop could be involved to make it well grounded. Moreover, some other interaction options for guests that were delimited in the process could be researched in the future work, such as interactions between guests and their friends or families. In summary, the funnel work was developed well with different approaches and got satisfying results.

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# Appendix I

## Talk to hoteliers and guests

### Questions for hotel staff

- Which type of TV is provided by your hotel? Is it the traditional cable TV, TV with the set top box, or smart TV?
- Except the lively TV, do your hotel TV have other features, like check-out, room service? Do you have the mobile or app to support the use of the TV?
- Within your work, do you receive some feedback from guests about the TV here? Some good points or some bad points? Do they complain the TV a lot in the hotel? Do guests usually ask for your help to use the TV?
- During their staying, what type of information is asked most by them?
- In your hotel, do you have TV in the public place (lobby, corridor, restaurant)? If you have, do guest use that a lot? Does TV gather guests together?
- From your view, do your guest communicate with each other a lot?
- If you are a guests in one hotel, which dreaming feature of the TV do you want to have?

### Questions for guests

- Are you travelling here to leisure or business? Do you always travel alone or with friends or colleagues or families?
- Do you like staying in the hotel? What are your top three activities when staying in the hotel? During your staying, do you use hotel TV? how you use it? If not, why? what did you do in your spare time when staying in the hotel?
- When your travel alone, do you think social interaction is important? Do you want to make some new acquaintance during your travel?
- When you travel with your friends or families, do you want to make some new acquaintance during your travel? Or do you just want to enjoy the holiday time with your families? How about travelling with colleagues?
- Would you like to share a memorable social (interpersonal interactions) story happening in your travelling? What is that?
- If there is a system which can help you have more interactions with people (friends, families or new friends), would you like to use it?
- What is your dreaming feature for the hotel TV?

## Appendix II

### Preliminary interview

1. How many times did you travel for one year? Are they business travel or leisure travel?
2. What is the difference between your business travel and leisure travel?
3. Do you travel alone or with your families/friends? Regarding the specific activities, what is the difference between them?
4. Do you have some interpersonal interactions during your travels?  
If you have, what is that? Is that between you and your friends? Or Is that you and other visitors? If no, why?
5. Did you use TV when staying in hotel? If yes, how you use it? If no, why?
6. When you traveling with your friends or families, what activities do you like to do together in the hotel? Choose four please  
Watching TV, Play with your phones individually, Play games, Watch Movie, Eating and drinking, explore local, Communicating with other visitor, Others
7. When you traveling alone, what activities do you like to do in the hotel? Choose four please  
Sleeping, Watch TV, Play with your phones, Play games, Watch Movie, Eating, Explore locals, Talking with other visitors, Others
8. What type of social experience do you usually have when staying in hotel?  
If you have, what is that? Is that between you and your friends? Or Is that you and other visitors? If no, why?
9. Do you like to stay in the hotel public space? Do you have the experience of watching TV at there?
10. Do you like to have more interpersonal interactions with other visitors in public place?  
If yes, what do you want to talk about? If no, why?
11. During your trip, what is the main motivation to have more interactions with families or friends?  
Self-expression: you want to share some personal experience with them  
Reciprocity: enhancing your relationship or strength your family bond  
Learning: learn things from other guests  
Curiosity: be curious about things that other guests know
12. What is your main motivation to have social interaction with other guests?  
Self-expression: share some personal experience with other guests  
Reciprocity: helping with each other, such as share information  
Learning: learn things from other guests  
Curiosity: be curious about different things from other guests

## Appendix III

### Scenario-based Interview

- Female      Male      Age
- How often do you have a leisure/business travel? How many days it usually last?
- Did you use a lot hotel TV in your past leisure/business travel? If yes, what contents did you like to watch? And what time point in hotel did you use hotel TV? If no, why?
- Do you often travel alone or travel group? How many people do you often have leisure/business travel together?
- Which social network do you use most during your travel?  
Facebook / Twitter / Linked in / Instagram   Others?

### Leisure/Business travel individually

1. You are having a leisure/business travel individually. The hotel room you are staying is equipped with a smart social TV and it can make you have some social interactions with other guests who stay in the same hotel. During your spare time in hotel, you tried to use this TV to have more interactions with other guests who stay in different hotel rooms to have a relax.



**In this situation what I mentioned, what type of social needs would be most important for you? Rank it.**

Reciprocity (e.g. share practical/local information through TV)

Being accompanied (e.g. invite someone who stay in the hotel to have a visiting local place together)

Entertainment (e.g. playing games with some other guests in separated hotel room)

Curiousness (e.g. explore other guests who have common interests with)

**What kind of social activities through TV would be most interesting for you? Choose four**

-Share practical/local information among guests

-Comment on the hotel service and share your staying experience through the hotel tag “# the hotel name” on social network

-Looking for guests who has the same visiting place with you and invite them to      travel together

-Play games with other guests in separated rooms

-Watch movie/video collections through social TV remotely

-Watch sport events on TV and comments it online.

-Communicate with some other guests who have the common interest with you  
Others?

What type of game do you like to play with other guests?

If the TV can help you filter some guests from all the guests, what type of guests do you want to socialize?

### **Leisure/ Business travel with your friends or families/colleagues**

1. Now you are having a leisure/business trip together with your friends/colleagues. The hotel room you are staying is equipped with a smart social TV as well and make you have interactive activities with your colleagues. When you and your friends/colleagues backing to the hotel after one-day visiting, you try to use this TV together to relax and entertain yourself.



**In this situation what I mentioned, what type of social needs would be most important for you? Rank it.**

Learnability (e.g. finding practical and useful information together to prepare for the second day visiting)

Entertainment (e.g. watching movie together)

Curiousness (e.g. having a virtual reality tour about local famous attractions)

**In the situation above, what type of interactive activities would be mostly interesting for you? Choose four**

- Watching movie/video collections together
- finding practical and useful information together to prepare for the second day visiting
- Photo sharing with your friends/families
- Tiny workout together
- Playing games together
- Video recording about your travel
- Have a scenery tour about famous local attractions on TV
- Others?

### **Hotel Public Space**

Now you are having a coffee in a hotel public space. At there, there is a smart social TV installed along the wall, which would bring more social interactions between you and other guests.



**In this situation what I mentioned, what type of social needs would be most important for you?  
Rank it.**

Reciprocity (e.g. share practical/local information through TV)

Being accompanied (e.g. invite someone to have a drink together)

Entertainment (e.g. playing games with some other guests in public space)

Curiousness (e.g. the social TV can explore guests have the same interests with you and then you can have a further communication)

**In the situation above, what type of interactive activities would be mostly interesting for you?**

**Choose four**

-Share practical/local information through TV

-Motion Sensing Game

-Quiz competition around TV content

-Some puzzle game competition

-Watching sports events together

-Exploring people who has the common interest with you and then you can have a further communication)

-Invite someone who stay in the hotel to have a drink together

-The TV works as an emotion wall showing how guests feel when staying in hotel which are collected from guests

-Others?

## Appendix IV

### Initial Design Considerations

- The content of design need to be useful for guests' travelling.
- The design need to make sure guests' safety and protect guests' privacy.
- The design could support guests' social experience from three aspects: reciprocity, self-expression and gift-giving.
- It is good to embody the target audience' identity to make sure guests have a clear vision about the people who they are interacting with.
- The design could utilize some triggers as a starting point to spark conversation among guests, such as common connections.
- The design could support conversation between guests and hotel staff and locals.
- Minimize unidirectional interaction.
- Allow public conversation and private conversation.
- The technology supporting guests' social experience should be simple and convenient.
- Maximize the strength of TV and mobile device to support hotel guests' social experience.
- The content need to stand out.
- The product should not arouse disturbance among guests.
- The product should respect guests, without burdening guests, especially guests who do not have willingness to socialize with strangers.
- The product should establish a sense of trust, especially among stranger guests.
- Watching live fantastic events (e.g. sports event, music, event) is a good way to gather unacquainted guests together no matter online or offline.
- Support different live TV program genres.
- Support interactions related to the TV program, such as ask questions, discuss, voting, etc.
- Give the option of socialization or not.
- Playing game is a good way for guests to relax and entertain themselves.
- The game should not require too much efforts, since most of guests are not game fans, and during their journey, what they want to be relaxing.
- The game should be simple and be finished in a short time.
- Party game and multiplayer games are good choice for guests who desire collocated interactions with their friends and families.
- Social activities in public space should be simple, easy to join and accommodate multiple guests.
- Gamification is a good way to stimulate guests to take part in.
- Context-based social activities in public space.
- Curiosity is a big motivation for guests' social interaction.
- Attractiveness could be a doorsill for guests to start social interaction in public space.

# Appendix V

## Synthesize Design Considerations

On-boarding (Make users start to use it)

- Consider multiple ways to inform guests what features existing on TV and what benefits could be brought by the service

Security/privacy: there is little or no privacy for users of hotel TVs

- Build trustworthiness on the product and present themselves as credible to customers
- Identity presence to make sure guests have a clear vision about the people who they are interacting with
- Consider avatar and anonymity for establishing users' identity
- Ask for permission once in need of grabbing basic user data
- Consider the type of information you are asking people to enter
- Respect guests, without burdening and disturbing guests, especially guests who don't have strong willingness to socialize with unacquainted guests
- Give the user appropriate control over settings (Give guests option to control the system if they would like to socialize with others)

Usability/Usefulness

- Ensure TV contents are practical or entertaining for guests. Thus the content should be infotainment relevance, including information and entertainment
- Simple and convenient to use

Sociability: the amount of and the way of interpersonal interaction that is supported by design

- Consider social motivations of reciprocity, self-expression, competition and curiosity when designing interpersonal interactions for hotel guests.
- In different contexts, find appropriate ways to support different guests' social motivations
- Consider the design is a way to gather unacquainted guests together either online or offline (such as fantasy events, games).
- Consider the design is the icebreaker to trigger conversations among unacquainted guests, working as the starting point to spark conversations
- Consider context-based social activities.
- In order to meet different types of guests, support remote interaction as well as collocated interaction.
- Consider different ways to instil a sense of socialization in the product, such as comments, social bonus and social achievements
- Support different ways of interaction among guests: comments, reviews, talking, messaging and playing.
- The design supported activities need to accommodate multiple guests, at least two guests.
- Allow synchronous and asynchronous interactions.
- Allow the bystander role in the social activities elicited by the design
- Guarantee the inclusiveness of provided service, without requiring too much efforts. Since most of guests are not fame fans and during their journey, what they want to be relaxing. (simple games, social activities in public space)
- Consider invitation is a good way to approaching guests nearby
- Support different activity/event genres
- Minimize unidirectional interaction
- Beyond pure socialization, learning is an extra benefit getting from the design.

Activeness: facilitate guests' motivation to socialize, especially for inactive guest, and mobilize

#### inactive guests' social activeness

- Consider to promote guest's activeness and positivity through reward
- Consider use the affection resonance to attract guests' motivation
- Utilize social proof influencing users to improve guests' social activeness, such as consider social activity presence of other guests. (<https://www.nngroup.com/articles/social-proof-ux/>)
- Instil a sense of socialization in the product, such as comments, social bonus and social achievements
- Promote guests-generated contents (contributions) by minimizing their efforts . Let users build their contributions by modifying existing templates rather than creating complete entities from scratch.
- Overcome participation inequality. <https://www.nngroup.com/articles/participation-inequality/>
- Social learning could be a way to improve guests' activeness of socialization.

Attractiveness: enhance the attractiveness of the design, attract to use it. Attractiveness could be a doorsill for guests to start social interaction in public space

- Content stand out
- Use appropriate ways to stimulate guests to take part in, such as gamification

Commutation: offer different channels for communication

- Support conversation between guests and hotel staff and locals
- Support public conversation and private conversation
- Support synchronous and asynchronous conversations

Edge cases

- Take case of edge cases when designing hotel social product, otherwise the design would easily go into the end. Some edge cases (empty data) could easily arouse customer dissatisfaction, which make them give up using the product.
- Inspirations, trip relevance recommendations and hotel/local promotions are important alternatives in the edge cases
- Consider the edge case of the product could be used by hotel visitors but not real guests

The value for the hotel

- Take the hotel in the loop when designing products being used in the context of hotel
- Learning socialization is a good way to enhance social experience for hotel
- Consider input promotional advertisement content

Empower the TV and the personal phone

- Take the strength of TV and personal phone. TV, good visual effects, sound effects and built-in features. Personal device, personalized, mobile, and easy accessible.