



Faculty of Design

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## Designing service entanglements: Towards stakeholder-centered perspective in design

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# Designing Service Entanglements

towards stakeholders-centered perspective in design

*prepared by*

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SCAD Design

*advised by*

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Carnegie Mellon HCII & Design

*presented at*

Relating Systems Thinking and Design 16' (RSD5)  
Toronto, Canada

*image credit: Eli Blevis,  
Indiana University HCI/d*

## **motivation**

service entanglements

approach

interviews

workshops

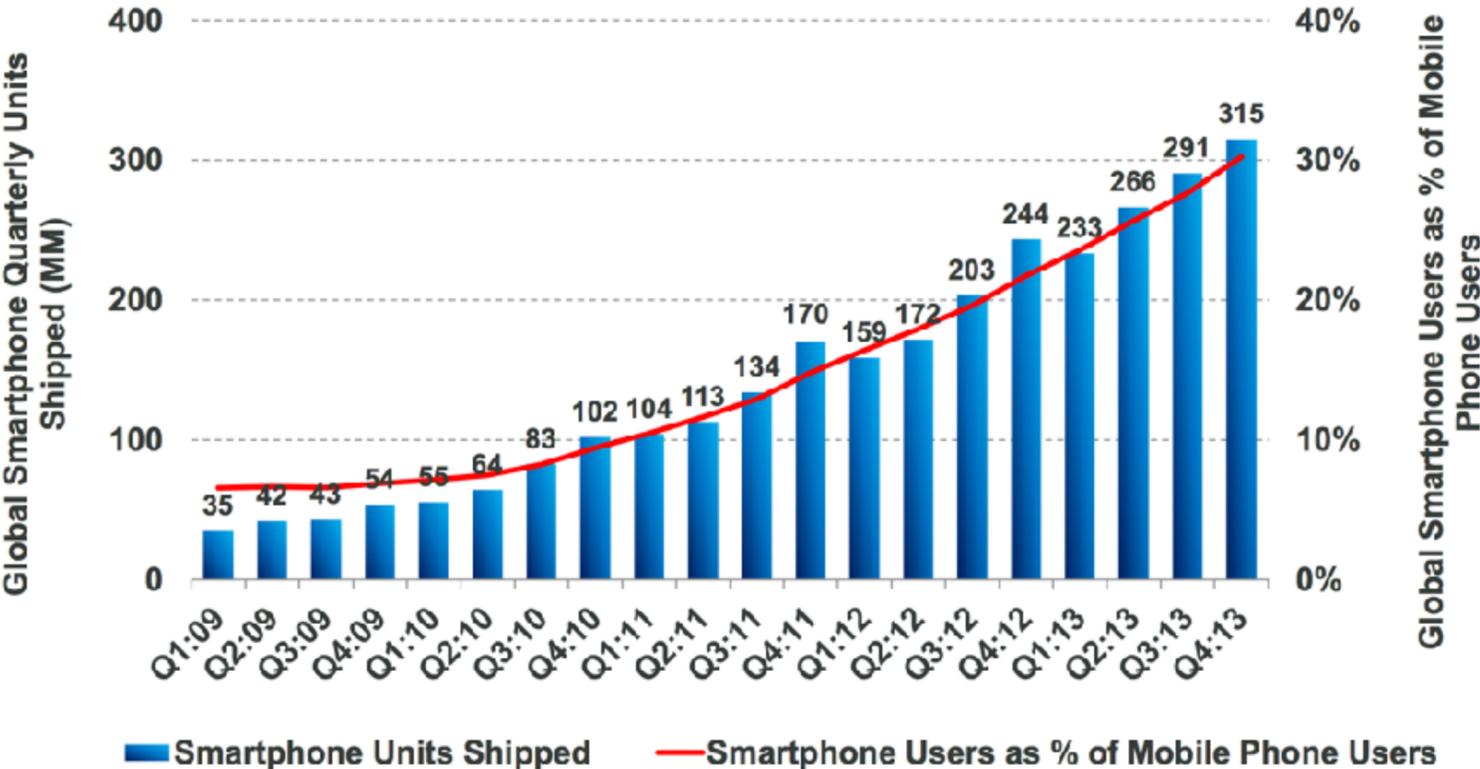
discussion

mobile computing

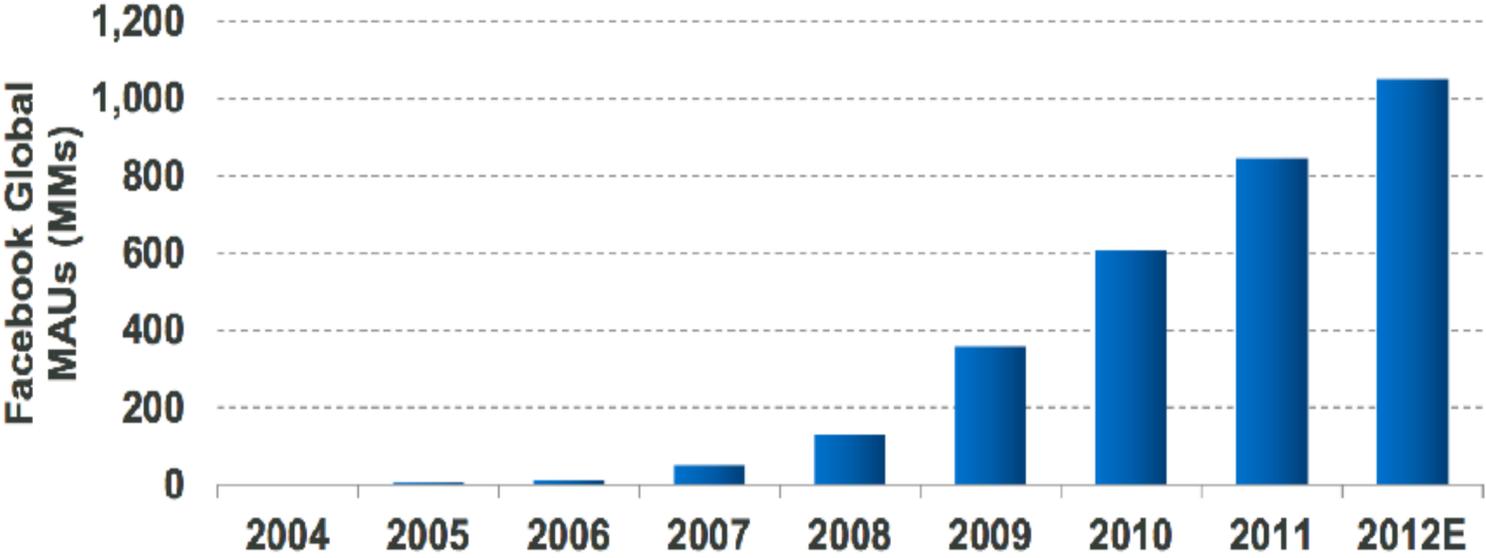


mobile computing + social computing

**Global Smartphone Quarterly Unit Shipments & Smartphone Users as % of Mobile Phone Users, 2009 – 2013**



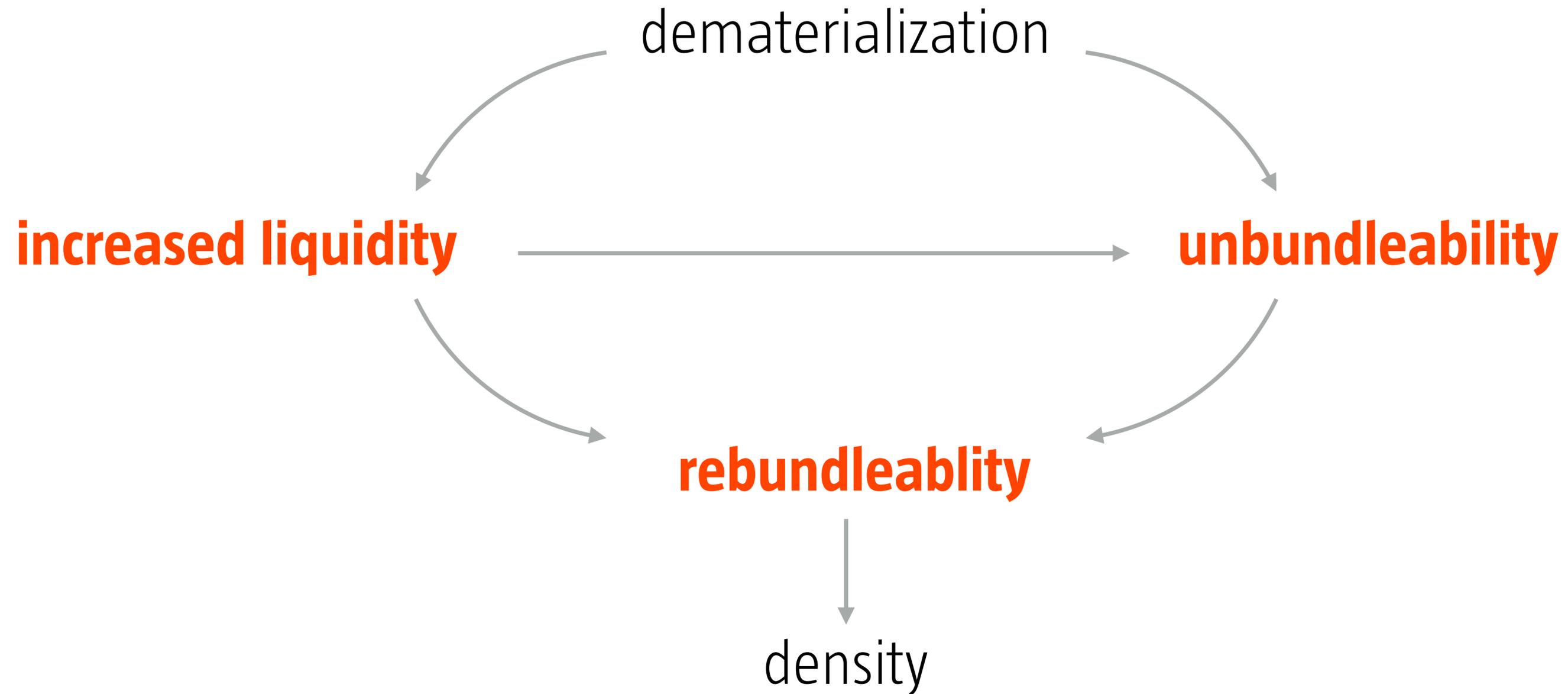
**Facebook Global Monthly Active Users, 2004 – 2012E**



Source: Facebook, 2012E MAUs are KPCB estimates.

# increased liquidity of service offering

Liquification of product and service offerings by technologies enables information to be more versatile, which leads to increased specializations in the delivery of product and service businesses



*drivers promoting density*

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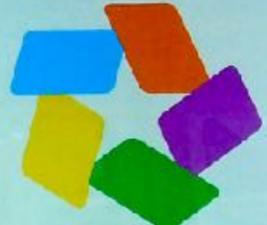
[www.uloop.com](http://www.uloop.com)

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2012

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LOVE US  
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**yelp**

[www.yelp.com](http://www.yelp.com)

Recommended on [tripadvisor.com](http://tripadvisor.com)



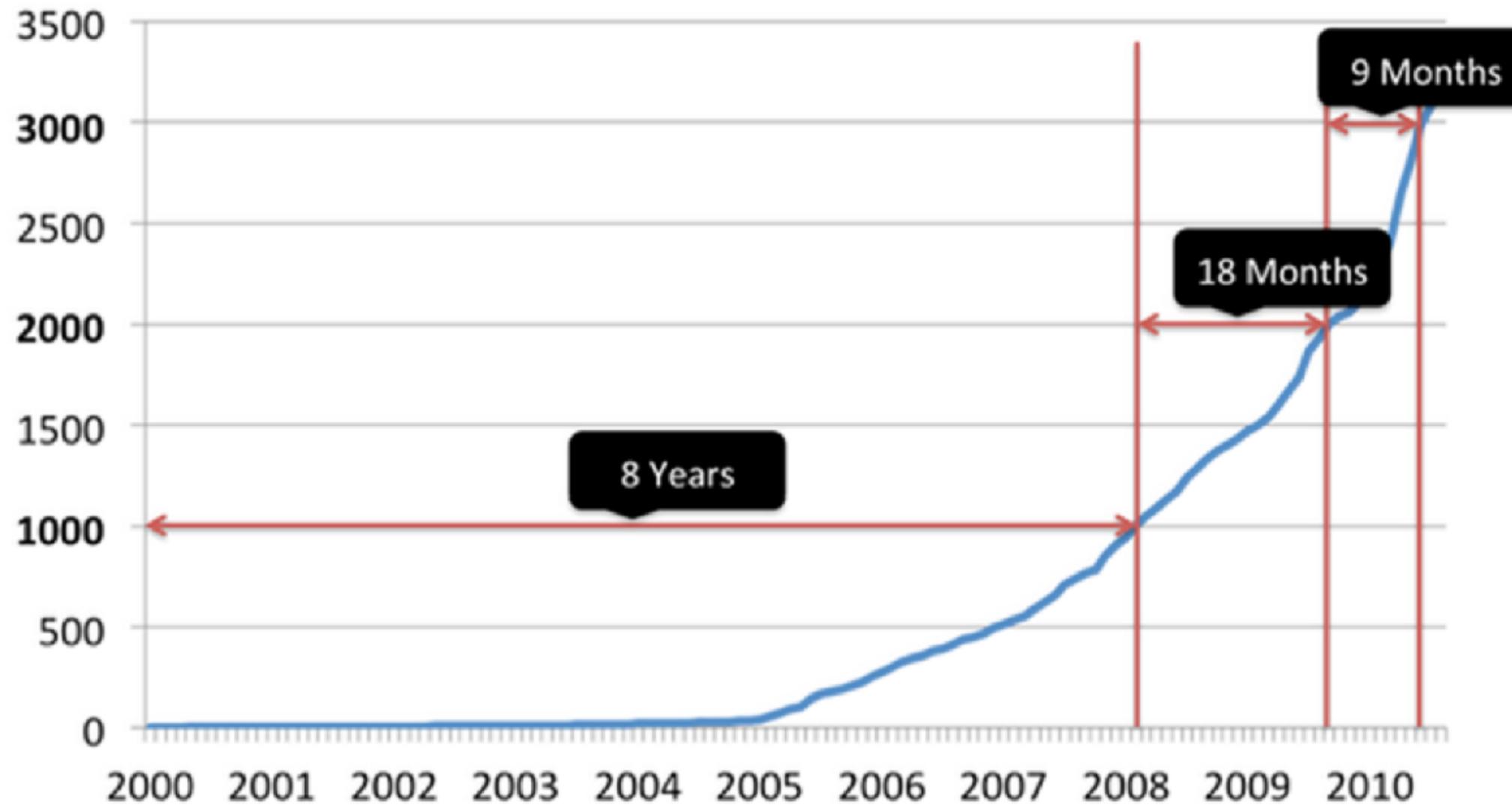
**tripadvisor**

Gift Card \$25 Gift Card

**Oishii** **Oishii**

Korean and Japanese style lunches Korean and Japanese





Total APIs over time

# Facebook platform supports more than 42 million pages and 9 million apps

COMMENT

f SHARE

Tweet



Brittany Darwell • Apr 27th, 2012



Applications, Facebook,  
Featured, Pages

There are now more than 42 million Facebook pages and 9 million apps and websites integrated with Facebook, according to a recent amendment to the social network's filing for an initial public offering.

The number of pages on Facebook with 10 or more Likes has increased by 5 million since Dec. 31, 2011, and the number of apps and websites that integrate Facebook are up by 2 million since that date. These new totals show that Facebook's platform continues to grow in ways beyond new users. It also shows just how much is competing for users' attention these days.

Facebook did not provide a category breakdown of the 42 million pages on Facebook. However, in a letter to prospective investors, Facebook CEO Mark Zuckerberg shared that more than 4 million businesses have pages on the site. Other pages on the social network — including many of the most popular ones — are pages for popular figures, movies and sports teams. A large proportion of pages are also likely to be fan-generated community pages. Unclaimed locations also account for some of these pages, although Facebook has been working to eliminate duplicates.

The number of apps and websites connected to Facebook is likely to quickly grow past 9 million. With Open Graph integration proving to be a large source of traffic for third-party apps and websites, we can expect many more blogs and media sites, as well as mobile games and other apps to implement aspects of the platform

Along with stats about pages and apps, Facebook provided other updated figures for photo uploads, interactions and friend connections in its filing this week. Between Jan. 1 and March 31, there were more than 300 million photos uploaded to the site each day — up from 250 million per day in Q4 2011. Users also generated an average 3.2 billion Likes and comments each day in the first quarter of 2012 — up from 2.7 billion per day in Q4 2011. And Facebook now has more than 125 billion friend connections between its 901 million monthly active users.



## MyFitnessPal™

Sync your meals and activities to Fitbit and adjust your daily net calorie goal on MyFitnessPal by the tracker data

[Learn more >](#)



Make your experience with Fitbit even more awesome.

## Browse Apps



### Lose It!

by FitNow, Inc.

Sync your meals from Lose It! to Fitbit and extend Lose It! food budget by activities from your Fitbit tracker.

[Learn more >](#)



### MyFitnessPal

by MyFitnessPal, LLC.

Sync your meals and activities to Fitbit and adjust your daily net calorie goal on MyFitnessPal by the data measured by your tracker.

[Learn more >](#)



### SparkPeople™

by SparkPeople, Inc.

Link Fitbit to your SparkPeople account and you can dynamically share and sync data - including weight, fitness and sleep - to your SparkPeople profile.

[Learn more >](#)

## What is this?

Browse the App Gallery to discover new website and applications that enhance your experience with Fitbit.

## Manage your apps

[View all >](#)

## Want to build some



# Channels

IFTTT lets you create connections between the 92 Channels below.

500px	App.net	Automatic	bitly	blink(1)	Blogger
Box	Boxcar 2	Boxah Package Tracking	Buffer	BuzzFeed	Campfire
Craigslist	Date & Time	Delicious	Diigo	Dropbox	Email
ESPN	Etsy	Evernote	Facebook	Facebook Groups	Facebook Pages
Feed	Feedly	fffffound!	Fiverr	Flickr	Foursquare
GitHub	Gmail	Google Calendar	Google Drive	Google Glass	Gumroad
IFTTT	Instagram	Instapaper	iOS Contacts	iOS Location	iOS Notifications

iOS Photos	iOS Reminders	JetSetMe	Last.fm	Life360	LinkedIn
Netatmo Weather Station	NewsBlur	NowVia	OneDrive	OneNote	Philips hue
Phone Call	Pinboard	Pocket	Push.co	Pushbullet	Pushover
Readability	reddit	Salesforce Chatter	SmartThings	SMS	SoundCloud
Stocks	Storytly	Sunlight Foundation	Surfline	Supply	The New York Times
Trello	Tumblr	Twitter	UP by Jawbone	Vimeo	Weather
WeMo Insight Switch	WeMo Light Switch	WeMo Motion	WeMo Switch	Wink: Egg Minder	Wink: Nimbus
Wink: Pivot Power Genius	Wink: Porfolio	Wink: Spotter	Withings	WordPress	Yahoo! Fantasy Sports
Yammer	YouTube				

## Popular Automatic Recipes



**Email my mechanic when the check engine light comes on**

by [automatic](#) on Feb 20, 2014

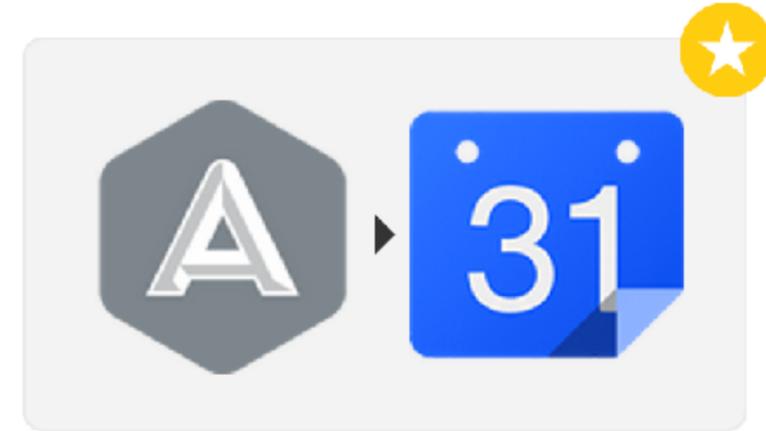
89 uses 6 favorites



**Turn my house lights on when I get home**

by [automatic](#) on Feb 25, 2014

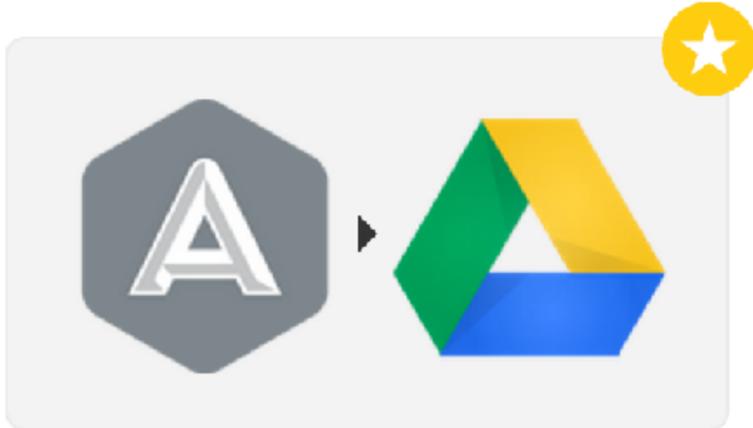
69 uses 16 favorites



**Log your vehicle's check engine light codes to Google Calendar**

by [automatic](#) on Feb 20, 2014

411 uses 41 favorites



**Log all of my trips to a Google spreadsheet**

by [automatic](#) on Feb 20, 2014

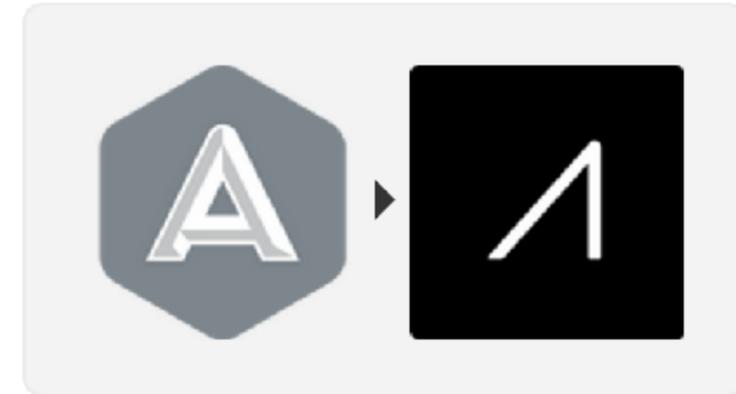
2,171 uses 217 favorites



**Add an iOS reminder when my check engine light comes on.**

by [automatic](#) on Feb 20, 2014

343 uses 28 favorites



**Show my trip summary on Google Glass**

by [automatic](#) on Feb 20, 2014

38 uses 7 favorites

motivation

**service entanglements**

approach

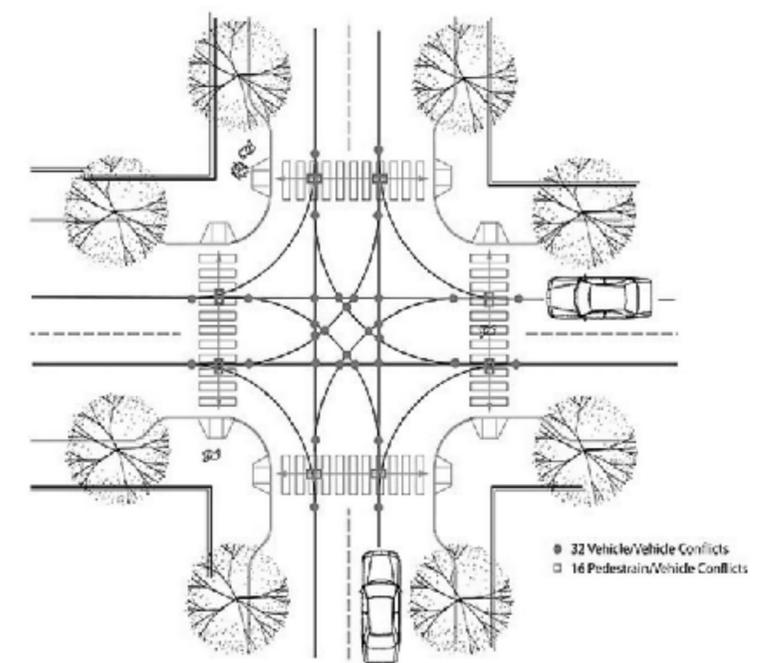
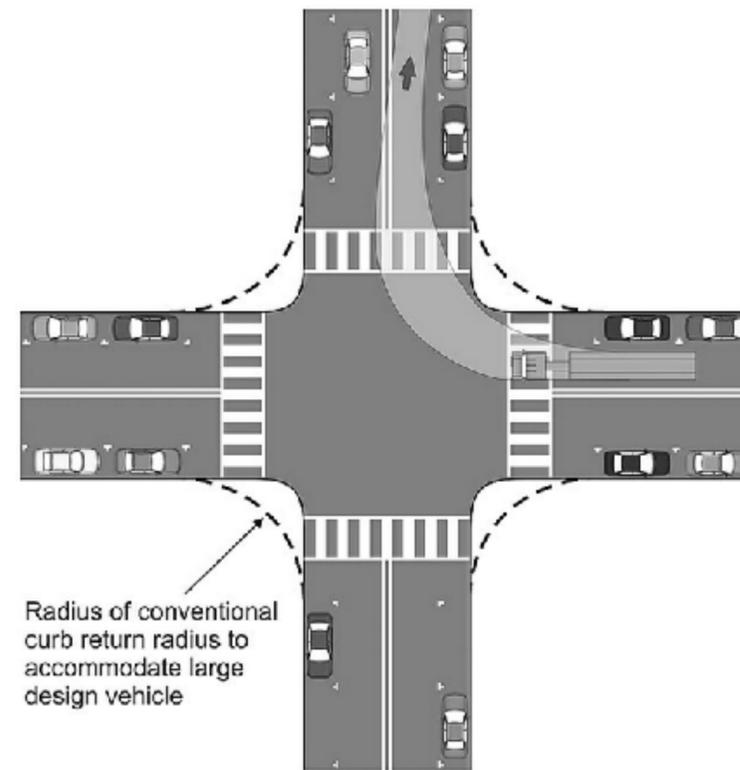
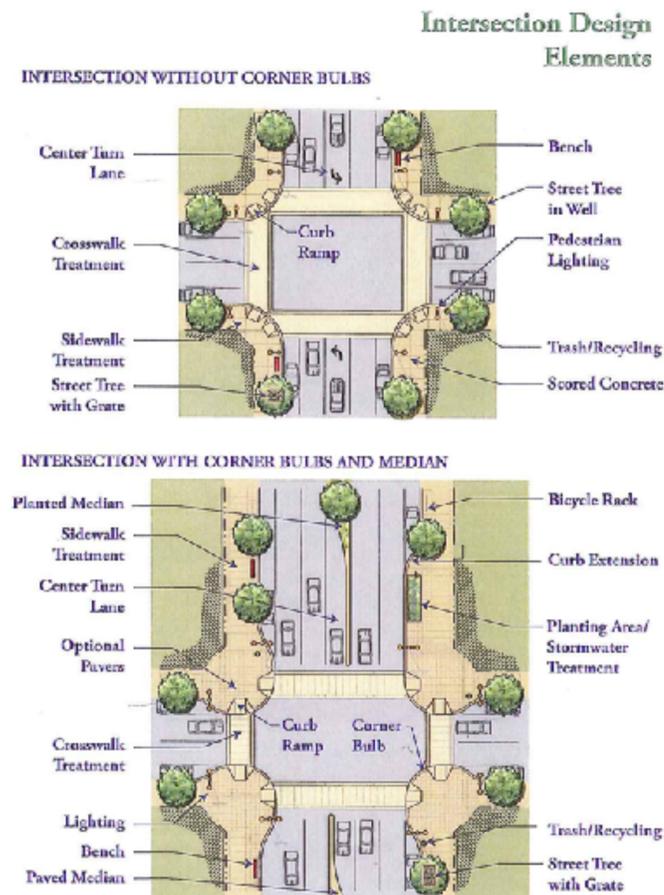
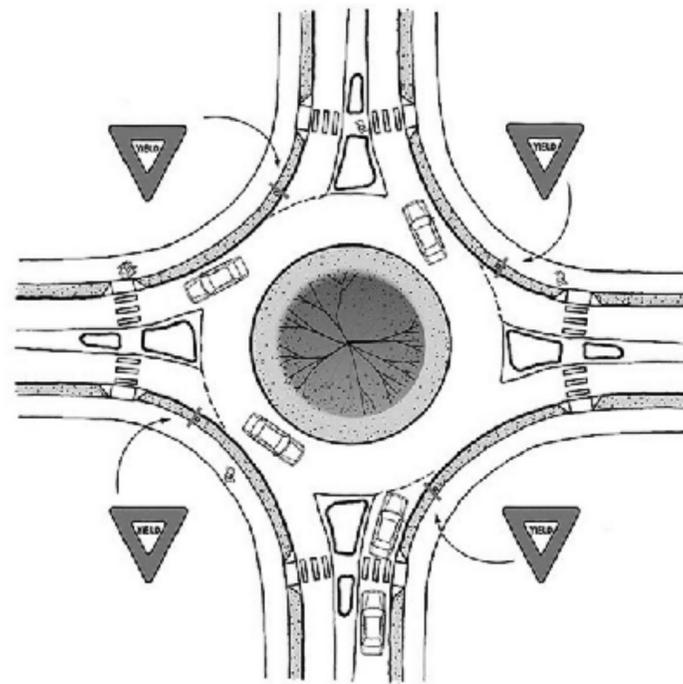
interviews

workshops

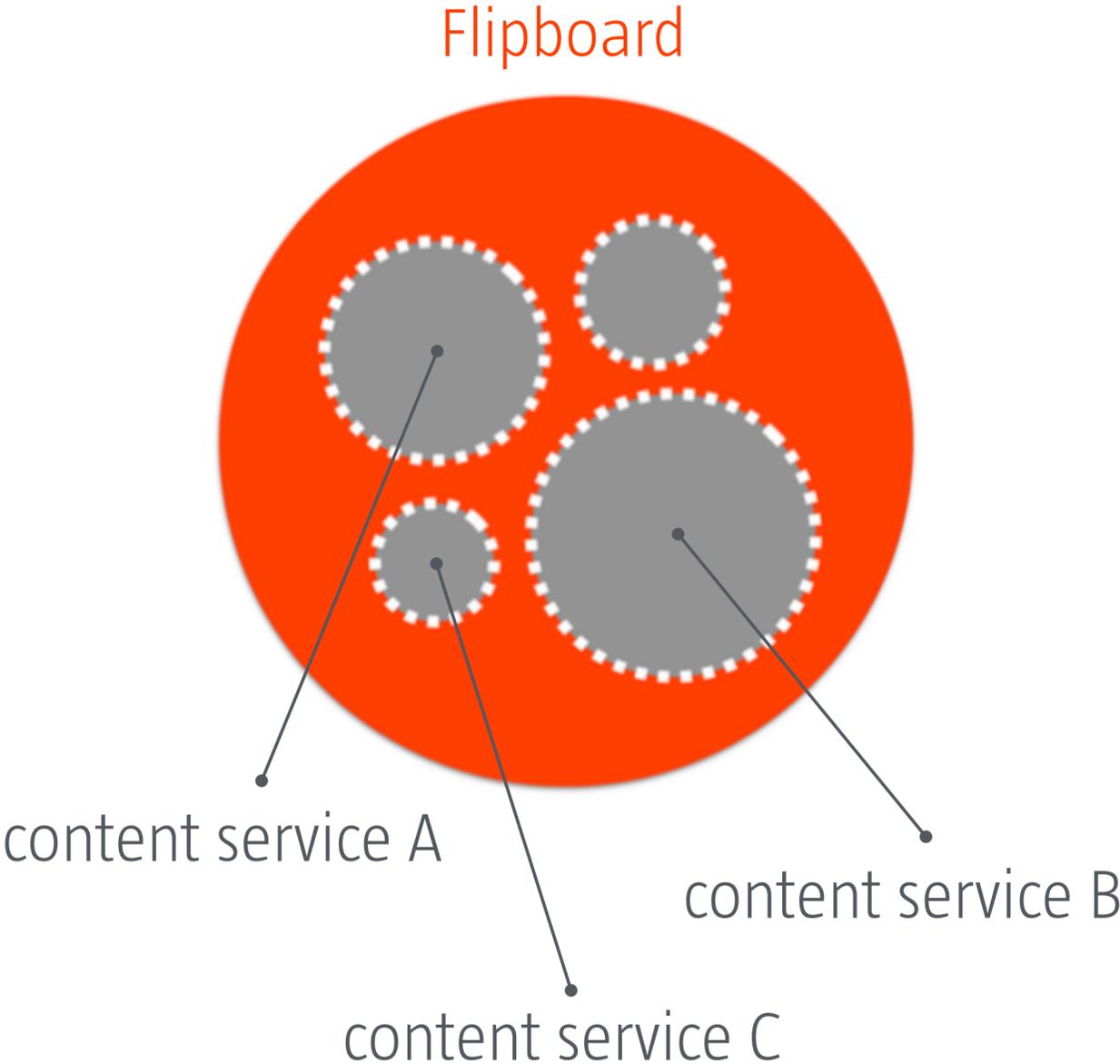
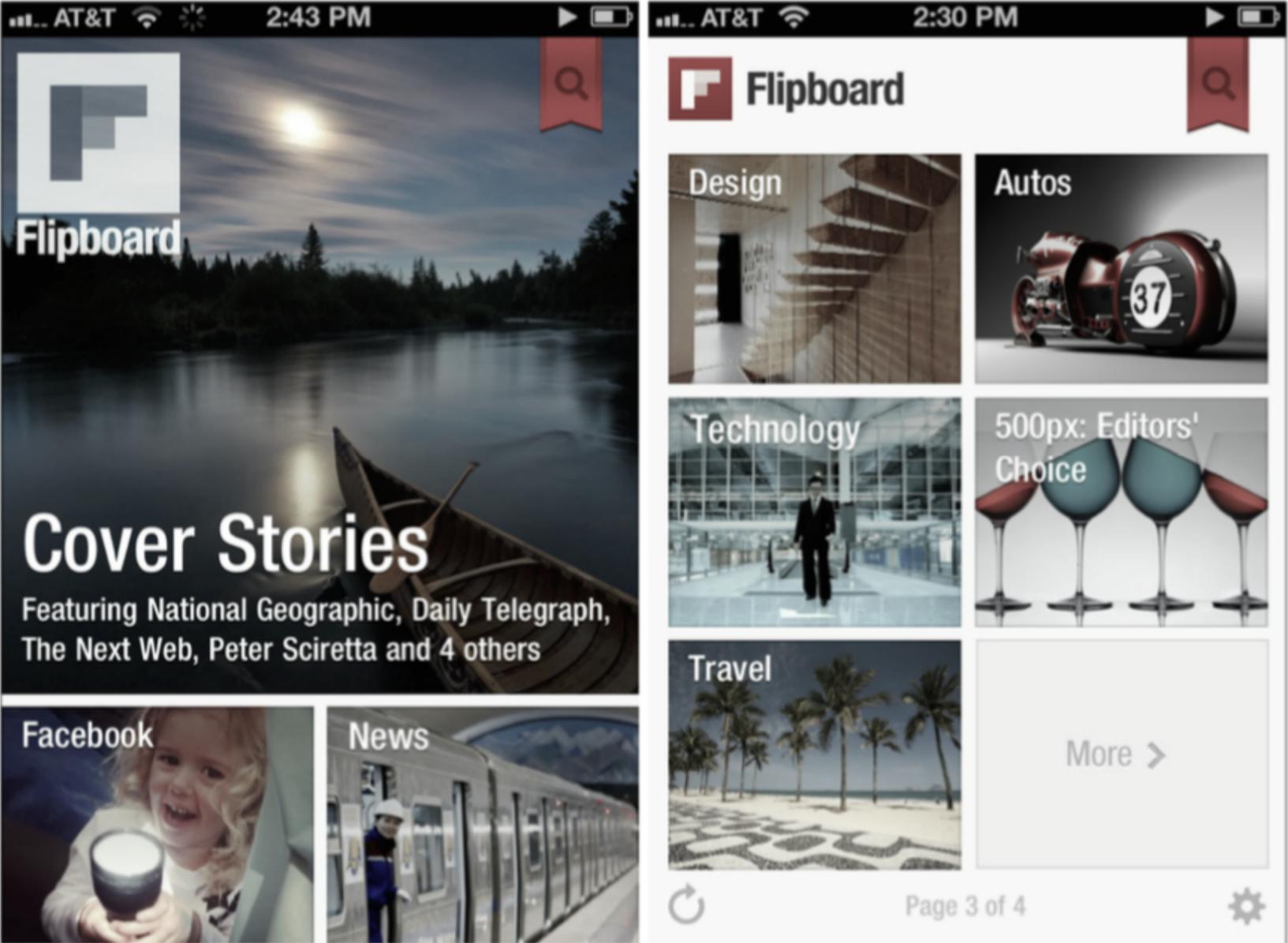
discussion

# Service Entanglements

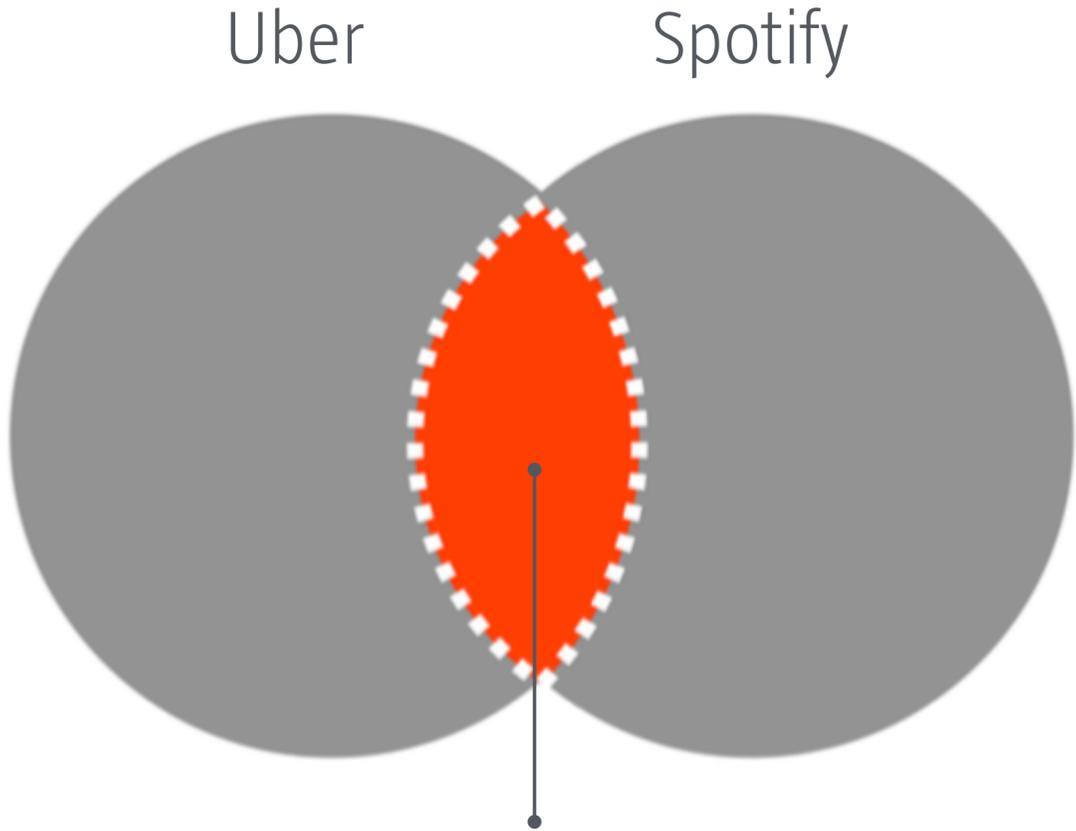
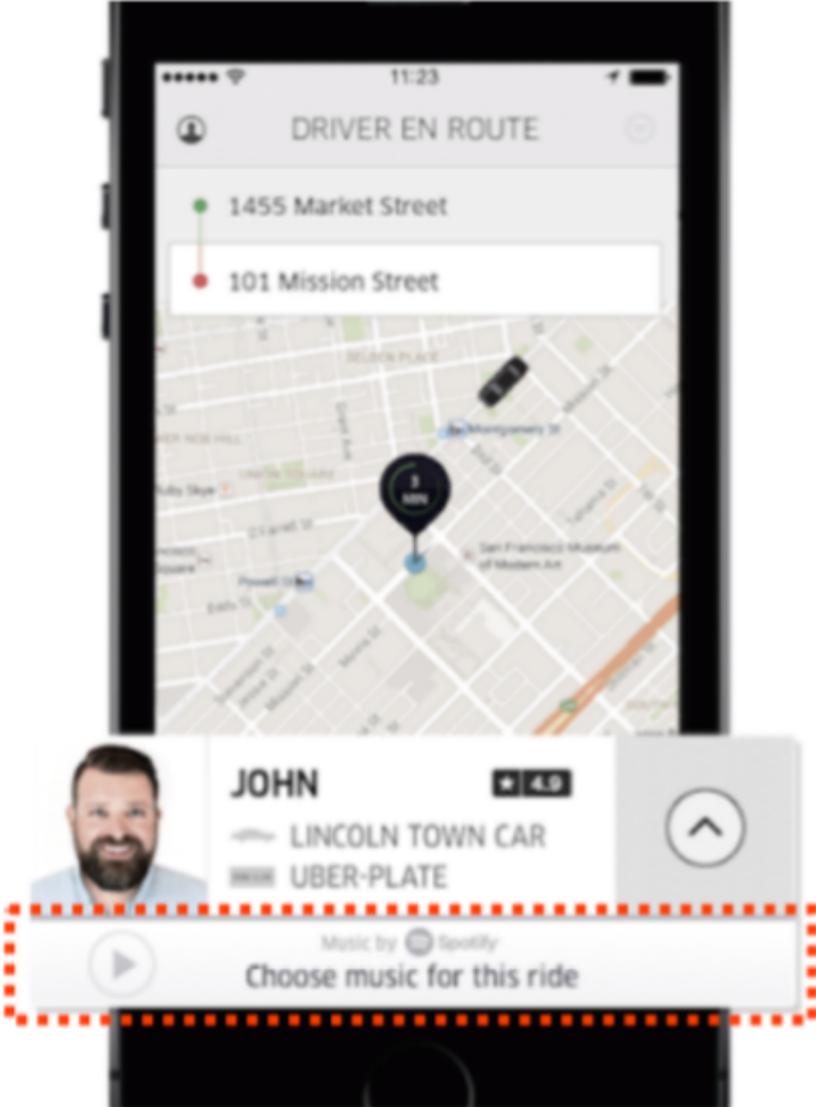
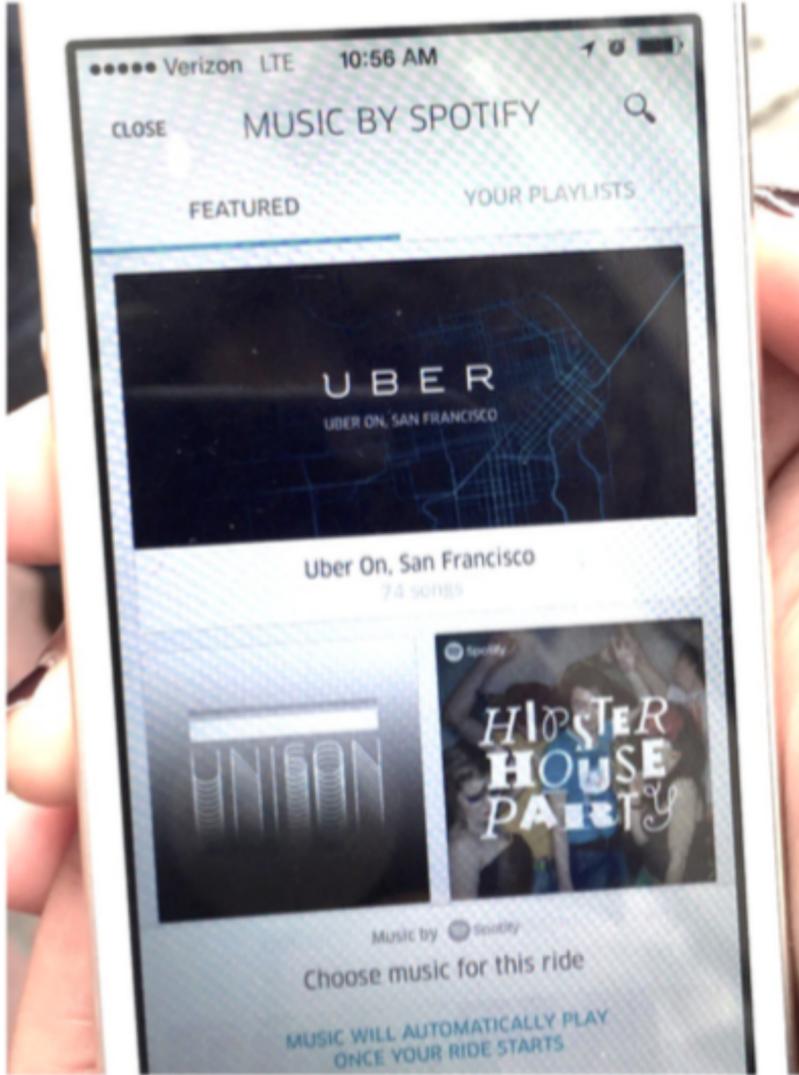
- interrelationships between multiple service systems
- entangled services co-produce an experience and a value flow
- not all values and experiences from Service Entanglement are positive  
*: because entangled services are not designed to be a single system*



# Entangled Services: dependent relationship



# Entangled Services: featuring relationship



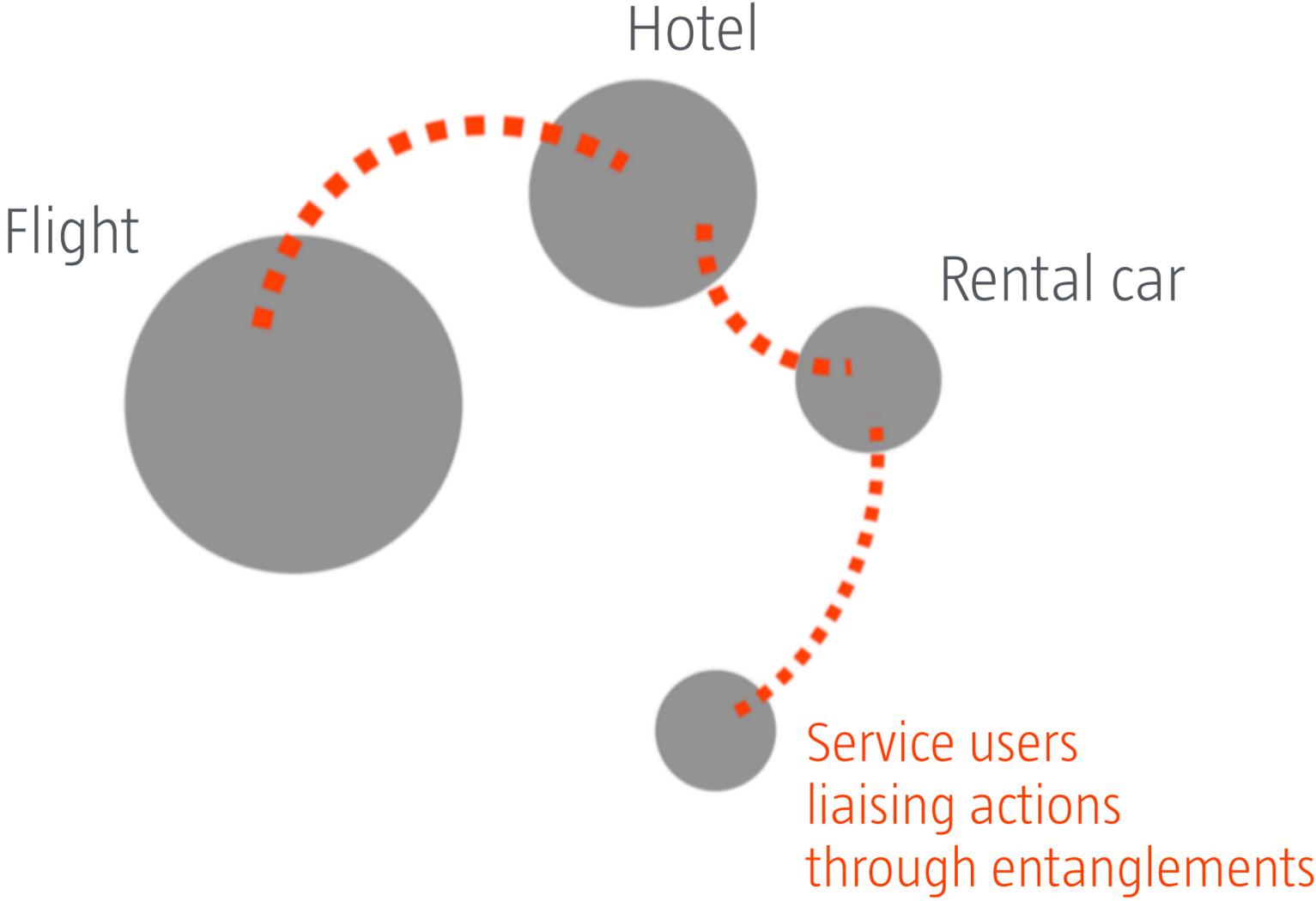
Listening my Spotify music within Uber system

# Entangled Services: liaising relationship

The screenshot shows the priceline.com website interface. At the top, there are navigation tabs for Flights, Hotels, Cars, Packages, and Cruises. Below these is a 'Flight Confirmation' section with a 'Print Itinerary' and 'Email Itinerary' button. A red dashed box highlights the 'Hotel Deals' and 'Add a Rental Car' sections. The 'Hotel Deals' section lists four hotels in Los Angeles with their respective prices and ratings. The 'Add a Rental Car' section shows three car categories: Economy Car, Compact Car, and Mid-Size Car.

Hotel Name	Location	Rating	Price (From)
La Quinta Inn ...	Los Angeles	3 stars	\$155.57
Crowne Plaza Los ...	Los Angeles	3.5 stars	\$184.95
Sheraton Gateway ...	Los Angeles	3.5 stars	\$189.86
Custom Hotel	Los Angeles	3 stars	\$191.22

Car Category	Price (From)
Economy Car	From \$155.57
Compact Car	From \$184.95
Mid-Size Car	From \$189.86



A systems approach for the service entanglements – ecology framings

**Soft Systems Methodology** (Checkland, 1989)

- analysis of complex situations where there are divergent views about the definition of the problem
- attempts to resolve “soft problems” where the boundary and structure of problematic situations are fuzzy and not clear

**Information ecology** (Nardi and O’Day, 2001)

- a system of people, practices, values, and technologies in a particular local environment
- in Information ecologies, the spotlight is not on technology, but on human activities that are served by technology

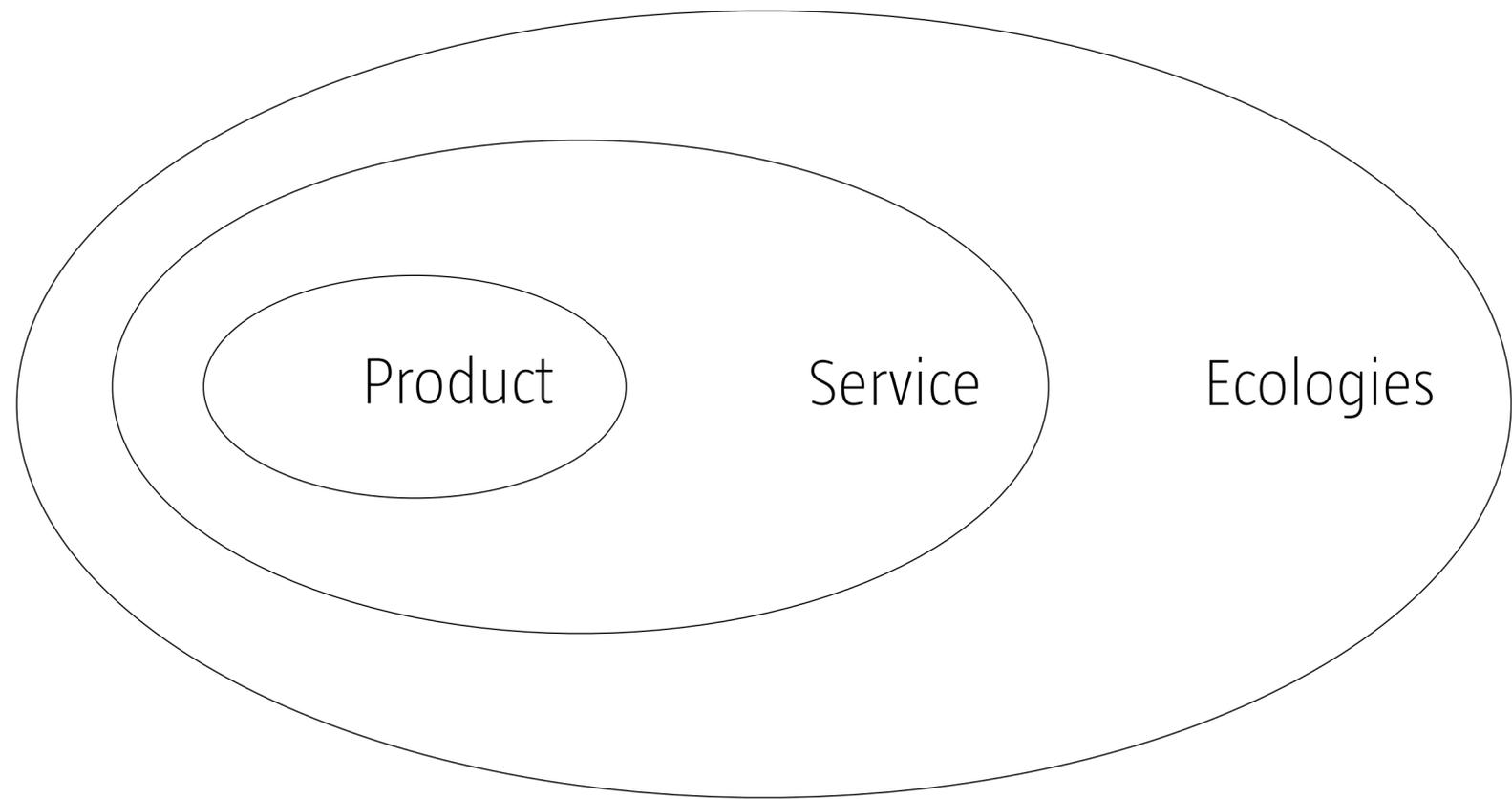
**Ecologies of Artifacts** (Jung, Stolterman, Ryan, Thompson and Siegel, 2008)

- a study of how interactive devices interconnect within a personal life

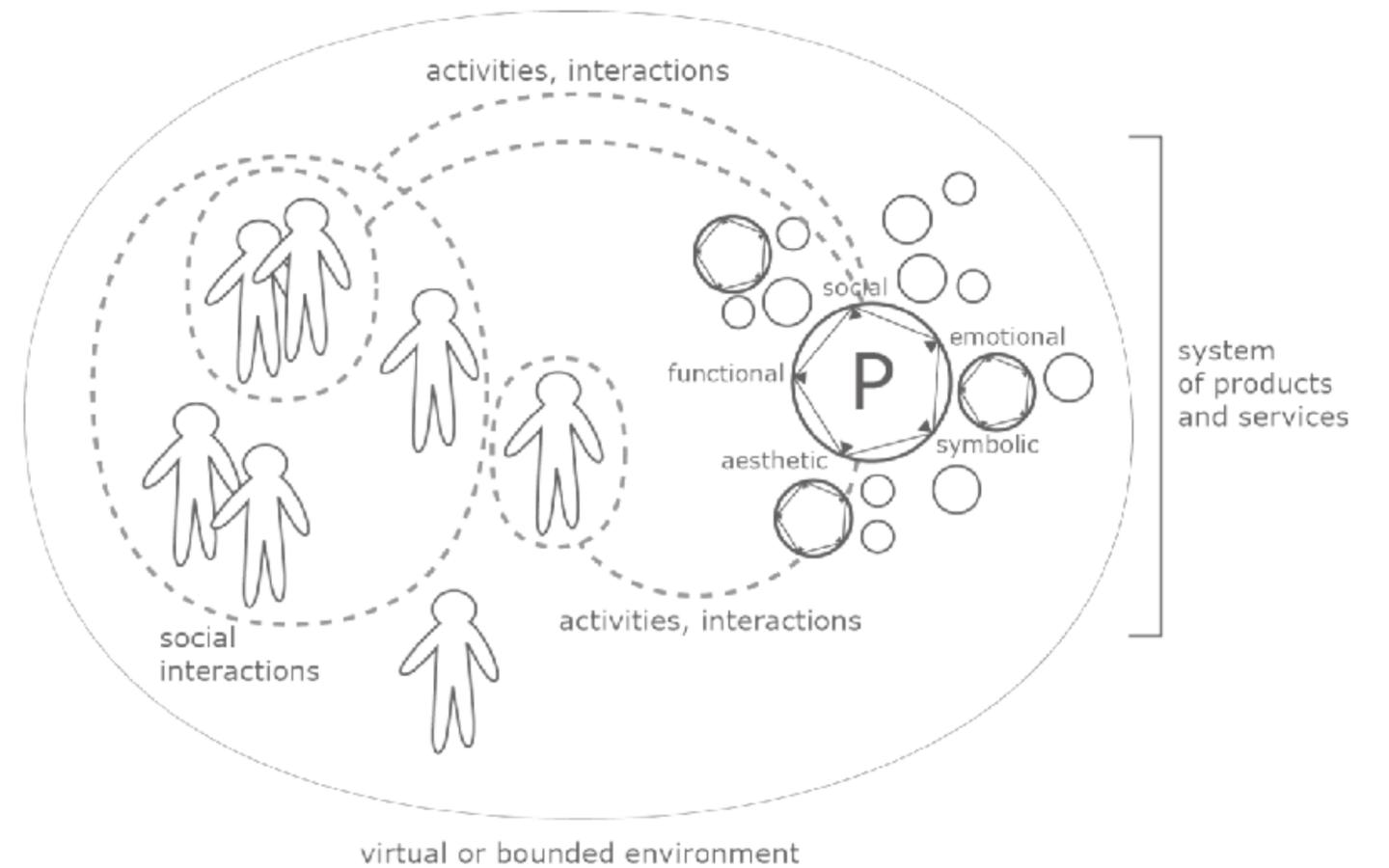
# A systems approach for the service entanglements – ecology framings

## **Product Service Ecology** (Forlizzi, 2007, 2013)

- the system of products and services is the central unit of analysis
- dimensions of the products and services within the system help describe how social behavior evolves within the system



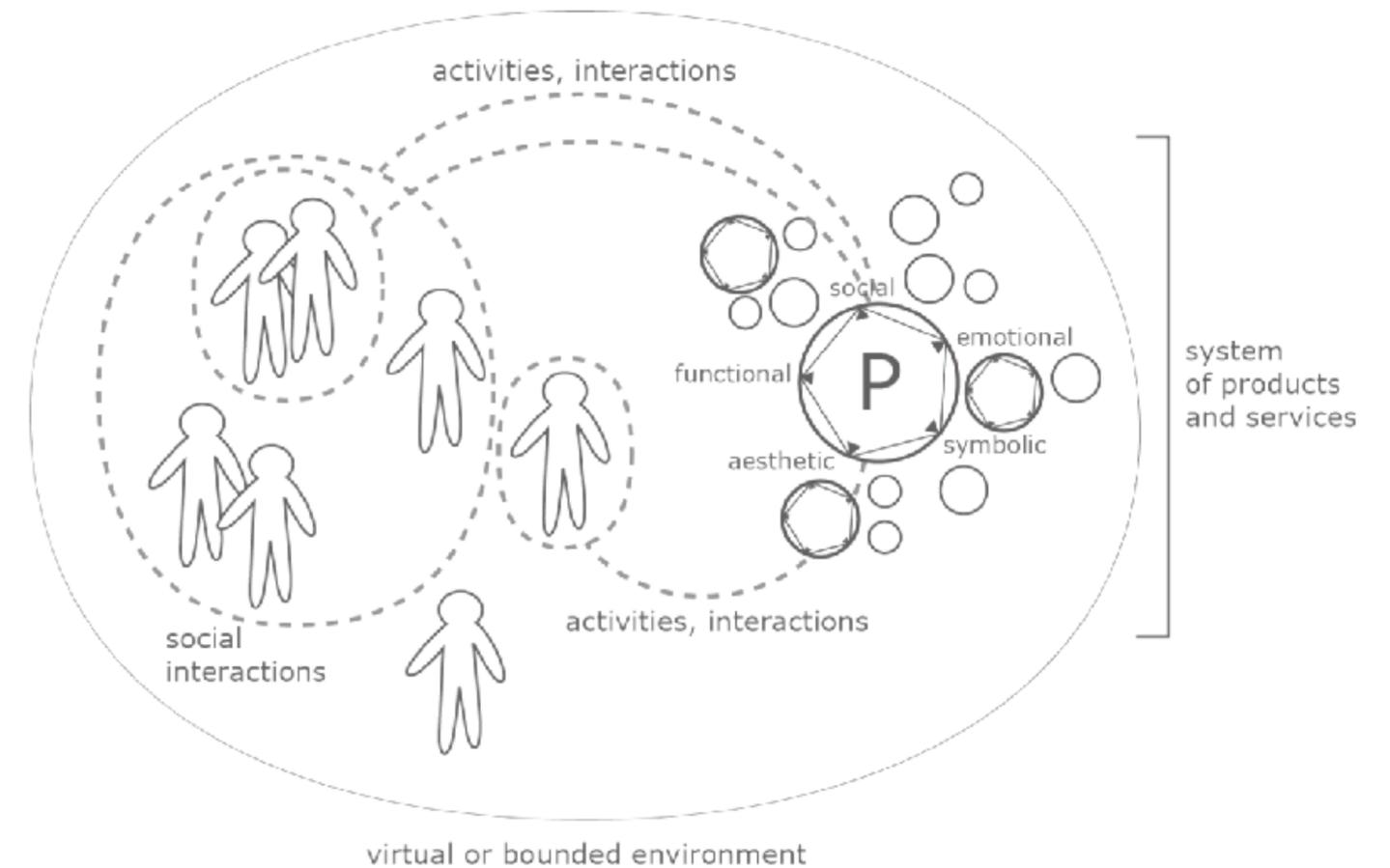
Dubberly (2013)



Forlizzi (2007, 2013)

## Product Service Ecology: Benefits

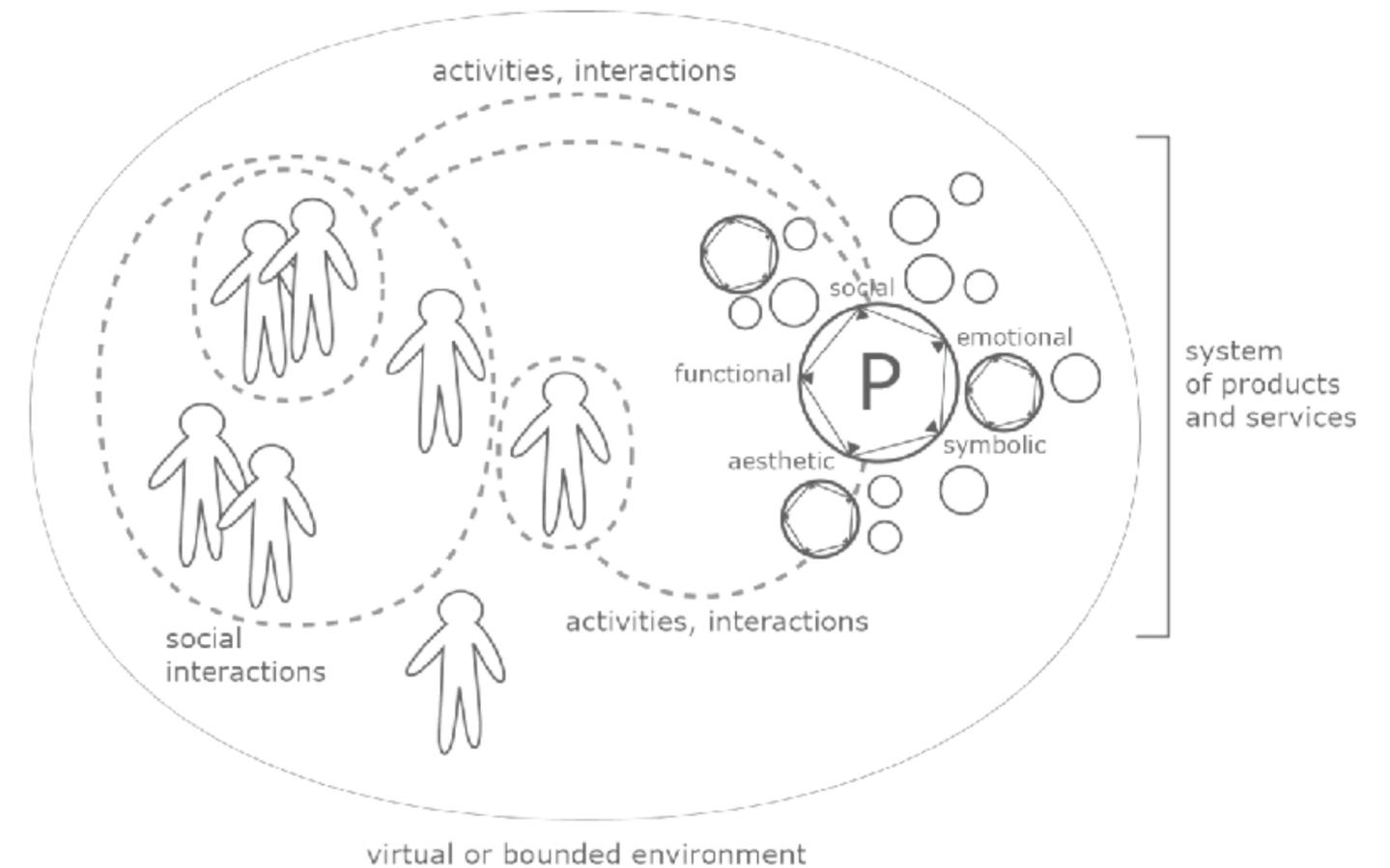
- Understand how problematic situations are linked to the physical and social environment in which they take place
- Consider the broader implications of the solution to be put into place
- Train designers in using their judgment in rectifying a problematic situation



# A systems approach for the service entanglements – ecology framings

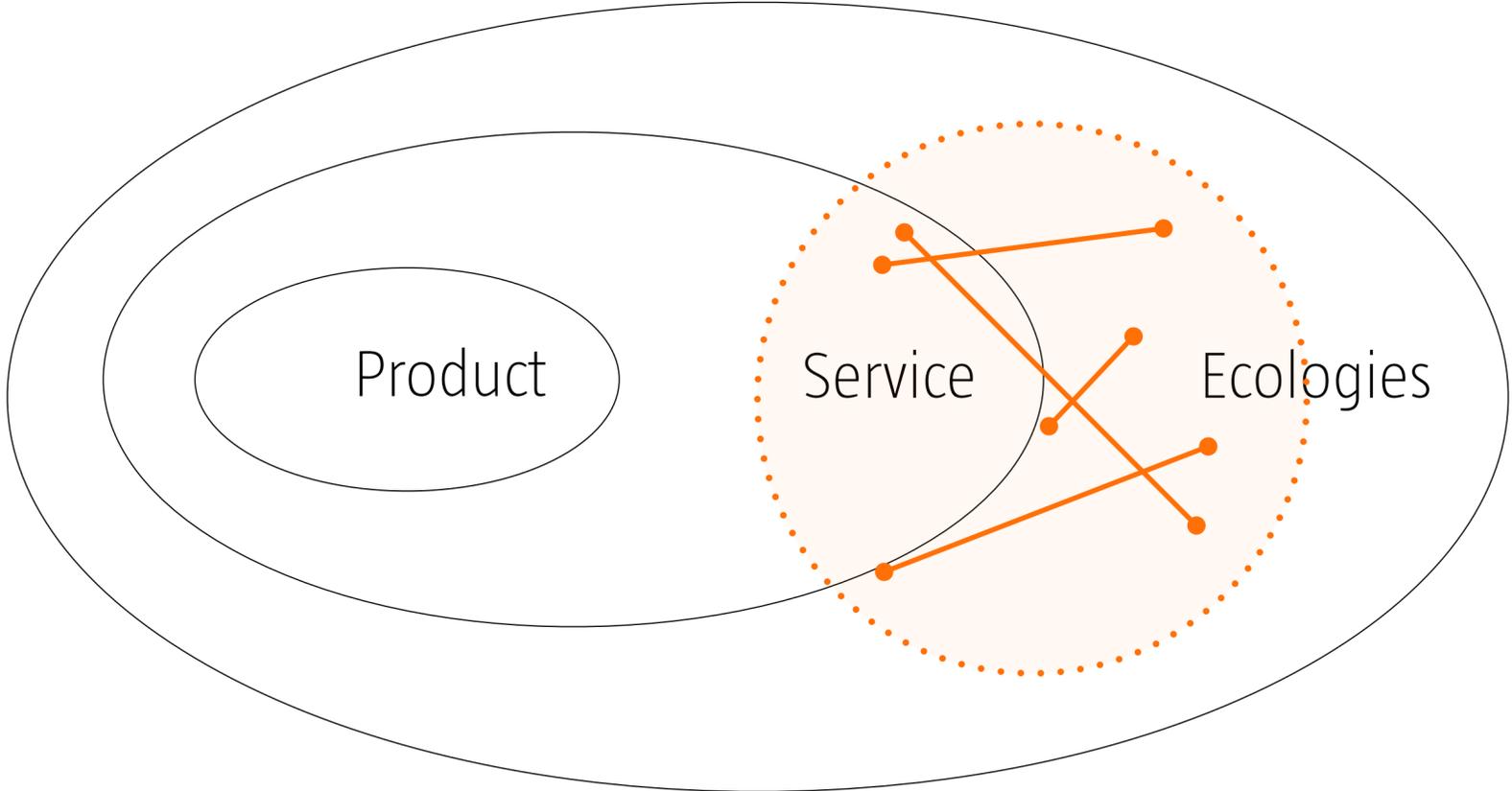
## Product Service Ecology: Approach

- Bridge conventional scientific and design disciplines
- Create a meta design, not a design of one product or system
- Focus on creating value
- Leverage approaches and models from service design

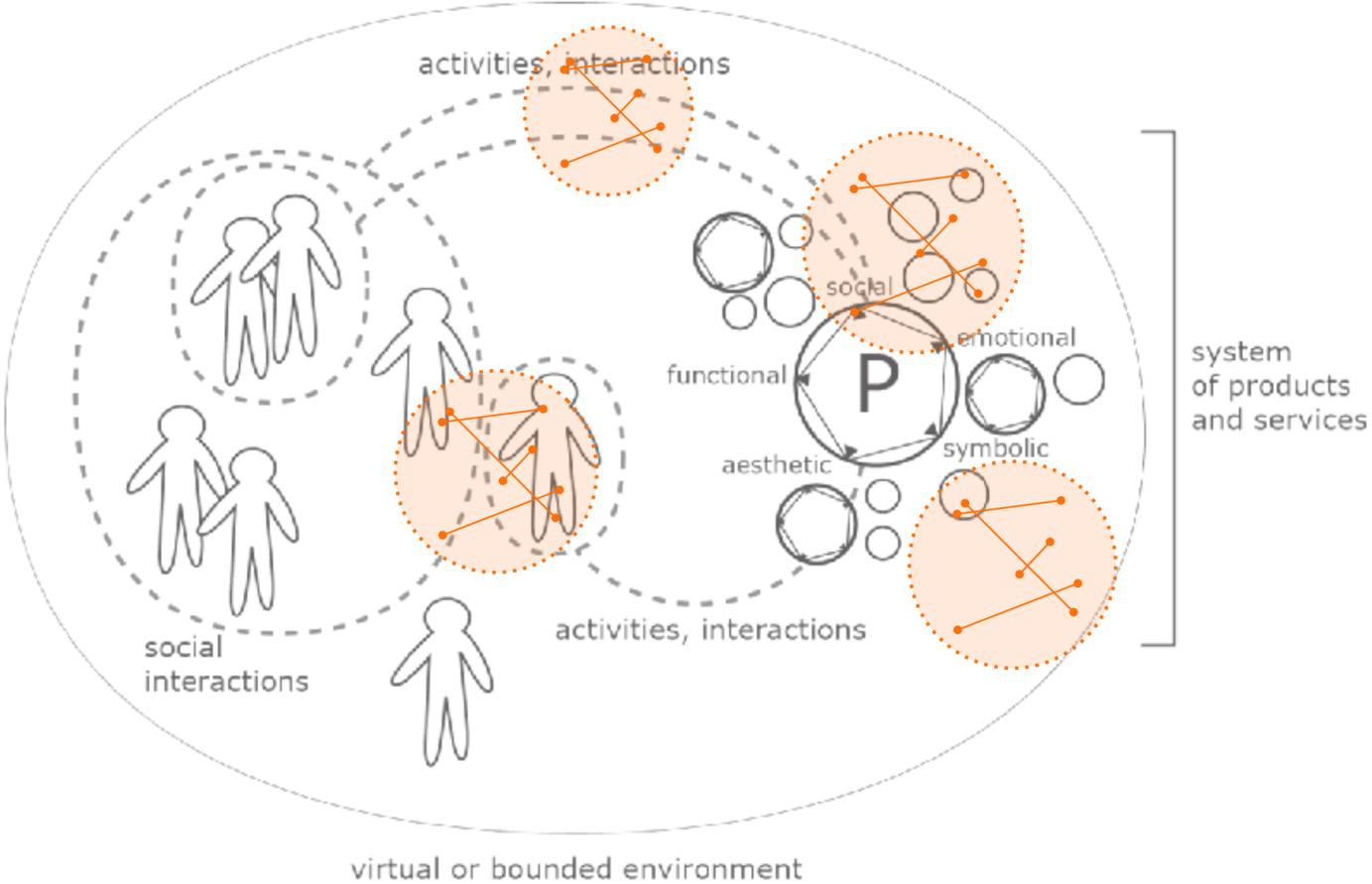


A systems approach for the service entanglements – ecology framings

# Service Entanglements



Dubberly (2013)



Forlizzi (2013)

motivation

service entanglements

**approach**

interviews

workshops

discussion

## **understanding service entanglements**

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interviews

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7 senior design consultants  
11 senior in-house designers

## **liquefying service entanglements**

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co-design workshops with exploratory tools

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5 co-design workshops with 9 design + HCI students

motivation

service entanglements

approach

**interviews**

workshops

discussion

## in-house design

	domain of service	role
P1	Internet of Things (IoT)	Co-founder and CEO
P2	Healthcare Provider (General Hospital)	Senior Service Designer
P3	Healthcare Device and Solution Manufacturing	Senior Service Design Consultant
P4	Social Commerce	VP, Global Design Group
P5	Internet Search	Interaction Designer
P6	Personal Wellness Product and Service	Senior Product Designer
P7	Social Network	Product Designer
P8	Mobile Public Transportations	Senior UX Designer
P9	Online Marketplace for Accommodations	Interaction Designer
P10	Internet Search	Interaction Designer
P11	Public Library	Executive Director

## professional design firm

	company	role
P12	Independent Consulting	Owner, Interaction Designer
P13	Experience Design Consulting	Design Director
P14	Social Innovation Design Education	Founder
P15	Innovation Strategy Consulting	Managing Partner
P16	Design Consulting A, SF	Interaction Design Director
P17	Design Consulting A, Austin	Experience Design Director
P18	Design Consulting B, Chicago	Interaction Design Lead

## a. growing needs for understanding influences of external systems

“ It is challenging because it (designing healthcare solutions for general hospitals) involves larger stakeholders. We need to know regulations, policies, and stakeholders’ strategic positions to the current changes in healthcare. It requires design team quick design decision-making because there are so many uncertainties. It causes extra iterations in design execution because we don’t know what will exactly happen in the complex landscape.”

– P8 (service design, healthcare solutions)

## b. systems orientation to tame interdependencies with internal/external systems

“ What third party application information to be displayed in the Timeline was **defined in meetings with product managers in charge of partnerships with the application categories**. We had a lot of discussions on how much and what kind information from music or game apps we want to show in relation to portions of personal postings. ”

– P4 (interaction design, social media)

## b. systems orientation to tame interdependencies with internal/external systems

“ API level design features should be more consciously designed, rather than engineered day to day. At first it didn't seem to be important. But I realized when you really want to design the whole experience well, you need to envision high-level future of how our systems should interface with our third party applications right.”

- P7 (product and interaction design, wearable solutions)

### c. designing for multiple systems has not been a conventional design practice

“ Working tightly with the Customer Support team was very helpful for identifying important interdependencies that would rise in the future. It helped me think of impacts when changes made by customers or hosts. **Voice of Customers glued many independent designs of customer-side and host-side into a seamless one – we found having CS team in our daily scrum very useful in this sense.** ”

– P1 (interaction design, online lodging marketplace)

c. designing for multiple systems has not been a conventional design practice

- maybe we need a new design approach to address the design issues from entanglements

“As we shift our focus from developing medical solutions to health solutions, **we found the hardest part we face everyday is capturing and resolving issues from interdependency of systems.** The interdependency lies in many different legacy (health information) systems, care practices, facilities and associated policies.”

– P9 (service design, healthcare provider)

motivation

service entanglements

approach

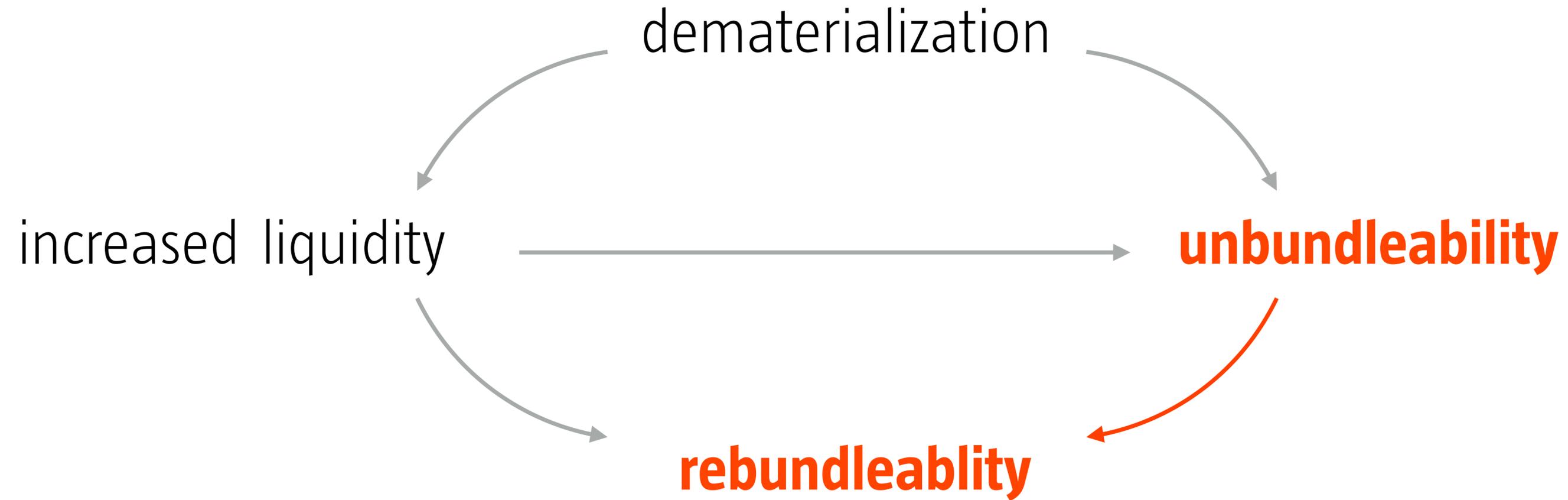
interviews

**workshops: liquefying service entanglements**

discussion



## key ideas in the co-design workshop design



## key ideas in the co-design workshop design

- a. meta-design: **sensitizing designers to the boundaries of multiple systems**
- b. enable **unbundling and rebundling** service systems through exploratory tools
- c. use **everyday material** than digital tools
- d. use **sample experience: travel** to other country

exploratory tools:  
a) Unbundling

**time**

start

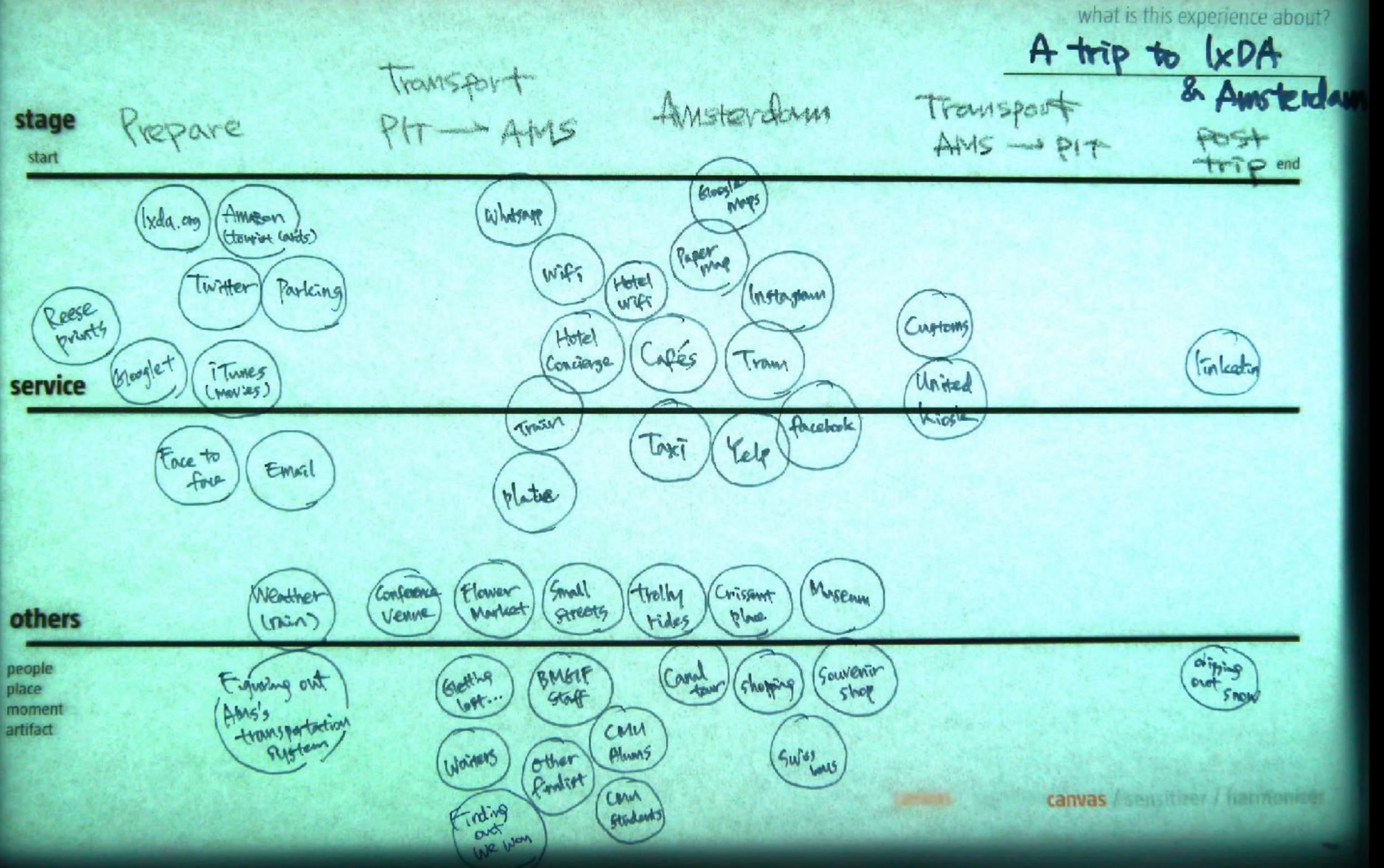
end

**services**

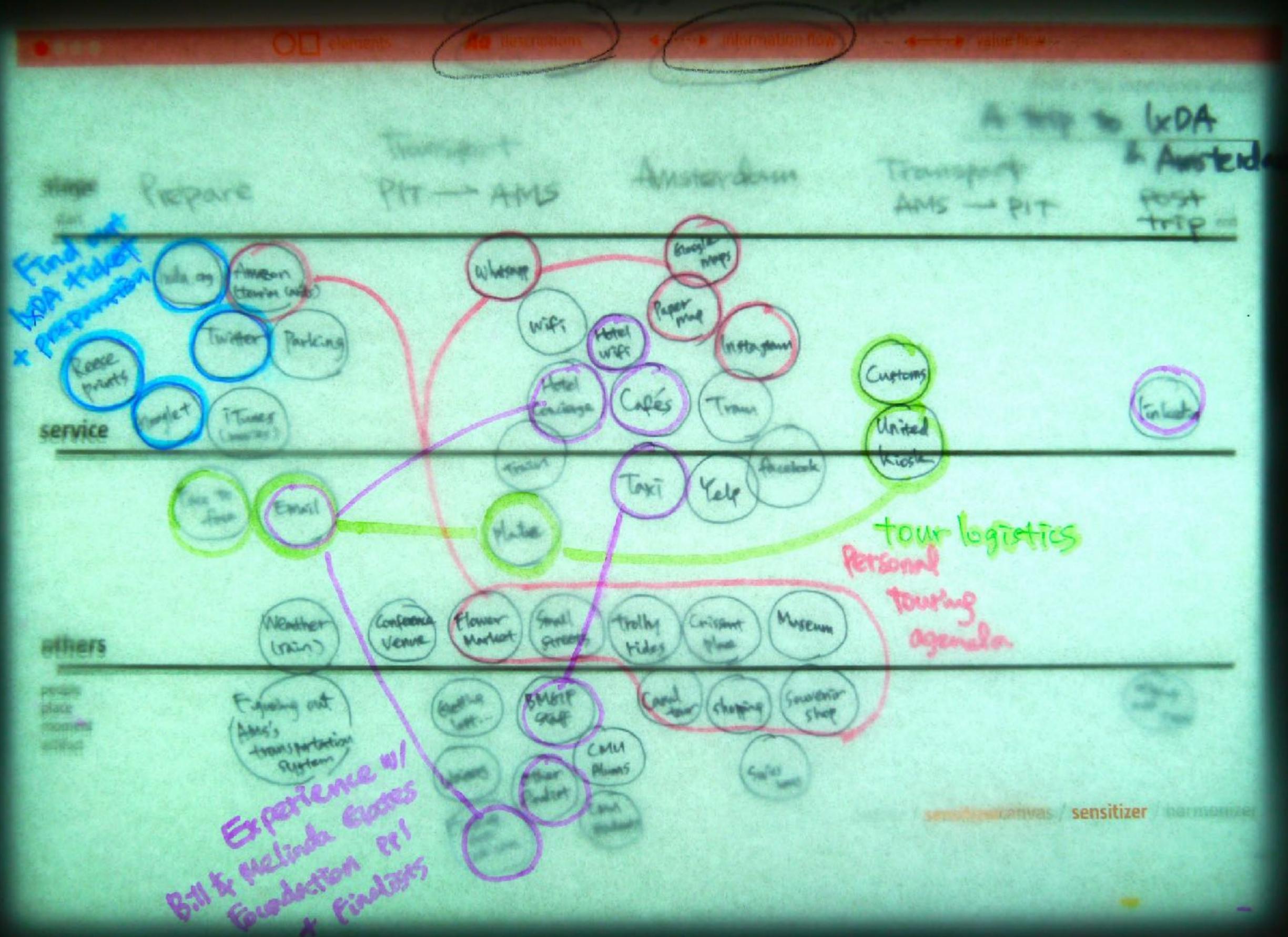
**others**

people  
place  
product

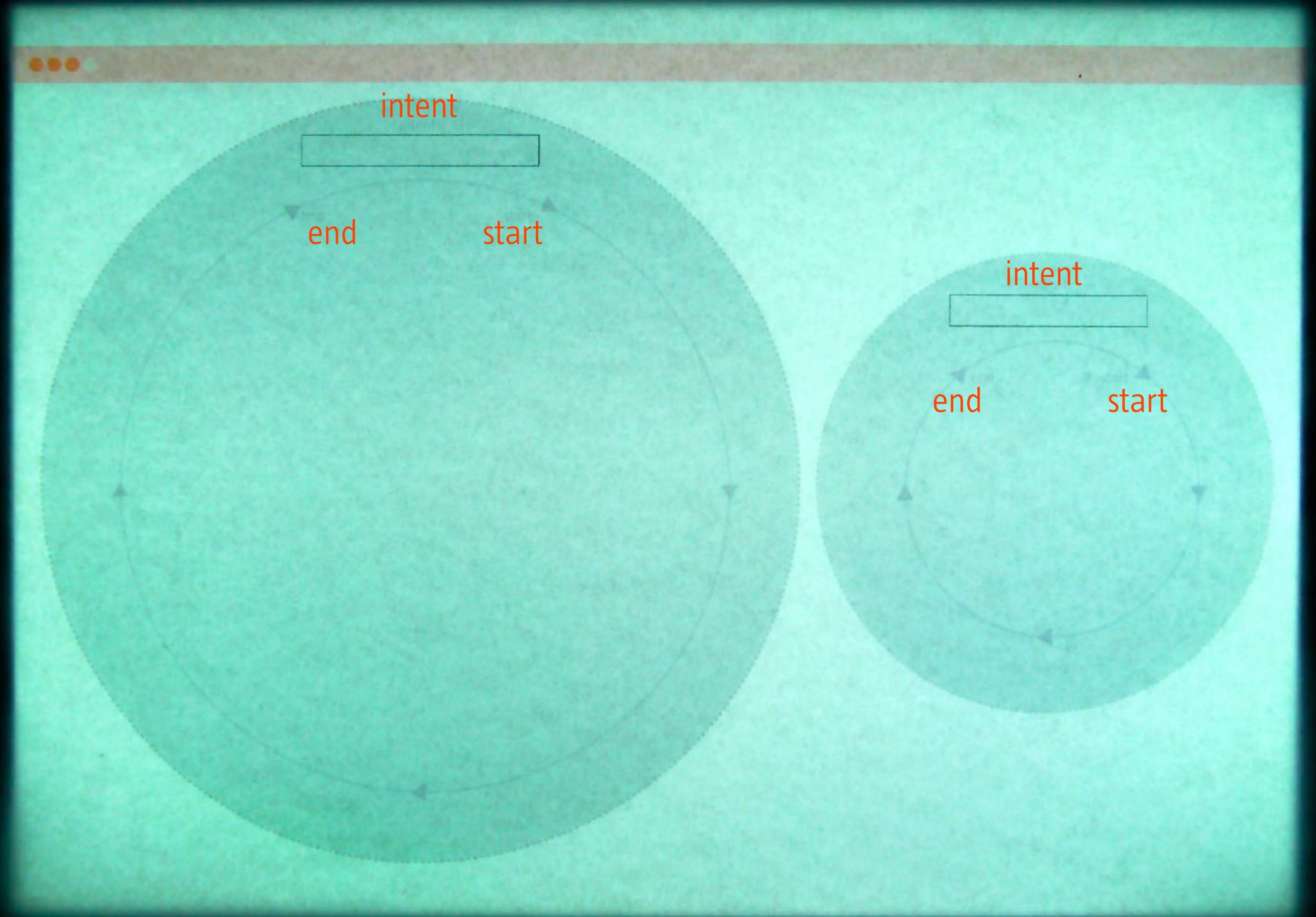
exploratory tools:  
a) Unbundling



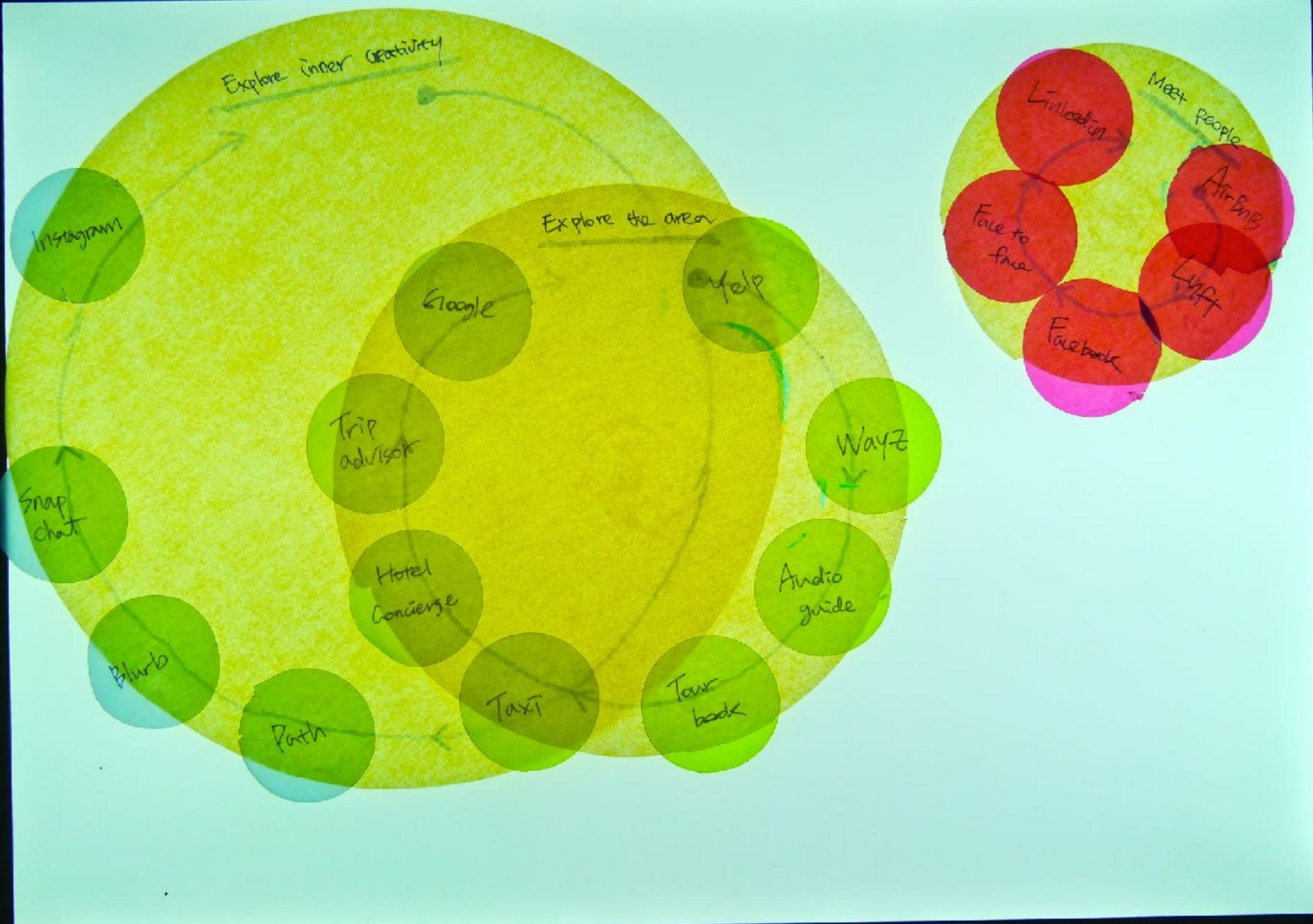
exploratory tools:  
a) Unbundling



exploratory tools:  
b) Rebundling



exploratory tools:  
b) Rebundling



exploratory tools:  
b) Rebundling



## co-design workshop

- 9 design + HCI students to recall their **recent travel experience**
- **deconstruct / reconstruct** a travel experience with services and other artifacts they interacted during the journey
- 90 minutes + take home // 5 sessions

## co-design workshop: participants

Session	Participants
W1	P1 (f, 26); HCI graduate student
W2	P2 (f, 25); Communication Design graduate student
W3	P3 (f, 28), P4 (f, 26), P5 (m, 25); Interaction Design graduate students
W4	P6 (m, 23); Product Design undergraduate student
W5	P7 (f, 28), P8 (f, 25); Interaction Design graduate students

## co-design workshop: activities

Activity	Average Time Spent
Introduction	5 min.
Decostructing	Solo: 40 min. / Group: 60 min.
Reconstructing	Solo: 20 min. / Group: 30 min.
Post-workshop interview	30 min.

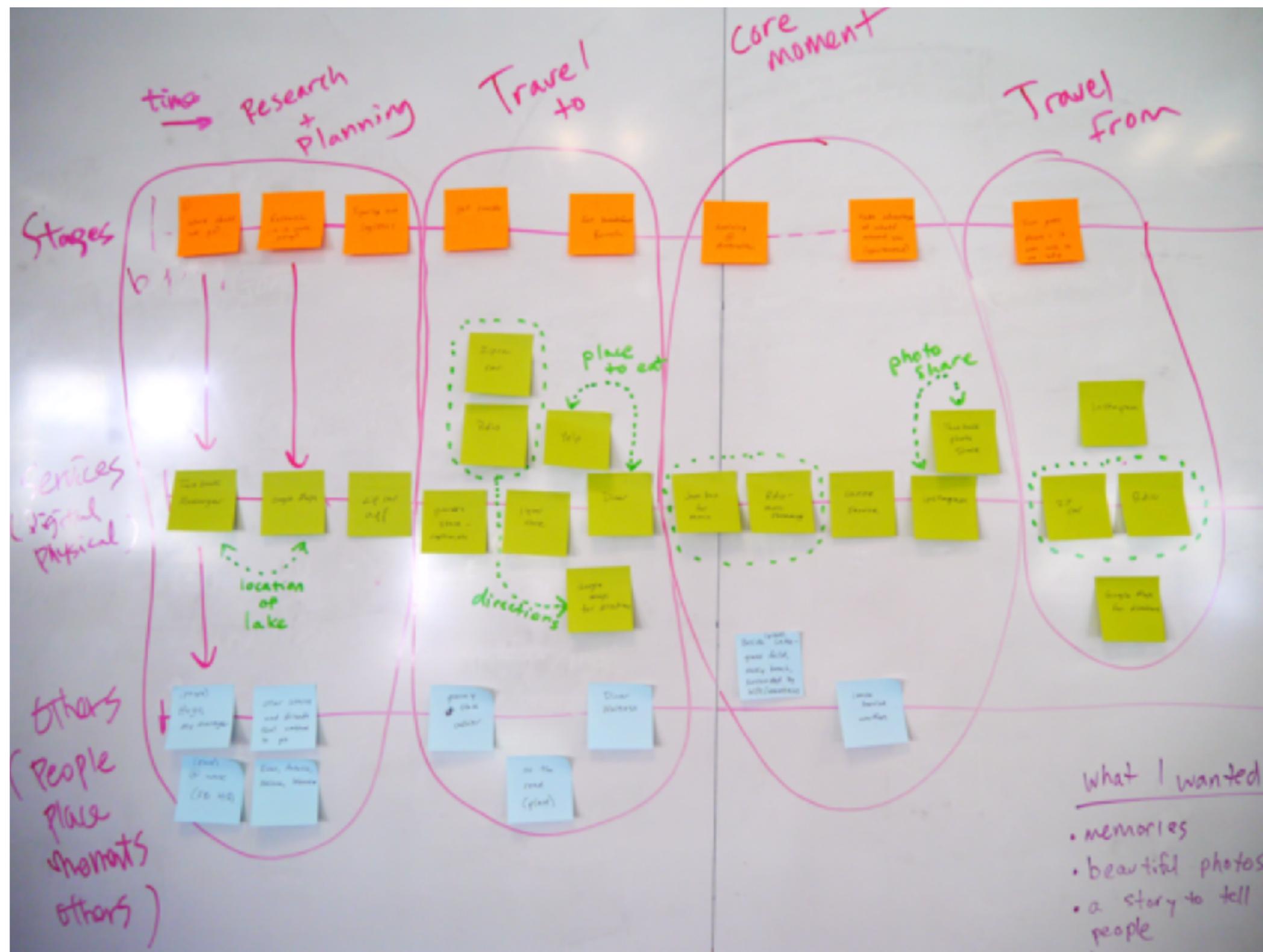
# co-design workshop: deconstructing with unbundler



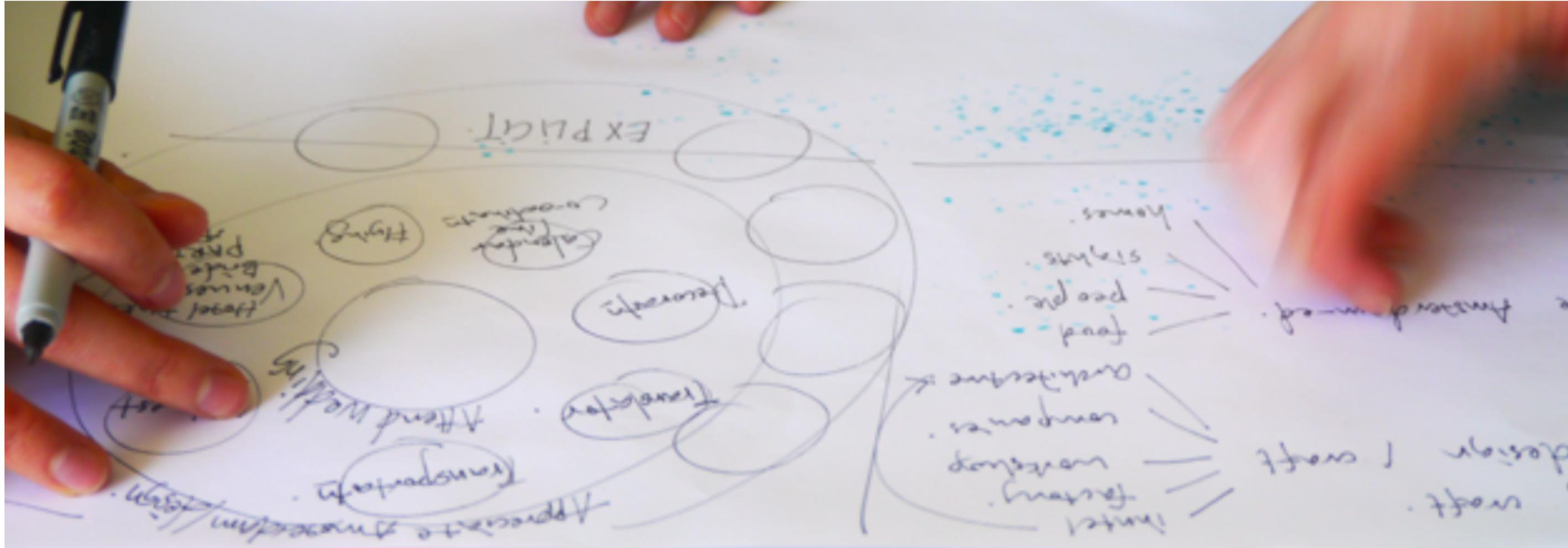
# co-design workshop: deconstructing with unbundler



# co-design workshop: deconstructing with unbundler



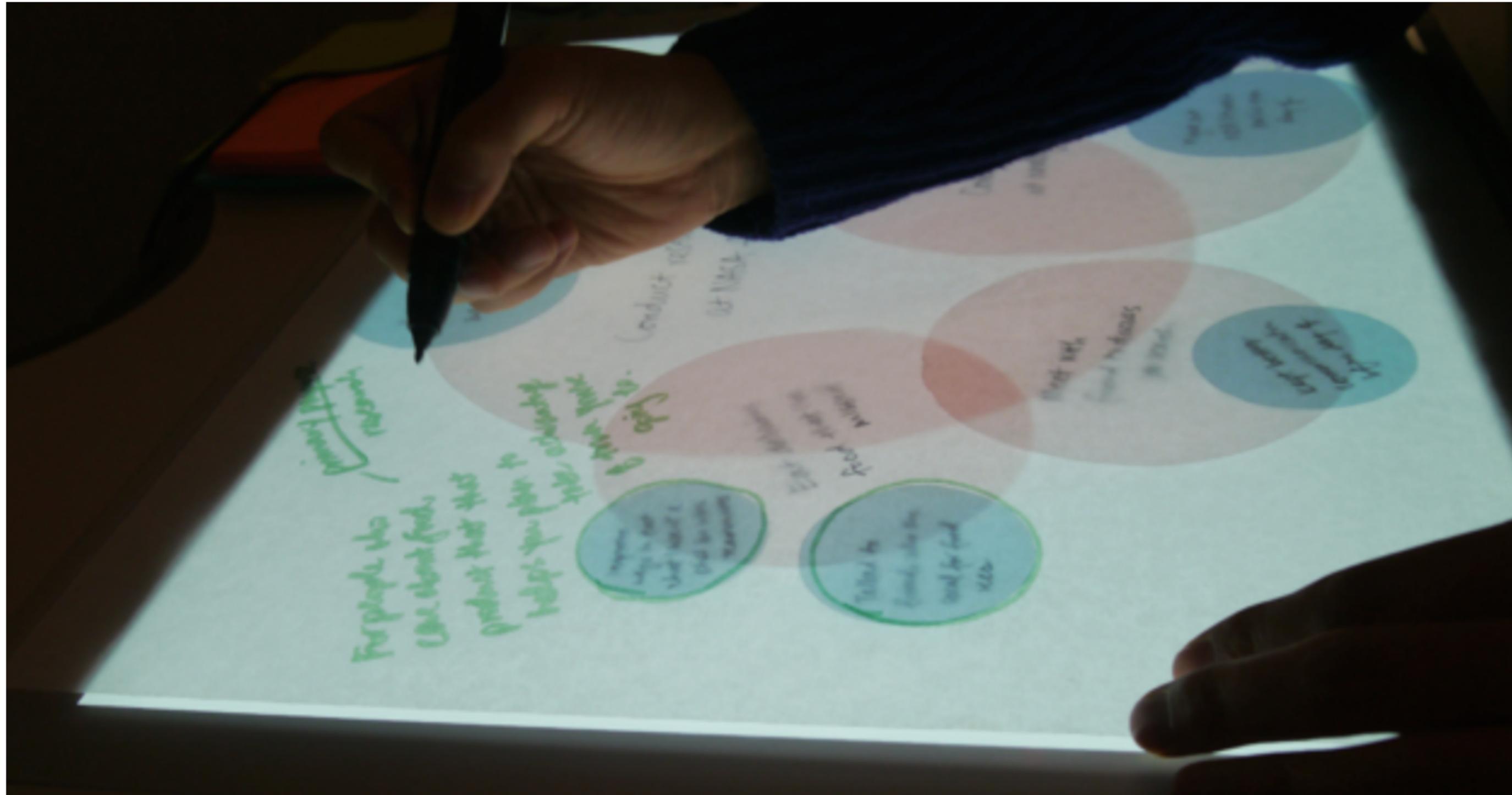
# co-design workshop: reconstructing with rebundler



# co-design workshop: reconstructing with rebundler



# co-design workshop: reconstructing with rebundler



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**workshop findings**

discussion





## a) Unbundling

### - successfully sensitized entangled services

P1: "I feel like everything was connected with Gmail and Google Calendar. It was a busy trip with teammates and there were lot of things to coordinate. When I found a lunch or dinner place at Yelp, I immediately turned on Google Calendar and put the info there so my teammates could know where I will be." – dependent services

P6: "(describing a line connecting Instagram and Faceook) We usually took photos with Instagram app. When I want to share pictures at my Facebook timeline, I used Facebook Photo sharing button in the Instagram." – featuring services

P2: "Including me, people traveled to IxDA used Whatsapp because it is free of charge. So this (Whatsapp) connects to Google Map and Calendar because we frequently exchanged our schedule and location info for where to eat, where we stay and where people are at during the conference." – liaising services

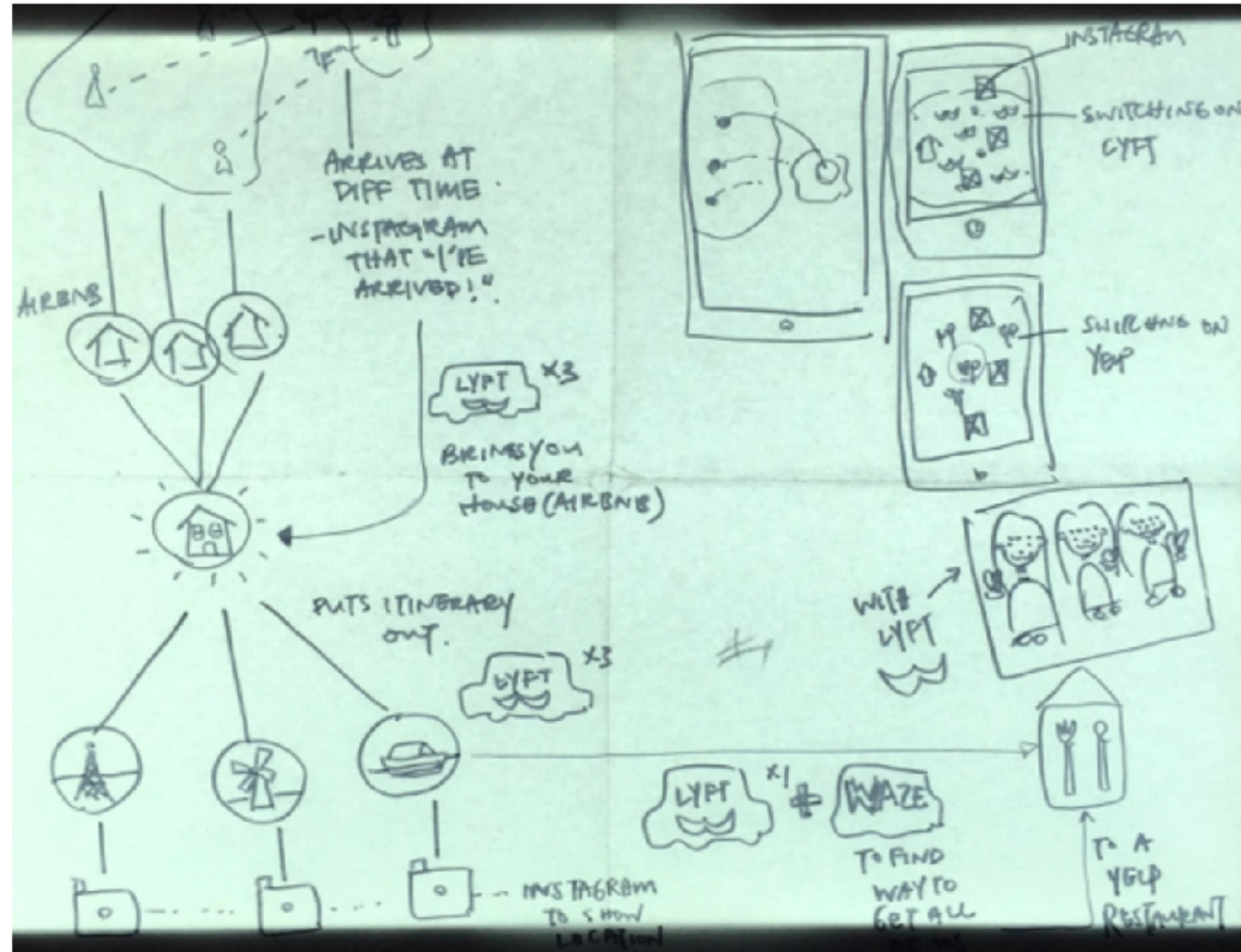
## b) Rebundling

(W4) In this rebundling, participant highlighted an interconnection of Rdio, a music streaming service and Zipcar, a rental car service



## b) Rebundling

(W5) Participant illustrated a rebundled future service concept integrating four services that are unbundled at the deconstructing activity



## b) Rebundling

- attached to the  
user-centered perspective

P1: "I want a calendar that automatically updates my status to all other services and team members. It can also give me wise recommendations of places to eat or visit. I don't want to use emails for doing this."

P4: "Sharing photos after trip was complicated. We created a sharing folder at Dropbox and three of us threw all photos we took there. I wanted to post some of photos we took at Facebook, not all of them. I had to switch between Dropbox and Facebook many times for this."

P5: "I feel like LinkedIn and IxDA conference websites can be more connected. I switched the LinkedIn App and the conference website a lot on my phone to get to know people I met during the conference day."

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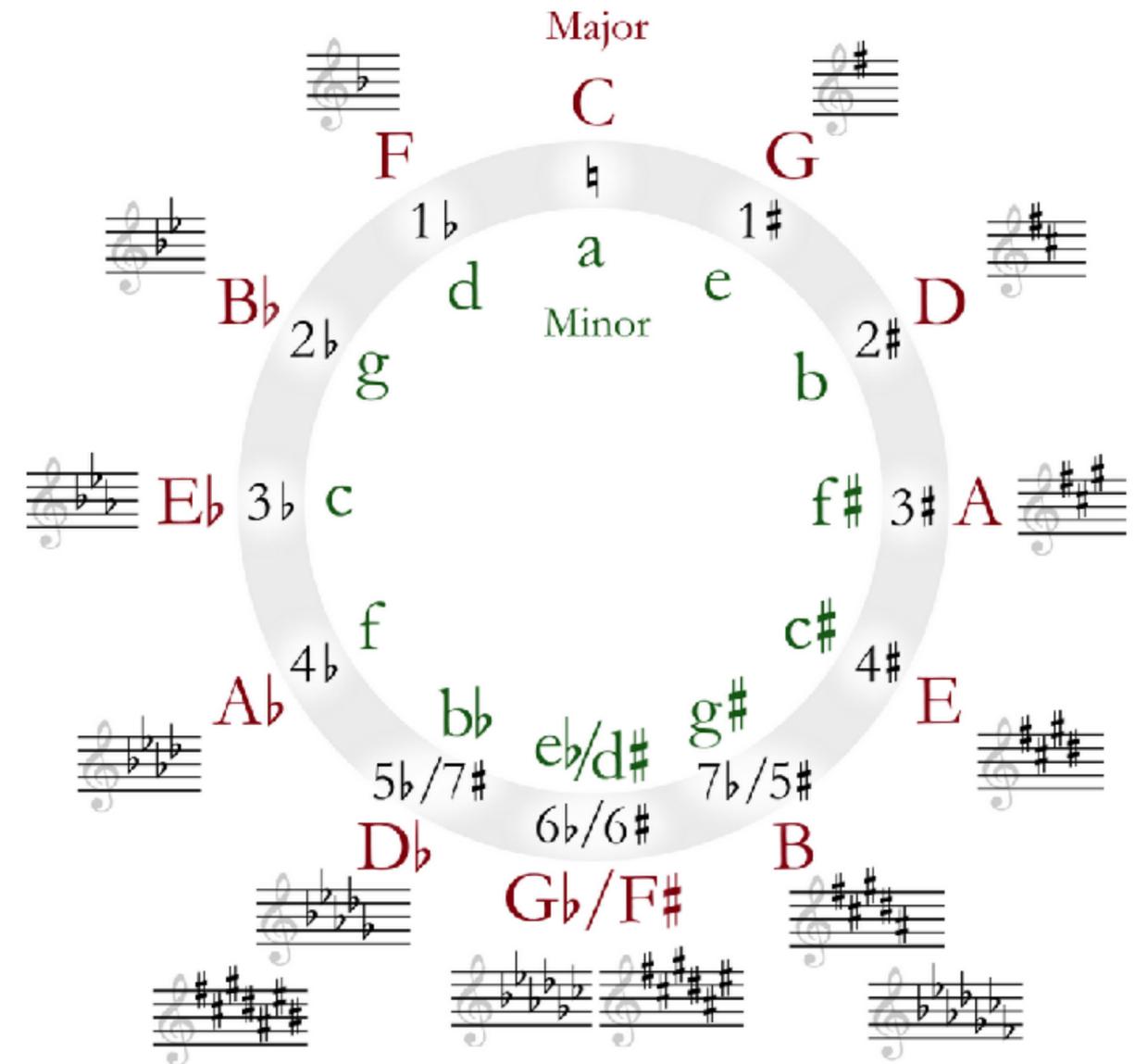
interviews

workshops

**discussion**

# Promises of taking systemic perspectives for designers

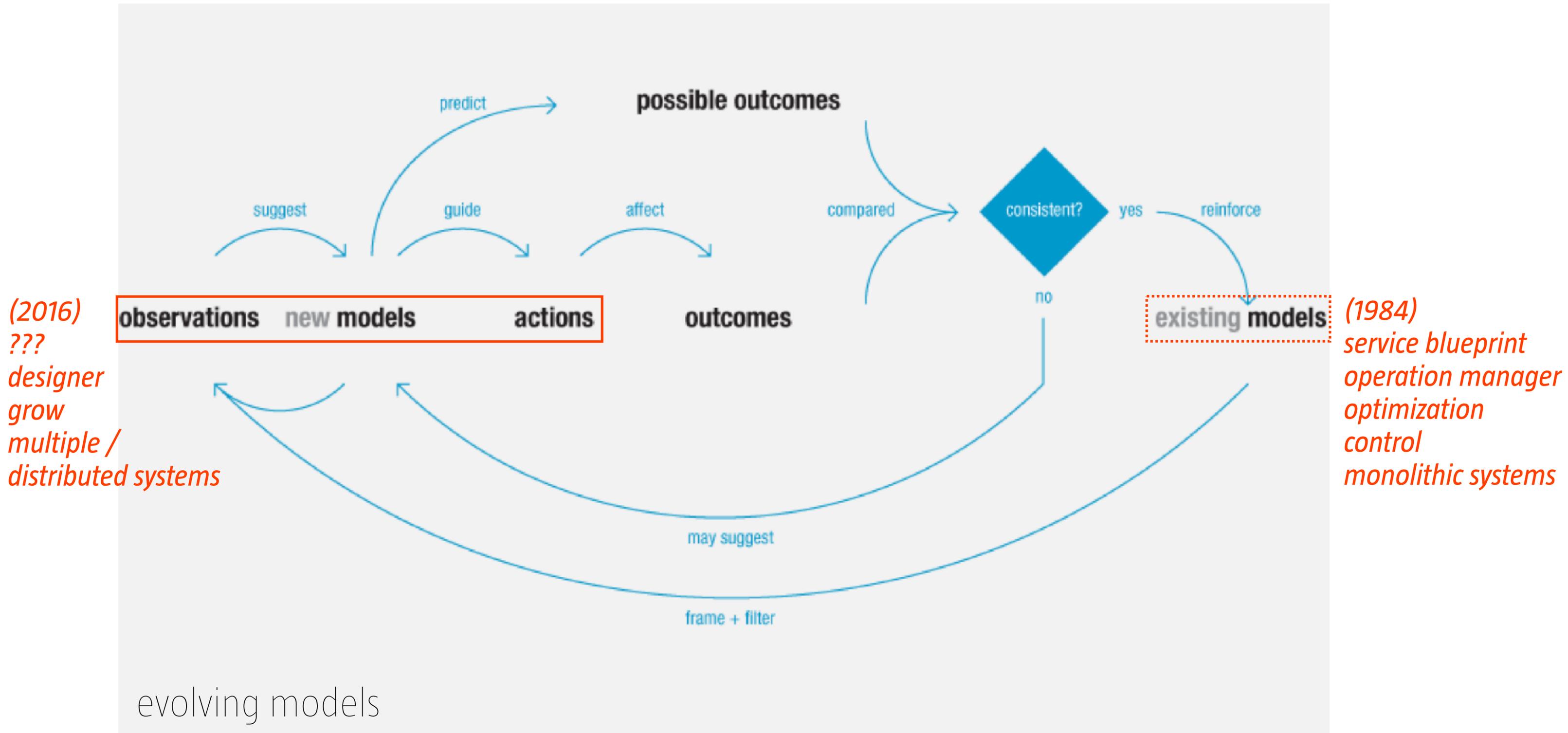
: interrelationship as a new design material

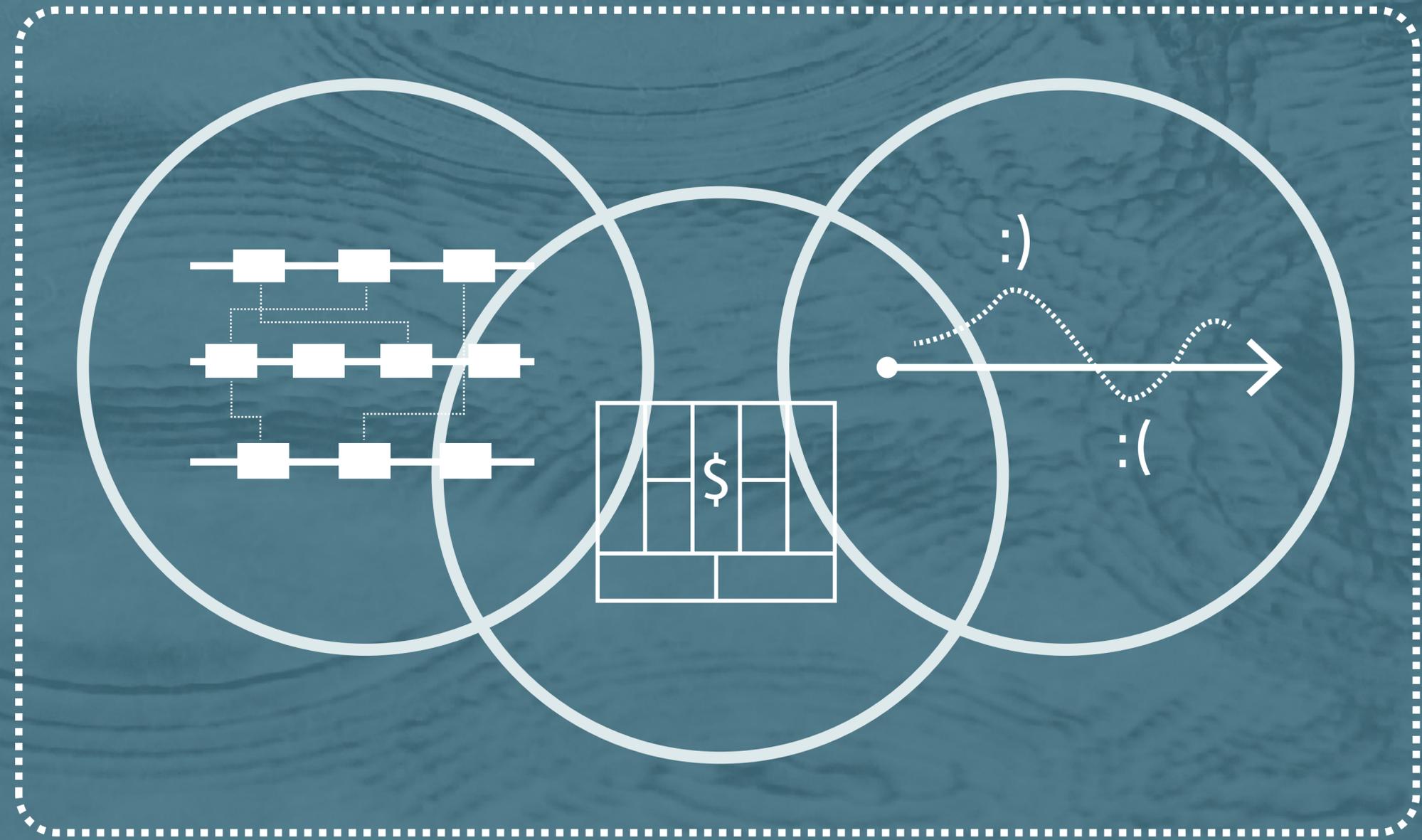


## Challenges of taking systemic perspectives for designers

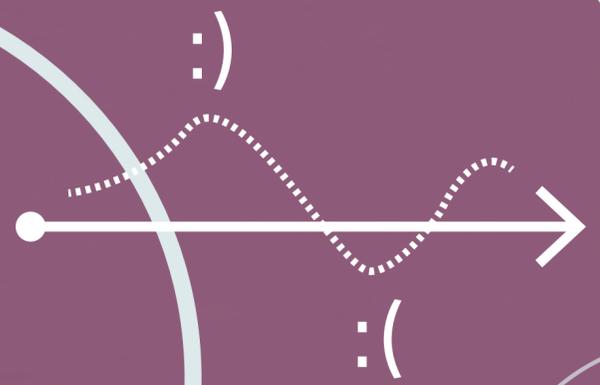
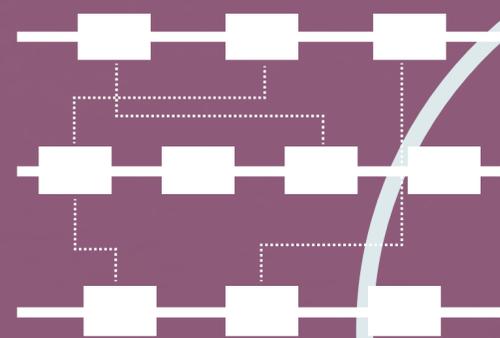
- identifying values-in-use (O)
- identifying values-in-exchange (x)
- current interaction designers might have been too much fixated to a user's perspective in design of an experience by the training
- For design of entangled services, taking stakeholders-centered perspective could be beneficial: identifying and designing value flows intersecting multiple service systems and customer's experience of systems

# we may need a better service model from a systemic designer's perspective

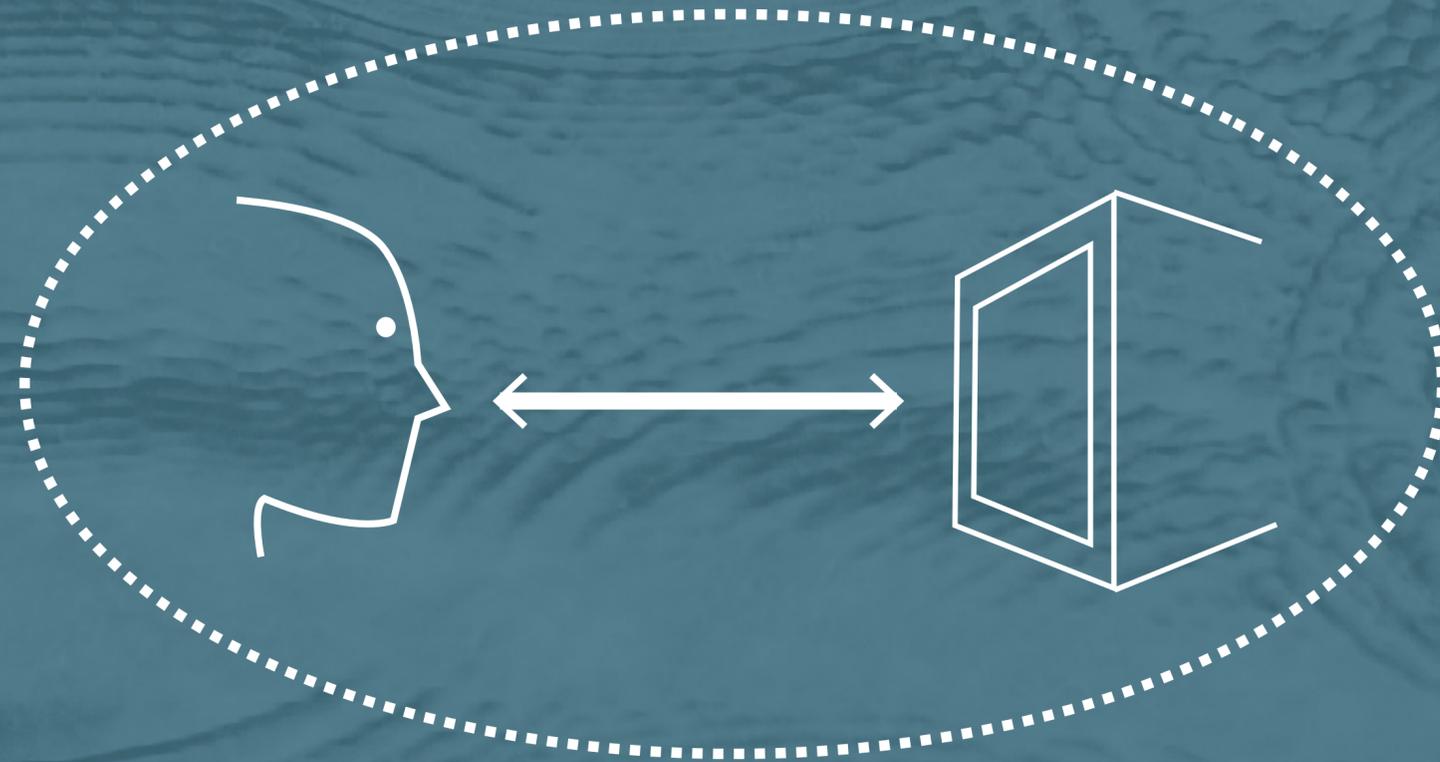




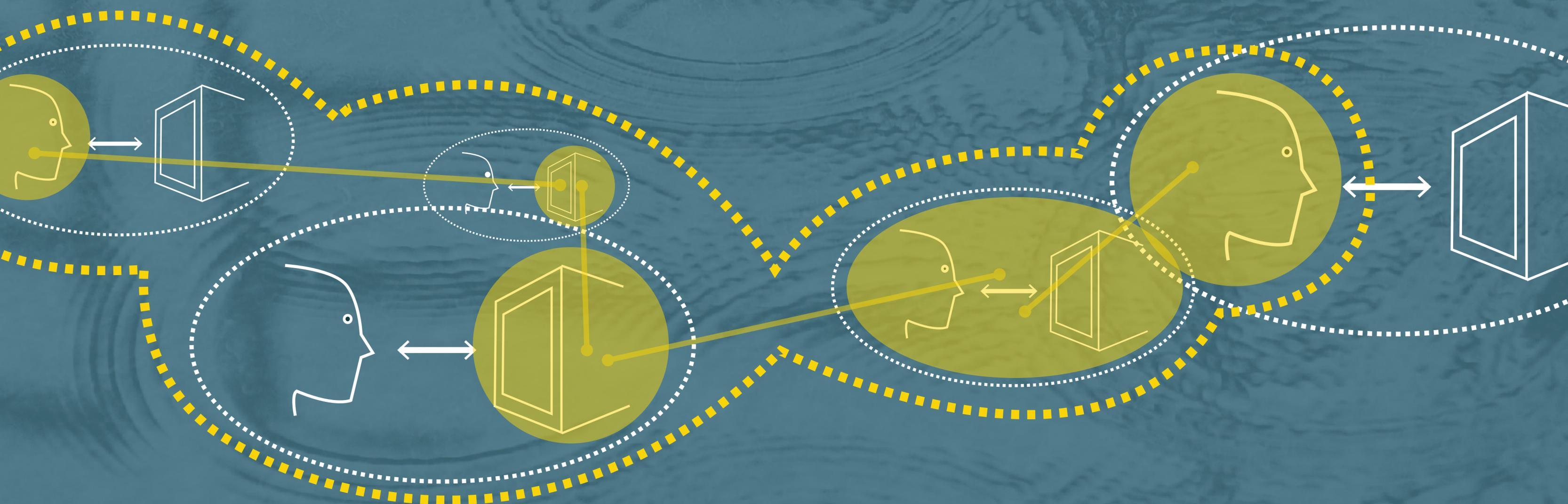
from **perfecting** a single artifact/system



to **flourishing** ecologies



from **single** user - system interaction



to **multiple** people - systems interrelationship

# Designing Service Entanglements

towards stakeholders-centered perspective in design

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**18 interviewee designers**