

Empowering seniors' mobility to maintain a healthy lifestyle: a case study

TREGLIA Chiara^{a*}; LU Yuan^b

^a Royal College of Art, Imperial College of London, United Kingdom

^b Eindhoven University of Technology, The Netherlands

* corresponding author e-mail: Chiara.treglia@network.rca.ac.uk

181

Ageing population is one of the most pressing societal issues that current and future generations will need to face. As part of her graduation research, a student from Industrial Design at University of Technology Eindhoven looked at the Dutch context and researched how empowering independent mobility could intrinsically motivate seniors to maintain a healthy lifestyle. The research culminated in a concept, YouGoGo, which is the subject of this case study. YouGoGo is a participatory mobility service that aims to suit the needs of every traveller, regardless of their age, physical abilities or access to technology. The service lets anyone become a “travel buddy”, by matching seniors and regular travellers according to their planned routes and providing rewards. In this case study, we will firstly illustrate the steps of the participatory design process used to develop YouGoGo; secondly, we will discuss which probes have been designed to collect quantitative/qualitative data (from different stakeholders and users) and how they have been deployed. As an example of innovation by intersecting engineering, social sciences and design, this case study aims to contribute towards a body of research that looks at holistic prevention and intervention systems, to engage the elderly in healthy lifestyles.

Keywords: ageing population, healthy lifestyle, senior mobility, prevention, empowerment

Context

Ageing population is an ill-defined problem. However, its consequences have been researched and outlined: there is an international concern that current social infrastructure will be insufficient to provide care to an always-increasing number of elderly people, whilst carers and taxpayers reduce in number. Ageing makes people's lifestyle less active on a mental and physical level, thus a preventative approach is needed to elicit the behaviour of maintaining healthy habits in later life stages. In light of this societal challenge, multiple disciplines, such as engineering, design and social sciences, are cooperating towards preventative holistic solutions. Physical activities are of great importance to older adults as it can not only help to improve their psychological well-being and overall quality of life, but also enable them to be care-free for a longer period of time (LeRouge, Ma, Sneha, & Tolle, 2013). However, due to ageing, the amount of physical activities taken by older adults naturally reduces.

The first author, referred to as the designer in the following paper, focused on ageing population in the Dutch context, where the rate of elderly over 65 years old is expected to increase to 26% by 2035 (Smits, 2013).



This work is licensed under a [Creative Commons Attribution-NonCommercial-Share Alike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

<https://creativecommons.org/licenses/by-nc-sa/4.0/>

This reported case study focuses on design for promoting physical activities among older adults, by empowering prolonged efficacy and independent mobility and it illustrates a 'research through design process'. The designer worked closely with multiple stakeholders and developed a concept that encompassed their insights and addressed their needs. The stakeholders were:

- 40 senior participants from Zuidzorg Extra (a business unit of ZuidZorg, a large home care organization in the southern part of the Netherlands), referred as participants in the following paper.
- 2 students from Summa College (a secondary vocational education) of which one was perspective Zuidzorg caretaker in training, referred to as students and trainee in the following paper;
- an account manager from 9292, the largest and most popular mobility service used in The Netherlands;
- the director of the ZuidZorg Extra unit in Eindhoven, The Netherlands;

The steps of this process are organised as follows:

- 'Problem scoping': probes designed to gather an understanding of seniors' lifestyle;
- 'Design process': probes designed to co-create (Sanders & Stappers, 2007) and validate YouGolGo, the design solution, with senior participants.

The Narrative

Problem scoping

First experiments

As the design challenge was still broad, the designer studied the role of social influence through a small social experiment with some of her family members. The objective was to understand how social context plays a role in motivating seniors towards positive behaviour and a more active lifestyle. She created a group chat on WhatsApp with 12 members of different ages, from 14 to over 65. She created couples, usually grandchildren with grandparents. The rules of the game were that every member had to challenge their respective partner in a physical challenge twice a week. Everyone had to provide evidence, with a video or photo, of the executed challenge, so all the members of the group chat could see the results. This 'challenges game' was played for two weeks. The insights obtained were in line with social influence, as described by behavioural theories:

- Some of her elderly relatives would not enjoy doing the challenges, as they would openly admit, but would pursue their challenges anyway, in order not to be disliked by the group, as addressed by the principles of social acceptance and rejection (Fogg, 2009).
- Some shared the view that being more in contact with their loved ones was a strong enough motivation to keep up with the challenges. This is in line with the principle of consensus (Kaptein, Markopoulos, Ruyter, & Aarts, 2015), by mimicking other people's good behaviour, participants would perform certain tasks they were not intrinsically motivated to do by themselves.
- Some asked to change their challenge according to their capability to achieve the goal and to make the challenge fit in their routine. For instance, three hours of gardening instead of a half an hour walk. This is in line with Fogg's findings (2009) on simplicity profiles.



Figure 1 Screenshot from WhatsApp group's challenge game, representing a senior performing a physical exercise.

Understanding seniors' experience

The behavioural insights gathered from this experiment inspired the designer to further investigate what intrinsically motivates (Ryan & Deci, 2000) seniors to maintain a healthy lifestyle. Ryan (2000) describes motivation as “the inherent tendency to seek out novelty and challenges, to extend and exercise one’s capacities, to explore, and to learn” (p.70). Particularly in group/social settings, this seemed to be a key factor that needed deeper understanding.

In order to do so, the designer adjusted a design probe (developed by a PhD researcher from Eindhoven University of Technology) to have an overview of which everyday activities the Zuidzorg participants already practice as a collective in their everyday, which one they miss out and which to reintegrate in their lifestyle. This probe presents 12 icons with text, in the middle, representing individuals or social groups (e.g. family, volunteers, relatives, neighbours, etc..) and presents two questions on opposite sides of the canvas:

- Which activities do you do already with others?
- Which activities do you wish to do more with others?

The task is to place some activity/hobby icons into either side of the canvas and link the activities to the persons in the middle. During 2 sessions of half an hour at the ZuidZorg centre, the designer gathered canvases filled out by 27 senior participants. After processing the results, the main insight was that the participants wanted to spend more ‘dagen uit’, days out, as a group activity.



Figure 2 Example of compiled adjusted Canvas. Translated from Dutch, the question on the left is “Which activities do you do with others?”, while on the right “Which activities do you wish to do more with others?”.



Figure 3 Senior compiling the adjusted canvas and linking activities with people.

Mapping first-hand and literature insights

Research shows that compared to other age groups elderlies do not travel as long in time and as far in distance (Böcker, Amen, & Helbich, 2016). Based on the insights from the culture probe study in the previous step, the designer decided to focus on creating a concept to support older adults to have more days out with their peers. To gain first-hand insights about their ‘day out’ experience, she created a flyer that was filled out by 13 participants, with the following questions:

- What does your day out look like?



Figure 5 Problem mapping on the topic of 'spending a day out'.

Design Process

In the first ideation phase, the designer came up with the idea of a buddy system that would pair regular travellers with senior travellers, to be able to travel together. Inspired by sharing-economy concepts (BlaBlacar, Uber in early phases) she wanted to design a 'win-win' situation concept, rather than relying on a volunteering buddy, accompanying a more vulnerable and less mobile buddy. Inspired by the Self-Determination Theory, she wanted to address three needs, described in Ryan (2000) as "essential for facilitating optimal functioning of the natural propensities for growth and integration, as well as for constructive social development and personal well-being" (p.68).

- the need for competence, in organising and spending a day out;
- autonomy, in travelling independently;
- relatedness, in relying on a participative support system to spend a day out.

The outcome of this process was YouGoIgo, a participative mobility service that suits the needs of every traveller, regardless of their physical abilities, their age or their access to technology. The concept is a two-ends system and it is built upon the infrastructure of 9292.

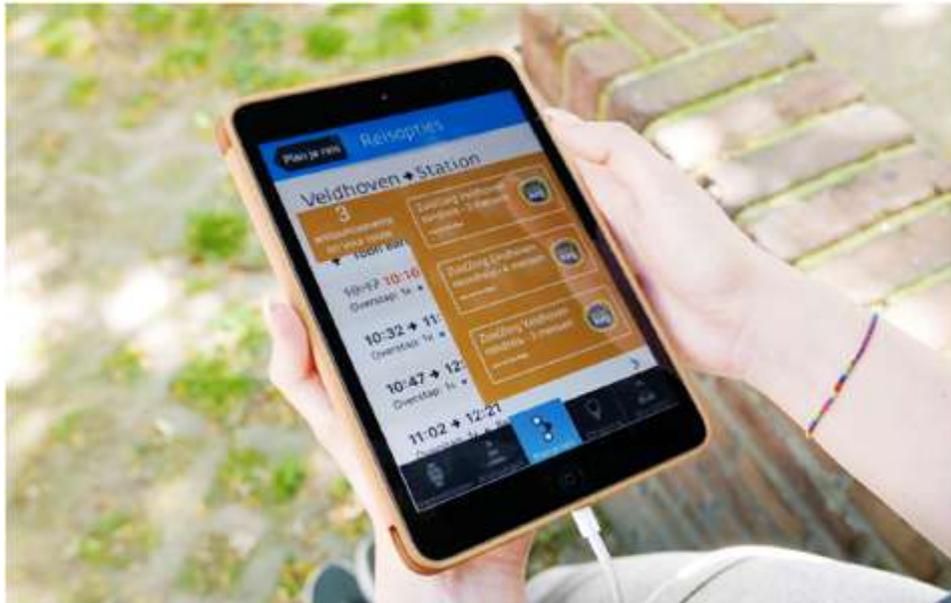


Figure 6 Example of YouGoGo interface.

Each feature of the concept has been co-designed as the final users of the service (the seniors) played the role of 'experts of their experience' (Sanders & Stappers, 2007) whilst the designer iteratively created and deployed probes, as tools to empower the expression of their expertise and knowledge.

Scenario's

The preliminary concept was sketched in two vignette-style scenarios. The task for the participants was to give feedback with sticky notes of different colours on the parts of the canvas they liked and the ones they disliked. The purpose of the exercise was to:

- envision themselves as 'protagonists' of a potential future mobility service;
- empathise with other potential roles in this scenario.

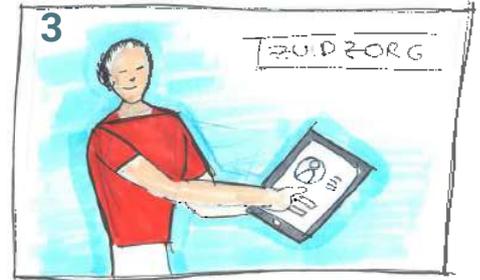
On Scenario 1, the journey of a group of three elderly ladies was described: with the help of a Zuidzorg carer a group of elderly ladies publish on this buddy service their route and requested a buddy to accompany them. After a while, they find one and decide it is a match. On the day of the trip, the senior ladies meet with their buddy and commute together, who supports them at challenging steps (managing tickets, navigating stations and stepping on or off trains and buses). When they arrive at destination, they shout out goodbye.



1 Mien wil een dagtrip maken naar Amsterdam. Ze vraagt haar vriendinnen Anke en Jose van ZuidZorg om haar te vergezellen. Ze zijn allemaal erg enthousiast en ze plannen om over twee dagen vroeg in de ochtend te vertrekken.



2 Ze laten Joep, een vrijwilliger van ZuidZorg, weten dat ze naar Amsterdam willen gaan.



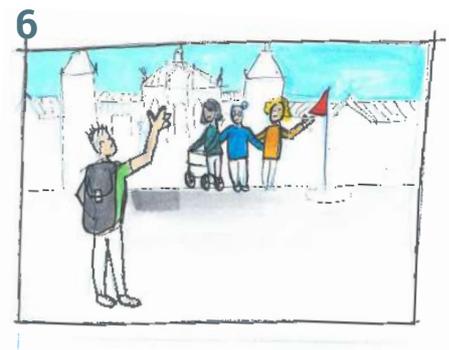
3 Later verteld Joep over Loek, een jonge reiziger die ook over twee dagen van Eindhoven naar Amsterdam gaat. Loek heeft met ZuidZorg afgesproken om de dames te ontmoeten op de afgesproken plek en om ze met alles wat ze nodig hebben om in Amsterdam te komen te helpen.



4 Op de dag van de reis ontmoeten de drie dames Loek op de afgesproken plek.



5 Loek helpt de dames met hun tickets en OV chipkaarten. Hij leidt ze naar de juiste perrons, helpt ze met opstappen en bij het vinden van een fijne zitplek. Eenmaal aangekomen helpt hij de dames bij het uitstappen en begeleidt ze naar de uitgang van het station.



6 The dames zijn in Amsterdam, ze bedanken Loek en zijn klaar voor hun dagje uit!

Figure 7 Canavs Scenario 1 (in Dutch).

On Scenario 2, the regular traveller's perspective of the same journey is described: a regular traveller creates a buddy account by using 9292. He checks if there are seniors travelling on the same route. Once a match is made, he meets with the seniors and accompanies them to the set destination. He helps them with all their necessities (like Scenario 1) until they arrive at destination.



Figure 8 Canvas Scenario 2 (in Dutch).

During 2 sessions of an hour, the designer collected qualitative feedback on both scenarios from 15 senior participants. The two main insights from this exercise were that:

- for some participants, it seemed hard to trust a stranger to accompany them on their journey. Some of them refused to believe that anyone would invest effort in helping senior travellers.
- It seemed hard to find a consensus among participants regarding the purpose and how to reward a regular traveller accompanying seniors on their journey.



Figure 9 Zuidzorg participants giving feedback on Scenario canvases.



Figure 10 Example of participant's feedback (in Dutch).

Role Play

At this stage, the designer conducted further investigation in order to unfold the issue of trust (between regular and senior travellers) that emerged from the previous exercise, as well as to figure out a safe way to reward regular travellers.

She organised four role playing sessions with 6 participants, asking them to 'act-like' one of one the regular travellers' personas that she created. They were asked to build arguments why a senior traveller would choose them and how they would like to be rewarded.



Figure 11 Senior and researcher in a role play session. Persona cards are displayed on the table.

Role play is widely used by design agencies such as IDEO, because it is an effective tool to stimulate empathy and creativity. Inspired by Simsarian's framework (Simsarian, 2003), the goal of the role-playing session was to let participants immerse in a 'what if' context, perform a role and formulate observations from the perspective of the role they played. The main insights of this exercise were the following:

- Seniors travellers want some specific information (picture, phone number and proof of ID) to be able to trust a regular traveller to accompany seniors on their journey. Moreover, the participants expressed they would feel safer if they were represented by an established organisation (e.g. Zuidzorg) within this system.

This insight informed the design feature of YouGoGo that enables ZuidZorg, or any other elderly centre, to build a company profile on the service. By doing so, they can represent their guests and publish their routes on their behalf. In this way, elderly care centres can function as authorities that guard the seniors' safety and make sure the system runs smoothly.



Figure 12 Example of interface where Zuidzorg publishes routes on behalf of its senior guests.

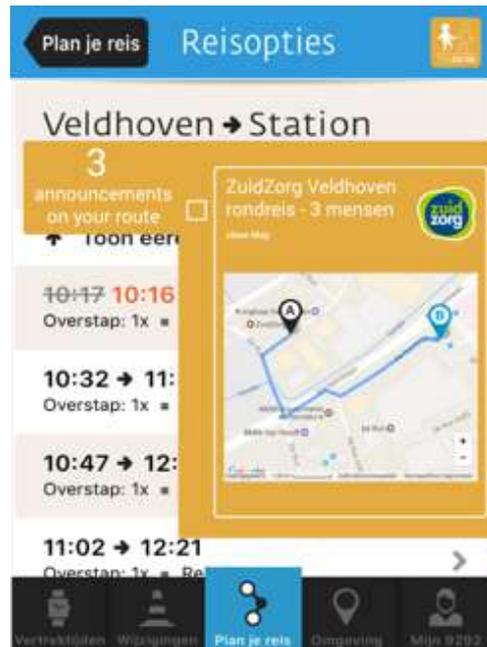


Figure 13 Example of interface displaying matching routes for senior and regular travellers.

- Participants expressed that they feel unsafe when handling money in public, thus many other proposals arose (e.g. not rewarding at all, offering coffee). A decision regarding reward was therefore not taken yet at this stage.

Semi-structured interviews

Two interviews were held with the student and the trainee in order to understand the perspective of potential regular travellers, as well as of a Zuidzorg carer, on the matters of trust and being rewarded on this developing travel service. The questions were the following:

- what would the impact be of using the company profile of ZuidZorg to publish seniors' routes?
- what would a ZuidZorg caretaker need to know about a regular traveller to confirm a match with him/her?
- how would she/he reward a regular traveller for the support she/he gives in accompanying senior travellers on their journey?

The trainee shared her perspective on the issue of trust: in order to feel safe in matching seniors with strangers, she wanted to know contact details, see a picture and a small biography, to have a complete overview of the other person. Reviews would also be helpful to make a more personalised choice. As Ert, Fleischer & Magen (2015) studied on Airbnb, a popular sharing economy platform in the tourism industry, pictures and reviews might have an important role in building trust between the multiple users of the service.

This insight informed the final 'privacy versus safety' compromise that is featured on YouGoGo: the users, whether business accounts or personal accounts, have to authenticate by default with a proof of ID. Besides, users have to share a phone number (which can be accessible by different channels e.g. WhatsApp, Messenger or just regular dialing). This information is crucial to allow seniors or carers to contact regular travellers and make arrangements, if needed. However, this information is not stored in the system and is deleted once the trip is over. A phone number associated with a name and surname is the only sensitive information that travellers need to share with other users. Any other profile details are optional to share and reviews from other trips can be hidden. However, regular users are encouraged to share as much info as possible, to increase the chances to be chosen for a match.

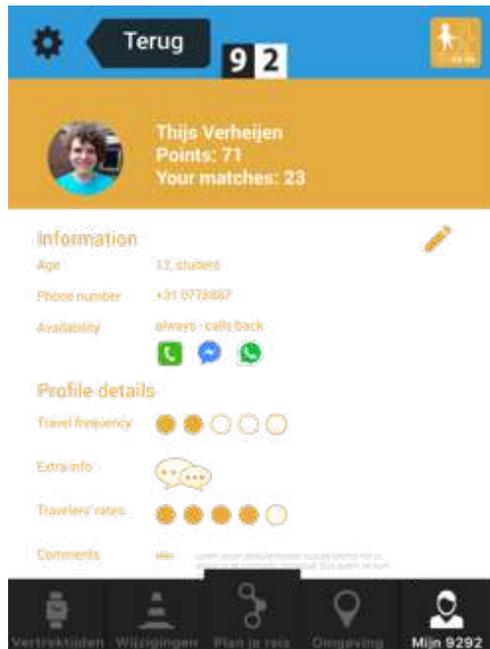


Figure 14 YouGoGo interface, displaying regular traveller's info.

Regarding the 'how' to reward regular travellers, the student and trainee agreed that a scoring system to gain a discount would be an appropriate way to be rewarded for accompanying the seniors. In this way, cash money would not be needed, by making the system safer for the seniors and more convenient for regular travellers.

This feature has been implemented in the final design of YouGoGo: a regular traveller gains scores for their service, which can be transformed into discounts. Any shop or promoting enterprise can join the system, by offering their discounts on the interface. The scores gained by the regular traveller double for return trips and for positive reviews by the seniors they accompanied. Next to this, they get to travel for free each time they accompany seniors, by showing the details of the trip to the conductor on the train or bus.

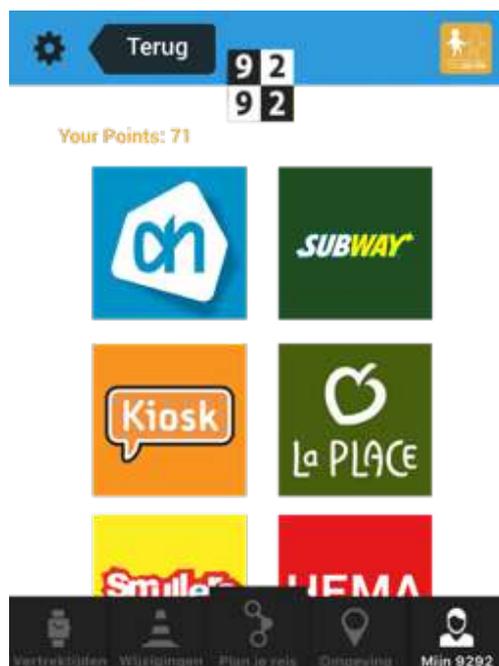


Figure 15 Example of interface through which a regular traveller can use her/his points to get a discount at different shops.

Service simulation

After the main features of the design had been defined, the designer organised a day out to Utrecht. A group of 6 participants, accompanied by the students, experienced the service, finally named YouGoGo. The students had been instructed to behave as regular travellers using the service: they had to support the seniors in navigating public spaces (such as bus stops and stations), support them with their ticket purchasing and help them physically overcome barriers (such as stepping on and off the train).

The designer behaved as the intermediary (a ZuidZorg caretaker) and she showed the seniors, on a designed interface, that they had a match with two students for their trip to Utrecht. She gave them information about the students and showed them pictures of them. She also asked them if the information provided made them feel more comfortable in trusting the students. Their response was largely positive.

Once they met, the seniors were able to recognise the students and the group travelled back and forth to Utrecht. Simulating the system was effective to test its features and highlighting the potential bottle-necks (e.g. such as potential disruption during rush-hour and the need for further investigation of viability and feasibility of the system at a policy level).



Figure 16 Participants and students simulating YouGoGo on a day out.



Figure 17 The group of seniors with their travel companions at a train station in The Netherlands.

Key learnings

From a design management perspective, the following key learnings have been found:

- **Trust in the design process and by technology:** in line with principles of cultures of participation (Fischer, 2011), it can be argued that the systematic democratisation of the design process (by creating probes that empowered users and stakeholders to participate in both the problem definition phase and in the design development phase) enabled a reciprocal feeling of trust and shared responsibility. Signs of this newly established trust could be perceived during the YouGoGo simulation-day and by the participants' enthusiasm to see the service implemented. However, research on sharing economy services claims that built-in trust (within the app or website) is what makes them so successful (Richardson, 2015). YouGoGo was developed in a process that entailed shared trust among all stakeholders involved throughout. However, the final design also relies on a trust-built-in mechanism: senior travellers need to trust their travel buddies from their online profiles, prior to meeting them offline. Further research is needed to assess whether trust between seniors and regular travellers remains when they are not involved in the design process and if other factors play a role (e.g. digital confidence in older users).
- **Empowering processes support an empowering solution:** as 40 senior participants were empowered to be co-creators and all stakeholders involved contributed as 'problem experts', a sense of agency and ownership over the final outcome appeared to grow throughout the process. By building reciprocal empathy, it was possible to thoroughly understand potential barriers to a healthy lifestyle, identify a design opportunity and create a 'win win' solution. This is in line with Manzini's (2010) insights on the role of the participatory designer in projects for social change. In practice, her role is to 'trigger interests of multiple stakeholders, align their motivations and empower their capabilities' (Manzini & Rizzo, 2011). As a result, it can be argued that YouGoGo is an embodiment of multiple stakeholders' perspective and it empowers them by giving them responsibility. Senior travellers, regular travellers, mediator organisations (e.g. Zuidzorg), partnering enterprises might have different motivations to join YouGoGo and they can gain different benefits from it. However, by design, they have to assume key responsibilities, in order to achieve those benefits.
- **Strategic and sustainable implementation of the service:** YouGoGo's proof of concept has been validated in a limited simulation, in terms of number of participants and iterations. Nevertheless, it was sufficient to highlight the need for further research to address liability and policy concerns, should the service exist at scale, once implemented in the Netherlands. A 9292 account manager and the director of ZuidZorg Extra have been consulted regarding the matter. They suggested collaborating on a strategic implementation roadmap starting with more extensive pilot studies to test and overcome the current bottle-necks of the service. This highlights the need for a

collaborative culture, across industries and disciplines: in the case of YouGoGo, designers, developers, behavioural experts, carers, policy makers as well as seniors and regular commuters, would need to come together to affect systemic change.

In light of the challenges set by ageing population, we argue that more focus should be put on empowering solutions to support one's sense of agency and efficacy, to maintain a healthy and active lifestyle. Such solutions should be integrated in a societal infrastructure that distributes their risks and benefits among different stakeholders.

Acknowledgment

The work presented in this paper was made possible in part by funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 690425. The authors thank all ZuidZorg participants, carers, Summa College students and the Zuidzorg director for their invaluable contribution. Special thanks to all students and PhD researchers at Studio Silver (TU/e Industrial Design) for their feedback and help in developing the concept.

References

- Arentze, T., Timmermans, H., Jorritsma, P., Kalter, M. O., & Schoemakers, A. (2008). More gray hair—but for whom? Scenario-based simulations of elderly activity travel patterns in 2020. *Transportation*, 35(5), 613-627.
- Böcker, L., Amen, P. V., & Helbich, M. (2016). Elderly travel frequencies and transport mode choices in Greater Rotterdam, the Netherlands. *Transportation*, 44(4), 831-852.
- Ert, E., Fleischer, A., & Magen, N. (2015). Trust and Reputation in the Sharing Economy: The Role of Personal Photos on Airbnb. *SSRN Electronic Journal*.
- Fischer, G. (2011). Understanding, fostering, and supporting cultures of participation. *Interactions*, 18(3), 42.
- Fogg, B. (2009). A behavior model for persuasive design. *Proceedings of the 4th International Conference on Persuasive Technology - Persuasive 09*.
- Kaptein, M., Markopoulos, P., Ruyter, B. D., & Aarts, E. (2015). Personalizing persuasive technologies: Explicit and implicit personalization using persuasion profiles. *International Journal of Human-Computer Studies*, 77, 38-51.
- Manzini, Ezio and Francesca Rizzo, 'Small projects/large changes: Participatory design as an open participated process', *CoDesign* 7(3-4) (2011):199-215.
- Richardson, L. (2015). Performing the sharing economy. *Geoforum*, 67, 121-129.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68-78.
- Le Rouge, C., Ma, J., Sneha, S., & Tolle, K. (2013). *User profiles and personas in the design and development of consumer health technologies*. *International Journal of Medical Informatics* (82), 251-268.
- Sanders, Elizabeth B.-N. and Pieter Jan Stappers, 'Co-creation and the new landscapes of design', *CoDesign* 4 (1) (2008): 5-18.
- Simsarian, K. T. (2003). Take it to the next stage. *CHI 03 Extended Abstracts on Human Factors in Computer Systems - CHI 03*.
- Smits, C. H., Beld, H. K., Aartsen, M. J., & Schroots, J. J. (2013). Aging in The Netherlands: State of the Art and Science. *The Gerontologist*, 54(3), 335-343.