ANGLIA RUSKIN UNIVERSITY

LORD ASHCROFT INTERNATIONAL BUSINESS SCHOOL

SETTING UP LIVING LABS.
EXPECTATIONS, POSSIBILITIES AND INTERESTS.

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ANGLIA RUSKIN UNIVERSITY

ABSTRACT

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DOCTOR OF PHILOSOPHY

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The long-term healthcare challenges caused by an ageing demographics have led to the proposal of two dominant strategies to tackle the issue. One sees technology as essential to successful care provision, and the other promotes democratic and civil participation to develop solutions adapted to the real needs of people. Living Labs appear as valid (but by no means exclusive) ways to merge these two approaches. So far, Living Labs have been described as experimental, participatory and real-life contexts, where multi-stakeholder collaboration and open innovation are promoted and where users are able to actively influence the innovation process. However, the promised democratic, open and participatory principles advocated in theory do not appear to be matched in practice and a critical approach seems to be missing from the existing literature.

This thesis focuses on Living Labs developing independent living solutions and extends the understanding of Living Labs beyond simple description of *who* does *what* and *when* in the process. The aim is to offer a critical in-depth account of *how* the process of setting up a Living Lab develops.

Following a qualitative research strategy and drawing upon concepts of Actor-Network Theory and Sociomateriality, this work presents three case-studies to understand how Living Labs are set up. The results offer a new perspective of Living Labs as heterogenous arrangements of human and non-human elements that do not exist in and for themselves but are, instead, the product of the links established between the heterogenous elements that temporarily sustain them. Whether they are open, real-life, participatory and democratic settings is never a guaranteed result, but a product of the heterogenous relationships established between different elements, in their own material and social contexts, at particular moments in time.

Key Words: Living Labs; Actor-Network Theory; Sociomateriality; Participation; Open Innovation; User Innovation; Collaboration; Civil Society; Innovation Collectives; Democracy.

Table of Contents

List of Figures

List of Tables

Notations

ANT	Actor-Network Theory
ENoLL	European Network of Living Labs
HCD	Human-Centred Design
HCI	Human-Computer Interaction
IS	Information Systems
LAIBS	Lord Ashcroft International Business School
NHS	National Health Service
PD	Participatory Design
R&D	Research and Development
SME	Small and Medium-sized Enterprise
STS	Science and Technology Studies
UCD	User-Centred Design
WHO	World Health Organisation

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Context and Introduction.

Before any theoretical, methodological or data-driven discussions take place, let me situate this PhD within a personal, social and political context. This should help with understanding, and making sense of, how the interest in the studied subject – Living Labs – developed, as well as placing this research within a conceptual framework that guided both the research in practice and the writing process that ensued.

Such was the exercise I kept repeating throughout my research journey. Thinking about the social and political context of the study would help me to situate the question of why the study was being conducted and make sense of what were the grounds on which it had been built, very much like a house that is constructed within a plot of land. Using a house metaphor is not a simple coincidence. In fact, many of the Living Labs studied for this work would take place in a house: either purposefully built for needs assessment, experimentation and collaboration or, in other cases, older people's homes would be used as settings for data collection. In presenting this work, and like a visit to one's house, I shall start by opening the door and inviting you in. After that, I will guide you on a more detailed visit to the different areas and rooms. Every now and then I will take you out in the garden (it is one of those houses!). Other times will require us to go back in. Although I planned this "visit" with a specific order in mind, feel free to move as freely as you wish. Also, it is important to remember that even though a bedroom and a kitchen are different spaces with different purposes, they are still part of the same house and we need both to have a house. The same is true for some of the chapters in this thesis.

In 2013, at the beginning of my PhD, I had the chance to collaborate, as research assistant, in an international EU funded project where LAIBS was a partner. The project was a way to evaluate how partners from different European countries could come together to strengthen their regional health economies. At the heart of the project was the idea of the demographic

challenges taking place across Europe – an increasing ageing population coupled with a shrinking work force – and the pressure these challenges would place on national governments and health and social services. How could society guarantee affordable, optimal living conditions and provide high quality health and social care to an ever-growing older population? With an aim to increase business development of SMEs whilst, simultaneously, meeting the demands of patients, that project was trying to contribute to the creation of a new approach that would, through the introduction of innovative business models, products and services, benefit all of those involved – from businesses, health and social care providers, through to end-users. Ultimately, the project would help with tackling the identified challenges. How? By promoting ways in which participation from, and collaboration between businesses, higher education institutions, local governments, citizens and social and healthcare providers could be enhanced.

When, in 2014, that first project came to an end, a new one followed soon afterwards that included some of the previous partners in a new European cross border collaborative project. This time the aim was to explore how the challenges of ageing populations could be turned into business opportunities for regional economic growth. This new project had a few requirements at its core: the needs of citizens and their dignity should be at the centre of any technological and social change / solution; and any change / solution would be developed with a co-creation strategy in mind. The concept of Living Lab was being used by a Dutch partner and there was the idea to import that model form the Netherlands to the UK. This project opened the doors to a considerable amount of data collection in my research.

Around mid-2014 – and following from a set of challenges and changes to my initial research proposal – I started to build what would become my new research topic. Heavily influenced by the reality of the projects I joined, I started to question the apparent mismatch that existed between the theoretical and publicly available descriptions of collaborative and user-centred projects

(like the ones I joined, and of Living Labs in particular) and their real-life practice.

At the same time, there was a political concern across Europe with health care provision and how future innovative solutions seemed to be dependent on a change of paradigm – from a top-down, technologically driven innovation system there was a recognised need to start involving citizens (and other stakeholders) in the development of those same solutions. These people would, in principle, be the main beneficiaries of these (potential) future solutions. So, their voices needed to be heard and solutions created accordingly. With people living longer, how could society cope with the demands of long term health and social care provision of people? How could businesses and innovators be involved with helping to create those solutions? What roles would national, regional and local governments play? How could collaboration among a myriad of stakeholders (citizens included) be enhanced? What would such collaborations yield?

These questions started to occupy my mind, and were influenced, as mentioned, by the fact that in 2013 / 2014, in Europe, several strategies and initiatives were taking place encouraging and supporting similar projects with similar goals (e.g. under programmes and initiatives such as INTERREG, i2010, Europe 2020, Horizon 2020). Not only that. A lot of public documents started highlighting the importance of concepts such as citizen driven innovation, human-centred healthcare and co-production. All those alluded to the fact that demographic changes would put pressure on health and social care systems, hence the need to provide citizens with an active role in working on the required solutions. Those projects seemed, in fact, to materialise in numerous ways of "Making Futures", to use Ehn et al.'s (2014) wording.

What struck me was that, sooner or later, those projects would come to an end. After that, what would become of those created solutions? How sustainable could they be? How sustainable is a model where *future* solutions are worked on with the anticipated problems of *today*? How is building future

solutions compatible with the fact that the problems they intend to solve will, in a great majority of cases, outlive the timeframe of the projects where the solutions are being worked on?

I soon gained an interest in studying, in depth, how such collaborative endeavours came to life. Specifically, my interest was in Living Labs that dealt with an issue such as that of the creation of long-term healthcare solutions, with a focus on independent living solutions. My experience, as a research assistant, appeared to show that such projects would not run without challenges. However, the many reports, documents and websites of those projects would rarely focus on the challenges faced. From reading through those, one would think that a project starts, several stakeholders are involved – with businesses, local governments and citizens collaborating in the development of a few solutions – and everyone and everything would live happily ever after. My observations, however, seemed to tell a different story. In this thesis, I will be sharing that discovery.

This thesis is organised in four parts.

Part I reviews the literature supporting this thesis. In Chapter 1, I critically analyse some of the literature that helps to recognise the wider political, social and economic contexts in which the subject of this research – Living Labs – were developed. Chapter 2 presents the theoretical framework used throughout my discussion and interpretation of both academic literature and research data: Actor-Network Theory and Sociomateriality. In Chapter 3, I critically analyse the existing literature on Living Labs and, based on my theoretical framework, propose a new way to look at the phenomenon. Living Labs, I argue, are the product of the links established between heterogenous elements (human and non-human) that bring them together. This interpretation helps to look at Living Labs as situated practices that are the product of their own material and social contexts.

In Part II, the aims and methods of the research are presented. Chapter 4 presents the questions guiding this research, which dissociates itself from a

tendency to describe *who* does *what* and *when* in the Living Lab process. The focus is thus on a much-needed in-depth understanding of *how* exactly the heterogeneity constitutive of Living Labs comes to life and how it sustains in practice. Chapter 5 addresses my epistemological, ontological and philosophical choices, and describes the research strategy, design and methods used in my data collection and analysis.

Part III focuses on the analysis and discussion of data. Together, chapters 6, 7 and 8 show that setting up a Living Lab is more than just bringing heterogeneous actors together under the banner of multi-stakeholder collaboration and open innovation. Living Labs, this research shows, are performed differently, in different contexts, by different actors in messy and multiple ways and may not be the open, participatory and democratic arrangements one may be led to expect from conventional descriptions.

Finally, in Part IV, Chapter 9 concludes this thesis. It provides a general discussion, presents its limitations and concludes with some theoretical, methodological and practical contributions.

Part I — Theorizing Living Labs

1 Making the future today.

> I have not seen any evidence that people want choice. I see plenty of evidence that people want services that work (Seddon, 2008: 26).

The stage is set: people are living longer (UNFPA and HelpAge International, 2012; Erjavek and Novak, 2014; Saito, 2014; Eurostat, 2015). A population with long-term healthcare needs, coupled with ever-growing unsustainable models of healthcare provision demands urgent future solutions (Bessant et al. 2012; Department of Health, 2013; Porter and Lee, 2013a; 2013b). The existing gap between the future health needs of people and the desired delivery of appropriate care seems to be increasingly reliant on technological innovations (Taylor, 2015; OECD, 2017) as well as concepts such as citizen participation, co-creation and co-production (Wood et al., 2016), human-centred design, patient activation (Khan, 2013; Hibbard and Gilburt, 2014), people powered health (Nesta, 2012), and user-involvement.

Nonetheless, if that gap is to be filled, how can people, and older citizens in particular, be involved in the different stages of innovating healthcare services and technologies? How can the needs of an ageing population be clearly (and correctly) assessed? What responses are needed and how easy it is to find them? What is the role of businesses? Is innovative healthcare technology the only way to tackle those challenges or could a more social focused approach be the answer? Is co-creation between stakeholders taking place? If so, how? How is citizen participation being materialized in practice?

When responding to the long-term healthcare challenge, technological innovation appears as one of the preferred ways to develop solutions. In Europe, for instance, there is an attraction with assessing "ICT's capabilities to support ageing citizens, revolutionise healthcare and provide better public services" (Barland and Lovett, 2014: 11). However, an over-reliance on technology may not be the answer needed. Using the UK as an example, Limb

(2012: para 1) notes how NHS boards seem to "view telehealth technologies too narrowly as a means to save money in the short term instead of developing the services patients will need in the future". In fact, the World Health Organisation's (2010) report on the outcomes of the Priority Medical Devices, has highlighted how the "lure of technology is strong, but the cost-effectiveness, real need, and likely usefulness of many innovative technologies are questionable" (2010: 10-11). WHO's report draws attention to the fact that the existence of medical technologies and devices is not, per se, a solution to successful healthcare delivery. I would argue that the same holds true when talking about healthcare services and products that are not necessarily technological. Apart from available, healthcare technologies and services need to be accessible, affordable and appropriate. Indeed, it may well be that the biggest challenge for the future of long-term healthcare provision is this: ensuring that issues of availability, accessibility, affordability and appropriateness are simultaneously met whenever healthcare technologies, products and services are developed.

In the particular case of this research, one of the first questions that triggered my thought process was: how could the appropriateness of long-term independent living solutions be guaranteed? What would an appropriate solution look like and for whom? [1] In a way, it was as if these solutions had to provide an answer to a specific demographic challenge: an ever-growing ageing population. An anticipated problem with future social, economic and political consequences is being addressed today. To properly understand what exactly was happening to address that demographic challenge, I needed to understand this challenge better.

In the next four sections I review literature that helps with situating this PhD within a wider social, economic and political context. Firstly, I will be

[1] I would like to highlight that these questions (as others presented on this and the previous section) shall not be read as research questions as such. I will be discussing and presenting these later in the work (Chapter 4). However, the questions presented here played a very important part in making me start to think about the context of my research, as well as clarifying the field in which I was working and my thought process.

exploring the ageing issue to shed some light on how this demographic challenge impacts the way in which society looks at the future of long term healthcare provision. Secondly, I will present two approaches that have been used to try and tackle what I opted to call the ageing threat. I will start by discussing evidence that deals with the way in which technology seems to be one of the preferred (and quite deterministic) ways in which to respond to the ageing challenge. Next, I will focus on a less technologically driven approach and critically analyse evidence that seems to suggest that issues of citizen participation, human-centred healthcare and co-creation appear to have gained momentum when it comes to finding solutions for the long-term health provision of an ageing population. I will conclude this chapter introducing how the concept of Living Labs may be considered one possible (but by no means exclusive) way in which to merge the technological and participatory approaches to the challenges posed by an ageing population.

1.1 The ageing 'threat'?

As previously pointed out people are living longer. This fact would not be a problem, and should perhaps be received with a certain degree of satisfaction, if ageing was depicted more as an opportunity than as a societal burden to which society needs to adapt, if not solve (Colombo, 2015). The discourse on how an ageing population is perceived has been criticized by some (Neven, 2010; Mort et al., 2013; Aceros et al., 2015; Neven, 2015; Oudshoorn et al., 2016). Aceros et al. (2015), for instance, note how some discourses of later life (in policy documents, for example) tend to portray ageing as a problematic issue and, even in cases where a more positive rhetoric is adopted, one is left with a normative set of discourses where certain ways of ageing are deemed more appropriate than others.

Regardless of the discourses on ageing, and the extent to which people are supposed to age "actively" (Age Platform Europe, 2013), "healthily"

(European Policy Centre, 2012) or "well" (Harkness et al, 2012), the truth of the matter is that older people account for an ever-larger percentage of the world population (SilverEco, n.d.). This tendency is confirmed not only in Europe (Eurostat, 2015) but across the world (OECD, 2015). In line with the argument put forward by Aceros et al. (2015), it also seems true that, most often than not, ageing is depicted as a challenge in which elderly people are given identities that may not correspond to the real ones. An example may help with clarifying this idea. When policy documents state something like: "Ageing people should be empowered to stay independent, autonomous and socially engaged for longer within their homes and communities" (EIPAHA, 2016: 3), such statement may be portraying someone (generally older citizens) whose needs for independent living may have not been accurately assessed. How can one be sure that to stay independent and autonomous in their homes is what older people want? Why empower them to achieve that? Louis Neven, for instance, found that elder participants in gerontechnology development "actively dissociated themselves" from the images of a user who is portrayed as frail, old and lonely and tap "into a repertoire of successful ageing, positioning themselves as healthy, active elders who were helping needy old people" (Neven, 2010: 344). Interestingly, during my data collection, Fabian, a project director I interviewed, told me how, in his view, the idea of long term independent living was nothing more than an idea that was caused by "a push from the system". He went on to note that "because there is no budget for intramural healthcare (…) people are living longer in their homes but it's not necessarily because they want to".

The last years have been prolific in published material focused on the issue and impacts of an ageing society, showing the extent to which society is ageing and its tendency to age even further. According to Eurostat (2015: 2), it is believed that in the EU, by "2080, almost 1 out of every 8 persons (12.3% of the population) would be aged 80 or over". In OECD's countries the tendency is similar, with those over 65 years expected to account for 25.1% of the population by 2050 (OECD, 2010 and 2015). In Japan, for instance,

with the expected share of the 65+ population to reach 40% by 2060, the country is working on "solving the 'super-ageing' challenge" (Saito, 2014). Across the world, it is now understood that even in lower-income countries the ageing trend is being replicated (World Health Organisation, 2015).

Some factors appear to be correlated. On the one hand, this "triumph of development" (UNFPA and HelpAge International, 2012: 16) can be perceived as a result of access to better nutrition, medical and technological advances, scientific discoveries, better healthcare, and improvements in health technologies, which have helped with decreasing the amount of illnesses. On the other hand, a decrease in birth rate coupled with "the combination of a smaller working population and a higher share of retired people will place additional strains on our welfare systems" (European Commission, 2010: 5). The longer people tend to live the higher the likelihood for them to spend part of their lives with some type of long term condition. Because everyone is ageing, this means that, simultaneously, the active workforce of carers, health and social care professionals will shrink. The consequence is easy to realise: ageing people in need of care may not have the required care when, in fact, they need it.

Through this lens, it is easy to understand why ageing may, in some instances, be perceived as a threat and how the challenges that a changing demographic appears to pose on social, economic and healthcare infrastructures and welfare systems become clearer.

Despite those challenges, the ageing threat has, in some occasions, been reframed within a more positive lens, and taken as an opportunity. In Europe, some initiatives have started to materialise such ideas into practice, even if acknowledging that "the opportunity that a European ageing society offers in economic terms" (AAL Programme, 2016a: para 1) is not yet clear. Also, across the world, there is recognition that longevity should be equated with more positive outcomes. According to the United Nations Population Fund, it is "how we choose to address the challenges and maximize the opportunities

of a growing older population that will determine whether society will reap the benefits of the 'longevity dividend'" (UNFPA and HelpAge International, 2012: 12). One of the choices needed to deal with an ageing population may be to start by recognising that population ageing is inevitable and that local, regional and national governments should be aware (and prepared) for such change. Simultaneously, this effort on building awareness should be extended to citizens, their families and communities, businesses and health and social care providers (ibid.).

Acknowledging that people who live longer will also continue to be active for longer leads to the idea that older citizens may become a source of both economic and social sustainability. For instance, it has been suggested that through harnessing innovation and new technologies to contribute to the autonomy of older people, and ensuring that an elderly population can remain in work for longer, citizens would be enabled to maintain their role in society whilst at the same time "avoiding labour shortages in ageing societies" (OECD, 2015: 15).

The concept of the Silver Economy has been one of the most popular in reframing the idea of an ageing threat into that of an opportunity (OECD, 2014)[2]. What characterizes the Silver Economy? "Whilst there is no single agreed definition, it is generally characterised by a focus on the opportunities arising from ageing, in terms of new and growing markets to meet the needs of the increasing number of older people" (Eatock, 2015: 2). For some, the opportunity lies in "turning the 'silver' economy into gold" (Ahtonen, 2012: 1), by promoting healthy and active ageing, as well as an active involvement of citizens (old and young) in the creation of much needed healthcare solutions. In this way, elderly people are not only regarded as sources of business opportunities, they become active participants in their provision, as "sources of innovation" (von Hippel, 1988)

[2] See also www.silvereco.eu

In Europe, one of the ways in which that aim has been achieved was through the implementation, in 2011, of the European Innovation Partnership on Active and Healthy Ageing – EIPAHA[3]. This initiative brings together relevant stakeholders at regional, national and European levels to tackle the social challenges brought about by an ageing population. The aim is to achieve a triple win by: "improving the health and quality of life of Europeans with a focus on older people; supporting the long-term sustainability and efficiency of health and social care systems; and enhancing the competitiveness of the European industry through business and expansion in new markets." (EIPAHA, n.d.: para 3).

Another way in which Europe is trying to promote healthy and active ageing is through a commitment by its member states to increase the employment rate of its 20-64 years-old population (Ahtonen, 2012). This is still work in progress, as it will probably require a reframing of pension systems across Europe, as people will, in the long run, likely be asked to stay in the labour market for longer, to make up for a decrease in the number of people at work (ibid.). Recent reports show how this is also a worry for countries outside Europe, with examples from Japan illustrating the need for the elderly to "keep on toiling" as a consequence of the evident greying of the country's workforce (The Economist, 2017).

Following from what has been discussed so far, and before continuing through to the next section, I would like to note that, regardless of whether it is regarded as a threat or as an opportunity, it is fair to accept that population ageing is happening and its potential consequences for social, economic and political systems appear to have generated some initiatives (in Europe and across the world) aimed at preparing for the future effects an ageing society may have in health and social care provision and the economy in years to come.

[3] https://ec.europa.eu/eip/ageing/about-the-partnership_en

The question now becomes: How has the ageing threat (or opportunity) been tackled so far? What solutions have been offered, and how have they been implemented to try and prevent the anticipated consequences an ageing society will have in the future of healthcare provision?

In the next two sections I will present and discuss literature that suggests how the ageing threat seems to have been fought with two main strategies. The first, a technological one, sees technology being used as the preferred solution for the future consequences of an ageing demographics, a scenario where the existence of technology guarantees success in leading a healthy and independent live into our older years. The second strategy may be defined as more human-centred, participatory one. In this case, if the ageing problem is to be successfully addressed then a needs-based approach, where the active involvement of citizens in the development of healthcare solutions (technological or others) is promoted, seems essential. These two approaches are the focus of the next two sections.

1.2 A technological fix

When it comes to healthcare provision, the "lure of technology" has been highlighted by some (World Health Organisation, 2010: 10-11) as a tendency where technologically based offers have, in a considerable number of cases, been perceived as the most appropriate solutions for the challenges of an ageing society. Despite this appetite for a high-tech offer, evidence appears to suggest that we may, however, be in the presence of a technological fix that may not sustain in the long-term. In what follows I will present and discuss such evidence.

Before continuing, I would like to clarify that, for the time being, whenever the words *technology* and *innovation* appear they should be interpreted taking into account the definition provided by Dodgson et al (2008: 2) who describe technology as "a replicable artefact with practical application, and the

knowledge that enables it to be developed and used" which can be "manifested in new products, processes, and systems, including the knowledge and capabilities needed to deliver functionality that is reproducible". As for innovation, it is "much more than invention - the creation of a new idea and its reduction to practice - and it includes all the activities required in the commercialization of new technologies (…)". It is the "successful commercial exploitation of new ideas. It includes the scientific, technological, organizational, financial, and business activities leading to the commercial introduction of a new (or improved) product or service" (ibid.). What is important to keep in mind is that, in such a definition, successful innovation is synonym with commercialization. Later in the work it will become clearer how my take on innovation is slightly different. But for now, and to help with the present discussion, I will be using Dodgson el al.'s (2008) concepts.

A look at some economic data may help with shedding some light on why the provision of technology seems to have been given primacy when talking about healthcare solutions[4]. In the UK, for instance, the life sciences industry as a sector has a positive impact on the UK's overall economic performance and, with people living longer, the potential for product innovations in this sector explains the growth in the number of companies entering this market. According to the Department for Business Innovation and Skills (BIS, 2016) the healthcare marketplace is a common ground for companies in the medical biotechnology, medical technology, industrial biotechnology and pharmaceutical sectors. "Companies in the medical technology sector are those whose major business activity involves the development, manufacture, or distribution of medical devices (...) and companies who have significant activity in supplying specialist services to the medical technology sector"

[4] Although, in the previous section, I have provided evidence from across the globe to show how global the ageing challenge is I shall, from now on, focus more on European evidence. The reason for this choice is that such was the context that most heavily influenced my research and where my data was collected. Non-EU evidence may still be discussed for comparative purposes only.

(European Union Medical Devices Directive 93/42/ECC, cited in BIS, 2014: 14). These may include, but are not limited to, businesses working in the Assistive Technology, Information and Communication Technologies (ICT), e-Health, telehealth, telecare and mobility access sub-sectors.

The UK life science sector technology sector generates a combined annual turnover of £60.7 billion, product of the work of 5,633 companies across the country. A look at data from the medical technology sector alone shows that in the period 2011-2015, the sector employment grew at just under 12%, with a turnover of £17 billion. It is also worth noting that digital health is the segment accounting for the fastest growing rate of employment - +28%. (BIS, 2016).

The positive economic impact of the medical technology sector is also felt across Europe, where the sector acts as employer to over 575,000 people in almost 25,000 companies, of which 95% are small and medium-sized companies (SMEs). The market value of the sector is estimated at 100 billion Euros and it makes for up to 31% of the total medical technology in the world. In terms of trade, Europe showed a positive balance of 14 billion Euros, twice as much as what had been verified in 2006 (MedTech Europe, 2015). Innovation in the sector is thus key for the continuing success of companies that intend to create globally scalable products and services for an ever more demanding healthcare industry.

The data above suggest that we may be in the presence of an economic imperative for a technologically driven approach to ageing, product of the positive influence the medical sector exerts in the wider economy. However, it seems also true that a widespread perception of health technology as something that successful long-term healthcare provision cannot go without is present. An interest in ICT use within healthcare contexts seems to be present, either to make communication between healthcare groups and teams possible or to deliver care in a safer and more efficient way (Cresswell et al., 2010).

In its 2015 report, the European trade association for the medical industries states that when it comes to medical technology devices "they all share a common purpose: improving, extending and transforming peoples' lives". (MedTech Europe, 2015: 7). A consequence of medical technology use is its acknowledged "beneficial impact on health, quality of life and society as a whole" with the added contribution to "living longer and better, and empower citizens to contribute to society for longer", which leads to improving "the quality of care and the efficacy, efficiency and sustainability of healthcare systems" (ibid.).

Such a rhetoric may end up having an effect (even if indirect) on the innovation policies within the medical technology and healthcare sectors. If medical technology is portrayed as such a sustainable, feasible, and profitable option it is likely that the sector may attract investment and business. Also, because of the rapid pace at which social, economic and organisational changes take place, firms face a pressing demand for constant renewal. However, this renewal, may not just be about high value activities, but also about increasing productivity across sectors, as well as building new capabilities and functionalities. Moreover, and if innovation is to thrive, governments at local, regional and international levels must be willing to support those activities, helping the private sector to compete and, more than anything, promote innovation as "a focal point of their economic and competitiveness strategies" (Atkinson and Ezell, 2012: 134). The need for an innovation policy emerges, with a view to maximize innovation and productivity. Translating this idea into innovating healthcare provision systems, means to be able to think forward in terms of what the sector will need to offer, as well as the needs it must respond to in the long run.

Such seems to have been the case across Europe, with the boom of initiatives calling for innovative solutions to solve the challenges an ageing society appears to pose.

A good example was the policy framework launched by the European Commission in 2005, entitled "i2010- A European Information Society for Growth and Employment". This was a European wide strategy promoting the development and later daily use of digital technologies – in work and private life situations. ICTs were there perceived as making "a positive contribution to economic growth, job creation and the enhancement of the quality of life" (European Commission, 2008b: 1) and, most importantly, portrayed as "Europe's best-bet investment for the future" (European Commission, 2005: 1). That strategy has also promoted the development and diffusion of e-Health technologies as an effective way to improve healthcare provision for an ageing population, as it would allow citizens to live independently, for longer, in their own homes, by supporting their well-being and daily activities.

The narrative of the European Commission seems to have endured and, ten years after the launch of i2010, it was still possible to come across reports of how, "in times of austerity", ICT was being promoted as "our most powerful ally to maintain cost efficient and high-quality care" when "public health systems are facing shrinking budgets and increased demand" (European Commission, 2015: no paging).

Other strategies, such as Europe 2020, also viewed the support for technological initiatives as the right way in which to meet societal challenges, such as the transformation in health systems and demographics. One of its key commitments was to encourage partnerships amongst member states to "speed up the development and deployment of the technologies" that could meet the identified needs and "allow older people to live independently and be active in society" (European Commission, 2010: 10).

Europe 2020 led to the creation of one of the most important European financial instruments ever – Horizon 2020 – to increase Europe's competitiveness (European Commission, 2011) [5] . Horizon 2020 was perceived as a way to boost innovation by facilitating the implementation of

[5] See also: https://ec.europa.eu/programmes/horizon2020/en/what-horizon-2020

ideas that could help with tackling societal changes, through the production of "breakthrough technologies and translate them into new products, processes and services" (ibid.: 2). One of the identified challenges needing a response was the area of "Health, Demographic Change and Wellbeing"[6], where innovative technologies were, once more, perceived as effective ways to "keep older people active and independent for longer and help European health and care systems to remain sustainable" [7].

Horizon 2020 also finances and acts as an umbrella initiative to other initiatives, one of which is the Active and Assistive Living Programme (AAL Programme 2016b: no paging), aimed at SMEs looking to bring products to the market. The aim of the programme is to "enhance the quality of life of older adults while strengthening the industrial base in Europe through the use of ICT" and covers topics such as "management of chronic conditions (…) mobility of older adults (…) support from informal carers (e.g. family and friends) and occupation in life". More recently, projects financed through Interreg Europe show how European structural funds continue to support initiatives where the aim is the creation of "more opportunities to implement new technologies in the health care sector, to create job opportunities and to provide better services for elderly" (Interreg Europe, 2017: no paging).

From these documents and literature, one can see that the idea of technology as an essential tool to respond to the societal and healthcare challenges posed by an ageing population has been rife. Not only in policy documents but also across other media, such as project websites, consultancy documents and newspapers. For instance, Smith (2012) notes how an ever-more networked society can directly help an older generation, by allowing for the presence of websites where people can share ideas about how to care for their loved ones, or how supermarkets and banks started looking at ways in which to improve their online services in order to better respond to the needs

[6] https://ec.europa.eu/programmes/horizon2020/en/h2020-section/health-demographic-change-and-wellbeing
[7] https://ec.europa.eu/programmes/horizon2020/en/area/health

of their older customers. Grosse (2015), in turn, reports on the wonders of telecare systems and how these brought more independence to patients who did not have to visit the hospital as often, even if there was acknowledgement that, although technology may improve healthcare systems, it should not be regarded as a panacea. In one of its recent press releases, 2020Health, an independent think tank in the UK, referred to older people as "power users" of health technology, highlighting how older generations are willing to embrace technology (2020Health, 2016).

Yet, whilst healthcare technologies may bring about some benefits, it may nonetheless be difficult to correctly predict the extent to which a direct link exists between the existence of innovative technology and the provision of better and (cost) effective healthcare.

1.2.1 Contesting the technological fix

The idea of technologies as essential solutions to the ageing problem has been criticized by some (Mort et al., 2013) in what was termed the "crisis account of ageing" (ibid.). The crisis account of ageing, of which Mort et al. (2013) are critical, argues "that without telecare solutions disorder will flow from situations where too many old people are living too long, needing costly care and with too few (unpaid) caregivers to look after them. In this narrative, telecare offers structure, explicit processes and security (often termed peace of mind) in cases where elderly people are alone at home, vulnerable to falling over, becoming ill, leaving the gas switched on and so on" (Mort et al., 2013: 803). This narrative, in accordance to what has been suggested above, promotes a "triple-win" rhetoric where, thanks to the existence of technology, older people are regarded as winners as they can "continue to live independently; society wins as public spending is reduced and healthcare systems are safeguarded; and the companies behind the technology win as they get to develop, sell, and make a profit on a new product" (Oudshoorn et al., 2016: 172).

Nelly Oudshoorn's work has highlighted the ways in which telecare technologies have been presented as part of governmental concerns with unaffordable healthcare systems. She identified three discourses used to sell (and reinforce) the idea of how important telecare is in responding to the perceived threat of an obsolete and bankrupt healthcare system and the demands of an older population (Oudshoorn, 2011). Firstly, the idea of a healthcare system unable to cope with an ever-changing demographic landscape, where people will tend to live longer with chronic diseases seems to be widely accepted. Telecare technologies are thus portrayed as essential tools to bridge the gap between the needs of an older population and the shortfall of human and technical resources. Within this view, care work ends up being transferred to telecare devices as well as to patient's homes. Secondly, there is the discourse of telecare as a means of rationalizing work and make healthcare more efficient. Care work is, in this view, expected to shift from expensive medical professionals to a more affordable category of telecare devices and workers. Also, because these devices are believed to increase the active role of patients in monitoring their own care, savings are to be expected, as healthcare moves from GP practices and hospitals to the patient's home. Finally, the discourse of healthcare neoliberalization, where patients are regarded as active agents of their own care. This view leads to a perception of the healthcare service as a commodity that patients can choose to buy and ends up redefining the "relationship between healthcare providers and users of healthcare technologies" which becomes "a contractual relationship rather than a public service" (Oudshoorn, 2011: 15).

Neven (2010: 344), studying the testing of a prototype robot to support the health of older people, showed how "age-based assumptions lay at the heart of technology design and implementation, both for technology designers and prospective users". On the one hand, "designers expected that old people would have a need for and could benefit from robots" anticipating that elder users would "want [health] robots". On the other hand, "elder participants [in the testing of the robot] also created a representation of the prospective user"

of the technology as someone "old, lonely and physically or mentally frail". As mentioned in the previous section, Neven was able to show that elder participants would not recognise themselves in images of old and fragile users in need of a health robot. They would, instead, adopt an "obviously not for me" stance and embrace the idea of how active and healthy their lives were, willingly helping *those* old people who truly needed help!

Perceiving technology as the cure of all evils when it comes to long-term health provision for an ageing population may, however, be a reductionist approach that "hides other changes in healthcare implicated in telecare technologies" (Oudhsoorn, 2011: 16), with suggestions being made that what really needs to be answered are questions such as: what happens to different actors when we see a distribution of healthcare among different actors (technologies included); or what will the consequences be of shifting healthcare from a physical one-to-one personal encounter to a virtual encounter between patients and healthcare professionals? (ibid.)

One group of healthcare technologies widely accepted as bringing long term benefits to health provision are those pertaining to the group of telehealth and telecare technologies (e.g. Department of Health, 2011 and 2013).

In the UK, around 2008, there was governmental interest in projects carried out to look at the impact that telecare technologies would have in terms of benefits for long-term healthcare provision. One of those initiatives was the Whole System Demonstrator (Department of Health, 2011). The Whole System Demonstrator (WSD) was a "pragmatic, cluster randomised controlled trial" that "used routinely collected administrative datasets to examine the effect of telehealth on primary and secondary healthcare and social care use by individuals with long term conditions (chronic obstructive pulmonary disease, heart failure, or diabetes) in three demographically diverse sites" (Henderson et al, 2013: no paging).

The problem with projects such as the WSD is that they raise questions in terms of evaluating whether the cost of implementing a technology matches

the potential benefits achieved. In the particular case of telecare, several sides to the same story appear to exist. For some, the benefits of using a particular technology would most definitely outweigh the costs of implementing it (Department of Health, 2011). Others, would claim that the creation of a new service or technology will always be more expensive than the benefits people will get from using the new innovations (McCartney, 2012; Davies, 2013). Finally, there are those to whom the issue is whether we are in possession of good evidence-based policies yielding results worth considering (Ekeland et al., 2010; Godlee, 2012). Overall, the available evidence appears to suggest that no evidence is, in fact, available that could justify the cost of adopting telecare systems, with some even suggesting the WSD was nothing more than a "public relation stunt" (McCartney, 2012: no paging).

In fact, implementing telecare, as well as other healthcare technology systems, appears to be an extremely complex process. On the one hand, we have a context of multiple stakeholders (patients, medical professionals, social carers, family members) and, on the other, the fact that a technological innovation needs to be combined with an organisational innovation (Barlow et al., 2006). This means that the existence and development of a specific telecare solution (the technology) does not guarantee, per se, its successful implementation and subsequent adoption. It needs to, most certainly, also be accompanied by adaptation at the organisational level (an organisational innovation), as different stakeholders need to be aligned with the aims of the solution for its successful implementation. Also, a successful implementation is believed to start at the planning and development stages, as the objectives of telecare need to be aligned in order to research which user needs are to be addressed, from what stakeholders, and at what stages (ibid.).

Regardless of the seeming need to understand the involvement of diverse types of stakeholders at various stages it appears that, as Gherardi (2010) notes, most studies in the telemedicine sector have either been focused on the systematization of results of pilot projects or on the evaluation of projects that have been implemented. However, an understanding of the implementation

difficulties within organisational contexts after the pilots have ended appears to be missing, which is surprising given that most difficulties seem to happen at this stage (ibid.). Research on the deployment of ambient assisted living systems also shows how real-life deployment is important in understanding the human and technical requirements of technology (e.g. Aloulou et al., 2013).

Researchers have, in fact, been urged to cross the "implementation line" in order to overcome an existing tendency of "treating *implementation* as a point at which the development of a technology stops and its use begins", which is seen by some as "empirically inaccurate" (Leonardi, 2009: 279, italics mine)[8]. In this view, development, implementation and use activities are perceived as mutually constitutive, and it is the relationship between all those activities that needs to be understood. Why? Because, according to Leonardi, such activities are "related, they often overlap, and they influence each other through the choices made within and between the communities that come into contact with the technology" (ibid.: 298).

Understanding the implementation of innovations in complex systems has been the focus of some recent work, with an emphasis on healthcare innovations and telecare (e.g. May 2013a and 2013b). The underlying argument is that whenever an innovation comes into being it rarely presents itself as a thing. Instead, it appears as something that looks like a thing, which can be a new system, an artefact, a new way to organise work or a new way of thinking. Moreover, whenever an innovation is introduced in a complex system, such as within a healthcare context, it is likely that it will never be isolated from the social, technical and spatial contexts in which it is delivered, and it will end up configuring and being configured by the social world they will be part of. The introduction of a (healthcare) technology innovation

[8] This idea resonates with the notion of Domestication as proposed by Silverstone and Haddon (1996; also, Silverstone, 2005), whereby in the process of technology consumption the act of purchase is not the end of the product journey. In this view, appropriating a technology involves the active participation of consumers in deciding whether the technology will be accepted or rejected.

(artefact or otherwise) is, thus, only the start of the story. It is then necessary to understand how these innovations and material practices "become routinely embedded and integrated into their social contexts – how they become normalized, or not" (May and Finch, 2009: 537).

In that process, participants are involved in some kind of work with contingent outcomes, and understanding this normalization may help exploring "the social production and organization of this work", in order to better appreciate and consider underlying "contingencies" and "their effects" (May and Finch, 2009: 538), as well as clarifying how complex interventions become operationalized in practice. A complex intervention is here regarded as a conscious attempt to introduce a new, or change an existent, pattern of collective action in an organisational setting (May et al, 2010) and the focus is in understanding the work that people do. In this context, work means a "purposive social action that involves the investment of personal and group resources to achieve goals" (May and Finch, 2009: 539). Normalization may, thus, be defined as the work carried out by actors engaging in a diverse set of activities (e.g. using a new technology; carrying out a new design process), leading to it being frequently embedded in the daily practices. This implies that actors - individuals or groups interacting with each other in a particular context – need to understand and assemble a set of cultural and material resources as well as negotiate, get agreement and cooperation from the other elements that are part of the context in which the implementation process takes place (May, 2013a).

This process helps to explain the social processes involved in the implementation of material practices (e.g. a new organisational process, technology; or design system) and, as May and Finch (2009: 540) note, "[material] practices become routinely embedded in social contexts as the result of people working, individually and collectively, to implement them; (...) production and reproduction of a material practice requires continuous investment by agents in ensembles of action that carry forward in time and space". Their focus is on the agency of individuals and groups whilst trying

to offer an explanation of the work of implementation, embedding and integration of material practices.

Oudshoorn (2011) has, in turn, shown how the implementation of telecare has the power to affect and transform the delivery of healthcare, with different groups of stakeholders developing different views of those products. Contrary to earlier studies suggesting that medical technology was a way to set up and reinforce the boundaries of a social / professional group, Oudhsoorn's findings show how introducing telecare technology challenges, more than it preserves, those same boundaries.

Through the concept of "boundary work", referring "to the work involved in maintaining healthcare professionals' authority over their qualifications" (Oudshoorn, 2011: 69), we are shown how "telecare technologies both initiate and are shaped by boundary work among healthcare professionals" (ibid: 70). The technology studied by Oudshoorn was a heart mobile phone and, at the time the technology was launched, it became clear how the device was designed to reconfigure the user of electrocardiograms (ECGs) as the patient and not (as until then) as the healthcare professional. This reconfiguration of the patient as a primary user led to "fierce resistance from medical professionals" and "general practitioners considered the new technology as a threat to their profession" (ibid: 72). The interesting fact in this finding is that the resistance shown by the medical professionals led the company that created the mobile phone to redesign the device, just so the primary user would be the healthcare professional (as expected) and no longer the patient! The boundary work of the healthcare professionals had a significant impact on the technology and its intended use(r)s. At the same time, the political discourse (as discussed above), that puts the patient at the centre of his/her own care and perceives them as "primary users of all kind of new medical devices, transforms patients into potential intruders" (ibid: 87-88). It is as if the "intruder" ends up performing tasks that used to belong to a specialist medical profession.

A final illustration of the underlying complexities of healthcare technology implementation is offered by Jeannette Pols (e.g. Pols, 2012; Pols and Willems, 2011). In response to a lack of knowledge on the subject (regardless of all the hype surrounding the industry), Pols aimed at understanding how the implementation of telecare happens in practice, critically analysing the discourse of how telecare makes healthcare delivery more efficient, cost-effective and supports self-care (see also Aceros et al., 2015 and Neven, 2015). Pols uses a material semiotic approach to show how the "relation between humans and objects changes identities in practice, and these identities change when the practices, relations, and attributes change" (2012: 17). Regarding the claim that telecare allows for self-care, Pols (2012: 76) considers it to be "misleading to think in terms of one patient (i.e. one self) caring for the self". In fact, the self is never on its own and is actually shaped by the surrounding "devices, professional carers, objects, regimes and other people" (ibid). Pols offers a great insight on the mismatch between the political discourse of telecare technology as a (almost) perfect solution to healthcare delivery and the actual practice of implementing the technology. One of the challenges highlighted is the difficulty of domesticating the technology[9]. As an innovative practice, telecare is in its infancy, which means that any attempt at implementing it will be entering unknown territory. As in bringing a new pet into one's house it is almost impossible to predict what may happen. Will it chew the much-loved Victorian chair? Will it adapt and blend well with our daily routines? Have we to adapt to the new element in the family? New technologies are, in Pols' view, no different. One needs empirical studies in order to begin to understand the way they will work or the effect they will have in the lives of those living with them. As Pols found: "innovative telecare practices (…) were complex practices still under construction (…)" and notwithstanding the existence of "seemingly sensible theories about care

[9] Pols's work is informed by Silverstone's (2005) work on Domestication, an approach that "informed the study of creative use practices where users put technologies to different uses than their designers intended" (Pols, 2012: 18).

and the working of technology" these "were proven wrong, again and again" (2012: 137).

1.2.2 Looking beyond technology.

From the evidence discussed so far, it is fair to say that the idea of a new (assistive) technology, telehealth or telecare system to solve the problem of long term healthcare provision for an ageing population does not suffice. Promoting such a rhetoric, even less so! Innovating ways of healthcare delivery often implies innovations in terms of both technology development and service provision. Also, it is necessary to acknowledge that not only one group of stakeholders is involved in the process, with various groups (carers, doctors, patients, relatives, funders, insurers) ending up with different degrees of connection to a specific technology or service, as well as facing potential difficulties when working with the technology. It is thus necessary to acknowledge, as noted by Duarte and Guerra (2012: 197), that the "real needs of doctors, nurses and other service providers" also need to be understood if one is "to return a really useful, complete and desirable solution".

To seriously consider technology as a potential solution to the ageing threat, one needs to acknowledge the existence of a rhetoric that frames technology as a *sine qua non* for a successful healthcare provision. After identifying that rhetoric, it is important to "question it and subsequently look beyond it" as this will allow "carers, care organizations, policy makers, and most importantly, older people" to "make fair assessments of the technological options available to them" (Neven, 2015: 43). As shown by Greenhalgh et al. (2013: 92), "the illness experiences and assisted living needs of older people are diverse and unique, hence do not lend themselves to simple or standardised technological solutions". To start overcoming this lure of technology, we should recognise that development, implementation and use are not static and sequential stages of a linear progression but, instead, mutually constitutive activities of a more fluid process (cf. Leonardi, 2009).

Acknowledging that technology appears to be linked with several meanings, making it almost impossible to separate it from its impact on people's lives, is also essential. Treating assistive technologies as neutral entities is not helpful either. In fact, it appears to be a myth (Polgar, 2010). The meanings that users attribute to technologies are key factors on the uptake or abandonment of those same technologies. For instance, technology can be regarded either as a tool (as a mean to an end, for the user to accomplish something), or as a sign of disability (signalling to others the disability or particular need of the user). Ambulatory ECG recorders, for instance, can be perceived as handy tools to monitor heart rhythm problems when the patient is at home, and as a nuisance whenever the patient needs to go shopping or to work, showing how "the same technological device can do and mean different things in different places" (Oudshoorn, 2012: 136). Also, the space where interactions between users and technology take place shapes the way in "which technologies enable or constrain human actions and identities, including relationships among people and between people and technological devices" (ibid.).

Avoiding the rhetoric of technological fix may be challenging, but is achievable nonetheless. As suggested by Pols and Willems (2011:496): "Rather than promises that technologies will, by their sheer installation, 'fix' something, there is a need for more modest accounts of technologies in practices, details about ways in which technologies are working, who is using them and what goals are brought into being".

In the next section I will critically discuss a separate set of evidence suggesting that issues of citizen participation, human-centeredness and co-creation have gained momentum when it comes to find solutions to the long-term challenges of an ageing population. In this alternative strategy, the active involvement and participation of citizens in the development of healthcare solutions (technological or not) is promoted.

1.3 A participatory approach to ageing.

Considering what has been discussed above, and the fact that technology, on its own, does not seem to be a suitable solution to the "ageing threat", some questions remain. How (and whether) can the demographic challenge be effectively tackled? Also, how could the needs of an ageing population be successfully considered if, as suggested by Mort et al. (2013: 810), healthcare technology is not to be regarded "as a universal solution, as much of the industry and policy literature implies, but as a situated one"?

Several factors have been found to prompt healthcare innovation: an unstable operational landscape; technological changes; budgetary cuts; persistent and long-term health problems; changing patient needs; social concerns; supply chain necessities and sustainability obligations (Akenroye, 2012). Also, the multitude of stakeholders and dimensions influencing the innovation process highlights the importance of shifting the focus from clinical and medical technologies to service provision in general, with service innovation accepted as a suitable answer to the challenges posed by an ever-growing older population with diverse and shifting patient needs (e.g. Peckham, 2000, cited in Akenroye, 2012). At times, innovation in healthcare has been viewed as "those changes that help healthcare practitioners focus on the patient by helping healthcare professionals work smarter, faster, better and more cost effectively" (Thakur et al., 2012: 564), which means that healthcare innovation is also about the practice of healthcare *per se*, and not only about the existence (or not) of technology. According to Thakur et al. (2012), in the US, future trends of healthcare delivery appear to show that we may be moving towards a model where efficient healthcare delivery is about *better* treatment and not *more* treatment. Better treatments will be based on the patient's personal history, with the aim of improving treatment solutions that worked in the past and making them more effective (ibid.).

Appropriate solutions for the delivery of future healthcare may, thus, rely on a shift from a provider centred and technological deterministic model of

care provision to a model designed around what patients really need (cf. Porter and Lee, 2013a; 2013b), highlighting the importance of involving users and other stakeholders early in the development of healthcare innovations. As it stands, healthcare provision appears to ignore which outcomes matter for patients, how people are doing, or the extent to which interventions are beneficial or able to reduce costs. Paradoxically, most attempts at implementing IT healthcare solutions have failed at keeping track of patients' information over time and providing different caregivers with consistent and relevant patient information, with a majority of healthcare IT systems appearing to have been designed to save money for individual services rather than measure the value of care for patients (ibid.).

Calls for participation, co-production and user and stakeholder involvement in the development of healthcare solutions have, in fact, been widespread. Nesta – the UK's governmental innovation foundation – has published widely on themes such as people powered health (Nesta, 2012; Horne et al., 2013), networks of integrated care services (Nesta, 2013); and the "growing consensus about the need for health and care services to embrace the benefits of taking more person- and community-centred approaches" (Nesta, 2016: 39). This highlights an interest in the active role people may play in the creation and development of solutions for their own health and social care. These ways of innovating may then be used "to spread the patient–centred and preventative approaches that can more effectively confront the conditions that are causing costs to rise" (Bunt and Harris, 2009: 38). WHO has also published on the subject, highlighting the advantages of a people-centred approach to health care, believed to restore "harmony and balance to individuals, as well as harmony and connectedness between people and their environment" with the added benefits of "increased patient safety, improved adherence to care plans, improved treatment and health outcomes, increased patient satisfaction with care, and improved quality of life for patients and their families, the community and society at large" (World Health Organisation, 2007: 17)

This interest in participation may be perceived as a way to contest the idea of a technological determinism, as discussed in the previous section. For instance, when Wiebe Bijker asks "How is technology made?" (2010) he is building upon a tradition started a couple of decades before (Pinch and Bjiker, 1984) where the social construction of technological artefacts (SCOT) was explored. In this framework, the development of technological artefacts is not perceived as isolated from the social environment in which they are used and understanding the process of social construction forms the basis of knowledge about a certain phenomenon. Up until then, most innovation studies were focused on identifying the factors that made firms innovative (e.g. company size; existence of R&D departments), contributing to understand what made technological innovations economically viable. However, because the contents of the innovation were unknown, only a simplistic and linear view of the innovation process was achieved. An explanation that accounted for technological innovation as something socially constructed was needed and, as Leonardi (2009: 283) notes, SCOT "proposed an alternative theory that explains how social practices shaped the development of new technologies". It is thus important to accept that the "distinction between technology and society can be transcended and that the subject matter of analysis is sociotechnology" (Bijker, 2010: 70). Here, technology is regarded as a force acting to (re)shape human activities and their meanings. In the context of health technology, as seen above, a new artefact may transform the way healthcare is delivered, the meaning carers and patients attribute to the available technology and medical care, and how stakeholders within the system (from policy makers to users) think about illness or even death. As Bijker (ibid: 64) observes: "Technology comprises, first, artefacts and technical systems, second the knowledge about these and, third, the practices of handling these artefacts and systems".

Accepting that technological determinism is not a sufficient model in which to understand the provision of solutions for long term healthcare, opens the way to a more strategic use of users to actively influence the process of

technology development[10]. This is in line with work on Human-Centred Design (HCD) which Steen (2008: 19) sees "as an attempt by researchers and designers to open their research and design efforts to users; an attempt to step outside their ivory tower and interact constructively with people out-there for whom they are developing a product".

According to Steen (2008), HCD is an alternative to the technology push paradigm. Often, the underlying root of many ICT innovations is a technology push paradigm, which seems to be favoured when developing new products and services (Brown, 2009; Stickdorn and Schneider, 2011). Widely used to make sure computer-based systems are designed in ways that improve the quality of human-system interactions, the adoption of HCD means that those in charge of design processes apply a "human-centred design perspective that can be integrated into different design and development processes in a way that is appropriate to the particular context" (British Standard Institution, 2010: 5).

The rationale behind this framework is that systems designed with HCD principles in mind lead to products that are easier to use, understand and deliver better user experiences. Such an approach calls for a thorough understanding of the needs of users, their tasks and environments and not simply technology (Norman, 1999; Giacomin, 2014). Also, users should be part of the entire cycle of product development, as they are key elements on the iterative process of feedback provision, with the design process focused on the entire user experience. A multidisciplinary team, with a wide range of skills and perspectives, is also needed.

However, simply understanding user needs may not be enough. Empathic design has been proposed as way to extend the focus from the needs of users

[10] The notion of user involvement in innovation and technology development processes will be discussed in more detail in Chapter 3. For now, and for the simplicity of the argument in this section, I chose to focus on the SCOT approach as a counterpoint to the idea of technological determinism. One should, however, bear in mind that SCOT is only one amongst a variety of approaches aimed at understanding user-technology relations. For a detailed overview of those approaches see Oudshoorn and Pinch (2008). For criticisms of the SCOT approach see, for example, Winner (1993) and Kallinikos (2004).

to the activities they perform (Thomas and McDonagh, 2013), taking designers to empathize with those for whom they create products for. The issue is to understand the diverse ways in which individuals interact with products and how they perform daily tasks (see also Norman, 2005a). A focus on the activity allows "unarticulated needs" to be uncovered, which are needs that "even the people who need them cannot yet articulate" (Norman, 2005b: 74). Within the healthcare sector, "using empathic strategies is a way of encouraging the development of more effective products and services" and can "serve to further develop and deepen the humanistic-centred approach in the education of healthcare practitioners" (Thomas and McDonagh, 2013: 5).

Even though HCD approaches have proved successful in practical settings of product development, service innovations and business strategy (e.g. Brown, 2009; Esslinger, 2009), it may be worth considering that their practical application is not straightforward. Steen (2012) showed how HCD practices differ from its principles – the theory (i.e. what *should be* done) versus the practice (i.e. what *is* done) – and, although HCD practitioners aim to be open towards others they end up, without realising, moving more towards their own self, filtering information to match their sets of believes, skills, ideas and interests (ibid.). Also, the fact that decisions need to be made in a project – closure (cf. Derrida, 2001, cited in Steen, 2012) – may present itself as a limitation to the extent to which designers will (or can afford) listen to users.

1.3.1 Participation: Democracy or Tyranny?

When it comes to health and social care, patient involvement is regarded by some as "an essential component of delivering a more person-centred service that is tailored and responsive to individual needs and values" (Foot et al. 2014: 12). In line with principles of Participatory Design (PD), a shift is thus necessary to offer a "fundamental transcendence of the users' role *from* being merely informants *to* being legitimate and acknowledged participants

in the design process" (Robertson and Simonsen, 2013: 5; emphasis in original). Behind the idea of participation lies a democratic ideal, where those "who may be invisible or weaker in organisational power structures" are given a voice to assert "their needs to those in power" (Kensing and Greenbaum, 2013: 33). Even if the idea of opening the innovation process to the public was once a foreign concept, today the "opening up of processes of research, technology development and environmental governance to publics may be considered the rule rather than the exception" (Marres, 2015: 16).

The idea of innovation as a networked based phenomenon is thus applied, where science and technology cannot be perceived as separate from wider social, economic and political practices. Innovation becomes a context-based activity, influenced by a varied network of social contexts and stakeholders, and not limited to a linear process taking place within laboratories or research and development centres. Such view also has implications to the politics of innovation, which stops being "situated in Parliament – the seat of democracy" to take politics and democracy to other places of the innovation network. (Van Est and Brom, 2012: 319)[11].

So far, it seems that the opinions, views and needs of those using a technology (or service) are recognised as important sources of information when it comes to the creation of appropriate solutions. Some would claim that process to be as participatory and democratic as it gets. However, it is fair to question how democratic that process really is. What are the real reasons behind people involvement and participation? Also, can we be in the presence of a rhetoric corresponding to that of the "technological fix" (see section 1.2), pushed by political and economic interests?

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[11] Issues of participation will be further discussed alongside the literature on Living Labs. For now, I just want to make the point that calls for a participatory (and democratic) idea of innovation do exist and have been widespread. Also, it is important to highlight that the idea of democracy discussed here differs slightly from the notion of Democratic Innovation in the work of Eric von Hippel (2005). Whereas von Hippel's idea is based on an economic model of innovation, where innovation equals more products, the participatory model here discussed is concerned with a democratic approach, in which people have a chance to actively participate in the creation of a more sustainable future (cf. Ehn et al., 2014).

Some researchers have found that, in the context of medical devices development, although the benefits of incorporating user needs appear, in theory, to be acknowledged, there is, in practice, "little evidence of how this is done, how the results of this are incorporated into the product development process, or indeed of the difficulties of doing both of these things" (Martin and Barnett, 2012: no paging). According to Martin and Barnett (2012) three factors appear to influence the degree in which manufacturers involve users. The first is regulation. More and more, US and EU governmental regulatory bodies require manufacturers to provide evidence of utilizing user-centred methods in the creation of medical devices, and a device is not launched if such requirements are not met. The second factor has to do with funders of health technology. Funding appears, more often than not, attributed as an award to companies promising to involve device users, as well as other potential stakeholders, in developing new technology. As most companies working with medical technology in the UK are SMEs, this funding is key not only for the companies to develop new products but also to keep them afloat. Finally, a third factor is that with more and more literature available on user involvement, manufacturers are, theoretically, in possession of tools that can help them with developing strategies to effectively conduct user research (ibid.).

Taking those factors into account, one may be led to argue that user involvement may not always be carried out to understand users' real needs. Could it be that the involvement of users in technology development happens for the wrong reasons? For instance, the fact that companies need to secure funding and regulatory bodies request usability tests, may cause user input to be used not at improving the product or service being created (as intended) but to fulfil necessary bureaucratic prerequisites.

As previously noted, calls for citizen participation have played a key role in government-supported initiatives (e.g. Foot et al., 2014; Hibbard and Gilburt, 2014; Nesta, 2016). A good example is the idea of the "Big Society", presented by the 2010-2015 UK's Conservative and Liberal Democrat

coalition government (Cabinet Office, 2010). The goal was to "give citizens, communities and local government the power and information they need to come together, solve the problems they face and build the Britain they want". The coalition government wanted "society – the families, networks, neighbourhoods and communities that form the fabric of so much of our everyday lives – to be bigger and stronger than ever before" acknowledging that "only when people and communities are given more power and take more responsibility can we achieve fairness and opportunity for all" (ibid.: 1). However noble these aims, one still gets a sense of how the government seemed to try and transfer some of its responsibilities to the citizens. In fact, some parts of the Big Society document read like an apology. For instance, when it is suggested that achieving a Big Society is the responsibility of every citizen and government department, and that the government "on its own cannot fix every problem" (ibid.), one gets the impression that putting "more power and opportunity into people's hands" (ibid.) can only be achieved at the expense of a government relinquishing its obligations, even if accepting, as suggested, that "we are all in this together" (ibid.). Whilst the aim of a Big Society may be to reveal stronger communities, the government seems to be given a chance to reveal its weaknesses.

The democratic and civil participation ideal claimed by the Big Society is not without challenges. A report from the House of Commons (2011:11) showed how one of the biggest challenges of the project was that "its very nature" would "necessitate a substantial change to Whitehall itself, and to the nature of government". Also, the government plans seemed to lack the necessary coherence to achieve the aims of a Big Society. Adding to these, suggestions have been made that, unless people were willing to acknowledge and discuss the inequality in British society, it would not matter how the government reimagined itself or how much communities participated, the Big Society could never be achieved (Cottam, 2009, cited in Emilson, 2014).

Although we may be able to acknowledge the potential benefits of user and citizen participation in developing solutions for challenges such as those

posed by an ageing population, it is also important to accept the challenges that such vision entails. No matter how democratic the collaborative and participatory mantra intends to be, the truth of the matter is that such an ideal view is only that: an ideal. Emilson notes that: "the view of the design process as a consensual activity should be challenged, and that contestation and difference are important elements of the process – especially in public or community contexts" (2014: 27). Practice reveals itself more complex and, even though the aim may still be one of giving voice to those who are often silenced, it may just be that they will seldom, if ever, have the final say.

The participatory ideal of democracy may thus turn into tyranny. Yes, the majority may regard (and practice) participation in a constructive, positive and empowering way. However, others may worry that "participation can become a rhetorical commitment that brings about no real change in people's power to affect the situations in which they live", being nothing more than a "bureaucratic hurdle to be jumped when promoting development programs" (McCarthy and Wright, 2015: 6). The tyranny of participation is reflected in the fact that, although an attempt is made to bring together different stakeholders and empower groups of people who are often ignored in society (Vines et al., 2013), the participatory process is often biased and not as participatory as promised. For instance, Bratteteig and Wagner showed that: some methods and tools may be considered more appropriate than others when it comes to working with users; important decisions are often made in the absence of the users and in ways that fit the project's aims (and not what users may necessarily need or want); and project leaders may end up deciding on behalf of users (Bratteteig and Wagner, 2012; 2014a and 2014b).

Back in 2001, Cooke and Kothari had already made the argument for participation as tyranny. Their understanding of tyranny stemmed from the fact that, in their view, "proponents of participatory development have generally been naive about complexities of power and power relations" (Cooke and Kohtari, 2001: 14) in practice. The authors claimed that a misunderstanding of power relations within participatory practices made it

necessary to "reconsider the notion of empowerment, and the claims to empowerment made by many participatory practitioners" (ibid.). Kohtari (2001), in turn, argued that because participatory practices often make use of a framework where dichotomies are reinforced (e.g. local vs global; powerless vs powerful), this leads to an assumption of powerful actors found at institutional centres, while the weak and powerless individuals are seen at a lower level. Only through participation can those individuals be empowered. However, one paradox of participatory research has been identified by Kohtari, namely, that regardless of how flexible and open the tools and techniques claim to be, there is a "desire to fix people's lives through processes of identification and framing of social interaction and activities" (Kohtari, 2001: 148), which reveals just how rigid the approach can be.

In summary, even though calls for citizen and user participation in the development of technological and service solutions abound, and its application appears to benefit the creation of products better suited to the needs of those who will ultimately use them (e.g. an ageing population), it is important to acknowledge that participation, as a process, is not a straightforward matter. The advantages of participation cannot be accepted without being contested. Such an approach would lead to a rhetoric of participation as a panacea to the issues of user and citizen involvement in the design of, for instance, long term healthcare solutions. The lure of technology, previously discussed, would be replaced by the lure of participation. In the example of the Big Society, with its underlying participatory mantra, we may be in the presence of nothing more than a cover up for the "regime's incapacity to do the right thing" (Seddon, 2008: 171). Accepting the democratic ideal promised by participatory approaches may be a reductionist tactic since, as discussed, democracy and tyranny may go hand in hand.

1.4 Living Labs: merging Technology and Participation?

Following from the ideas presented above, it seems that the ageing threat has been addressed with two main strategies. On the one hand, there is a strategy that sees technology as an essential solution to the demographic challenge (cf. Section 1.2). The mantra goes that, without technology, healthcare provision for an ageing population will fail. On the other hand, I have discussed another set of evidence that seems to suggest the ageing problem would be better solved if a participatory approach was adopted (cf. Section 1.3). Here, the solution to the ageing threat is believed to rest with those (in)directly affected by ageing (i.e. citizens, their families and population in general), calling for an active participation of these elements in the development of potential solutions. Of course, each tactic has its own limitations. Technology, *per se*, does not equal successful healthcare provision, and such an approach seems to ignore how issues of implementation, and the meanings people attribute to technology, may influence its (non-)adoption. In the case of participation, it seems that such strategy is not as democratic as one would make it, and that people involvement may sometimes be used as a bureaucratic design requirement that has nothing to do with listening to people's actual needs.

Living Labs may thus be presented as contexts in which both the technological innovation and participatory/user-centred approaches advocated to tackle the ageing challenge are brought together. This section offers a much-needed clarification of the notion of Living Labs and shows how these contexts can be regarded as ways in which to combine the creation of innovative solutions (technologies; products; methods; services or processes) with the active participation of various stakeholders (e.g. users; producers; local governments; universities) in the innovation process. Their aim is to create solutions better suited to the real needs of people.

Within the traditions of open and user innovation (von Hippel, 1988 and 2005; Chesbrough and Appleyard, 2007), Living Labs appeared as valid ways of testing and promoting people participation in the creation of new products and services. As a research theme, however, they are a relatively new phenomenon and research in the area appears scarce when compared to other streams of research, such as open and user innovation and innovation management literatures, where research has been much more prolific (e.g. Ståhlbröst, 2008 and 2012; Bergval-Kåreborn el al., 2009; Dell'Era and Landoni, 2014).

Living Labs were a practical response to the ever-growing need of involving users as generators of innovative ideas and as active participants in the innovation process and are considered to be valid ways in which to "provide structure and governance to the user participation" as well as "creating societal involvement" (Almirall and Wareham, 2008: 44). Such was the perceived success of those initiatives for the innovation process that, to promote these real-life spaces of co-creation between users and producers, a European Network of Living Labs (ENoLL) was established in 2006. As of January 2017, this "international federation of benchmarked Living Labs in Europe and worldwide" (ENoLL, 2017a: no paging), managed to build a network of 395 members from across the globe, of which only 170 were active in mid-2017. Although most of its participating elements are from Europe, Living Labs from Australia, Asia, Canada, South Africa and USA are also present (ENoLL, 2017a: no paging).

The main difficulty with Living Labs appears to be the lack of agreement when it comes to defining them. Living Labs have been defined as: methodological approaches to innovation (Mulder, 2012; Dell'Era and Landoni, 2014); environments amenable to open and distributed innovations with structures shared by a diversity of stakeholders (Guzmán et al., 2013) where user needs are catered for (Bergval-Kåreborn el al., 2009); open innovation networks (Leminen et al, 2012; Leminen, 2015a; 2015b); and approaches to innovation where openness, realism, empowerment of users

and sustainability are key principles (cf. Ståhlbröst, 2012). Perceived as ways in which to co-create innovations "through the involvement of aware users" (Dell'Era and Landoni, 2014: 139), Living Labs acknowledge the active role of end users in the innovation development process, where the innovation may be either a product or a service.

Others (e.g. Füzi, 2013) approach Living Labs from the perspective of a Quadruple Helix model of innovation (cf. Carayannis and Campbell, 2009).[12] In this view, the functions of Living Labs in the innovation process are dependent on which element of the helix plays a leading role in its activities: industry; government; academia; or civil society (Arnkil et al., 2010, cited in Pełka, 2013). However, regardless of whose role dominates, Living Labs are characterized by some commonalities, such as: a) participation, with all stakeholders in the value chain participating in the innovation development process; b) provision, at all stages, of services to customers of the Living Labs; 3) an approach focused on user needs, with evaluations taking into account the user's perspective; and 4) provision of infrastructures and tools needed for the creation of innovations (ibid.: 146).

ENoLL defined them as "real-life test and experimentation environment[s] where users and producers co-create innovations" (ENoLL, 2014: para 2). These "Public-Private-People Partnerships" (ibid.) foster processes of open and collaborative innovation that can then be "studied and subject to experiments" (ENoLL, 2017b)[13]. Also, Living Labs play a role as "intermediaries among citizens, research organisations, companies, cities and

[12] Carayannis and Campbell (2009) give an account of the Quadruple Helix innovation model where "Civil Society" is added to the triad of "Government-University-Industry" relationship dynamics driving innovation in a knowledge society. In accounting for a 21st century model of innovation ecosystems, the Quadruple Helix proposes that the public (i.e. civil society), as user and generator of knowledge, is also part of the wider innovation system and has a role to play. The rationale behind it being that, in advanced knowledge economies, knowledge exchanges take place across all levels of society.

[13] It is important to note that the definition of Living Labs provided by ENoLL (2014; 2017a and 2017b) on its website has been slightly updated between 2014 and 2017. I use examples of definitions from both years as, for instance, the idea of "Public-Private-People Partnership" (in use in 2014 but absent in 2017) is an important one to bear in mind, as it draws directly on the ideas of the Quadruple Helix model (cf. Carayannis and Campbell, 2009).

regions" (ibid.). Their aim is to generate "value co-creation, rapid prototyping or validation to scale up innovation and businesses" (ibid.). Through the adoption of a citizen-centred approach Living Labs can "better mould the opportunities offered by new ICT concepts and solutions to the specific needs and aspirations of local contexts, cultures, and creativity potentials" (ibid.)

The difficulty in finding a common definition of Living Labs may be linked to the fact that these real-life environments have been used in diverse contexts with different aims, for instance, ICT development, healthcare and sustainability (Bergval-Kåreborn el al., 2009). A visit to ENoLL's website confirms this tendency, with the areas of activity of its members ranging from health and wellbeing; smart cities; culture and creativity; energy; mobility; through to social innovation; social inclusion; and education. (ENoLL, 2017b).

For the purposes of the present discussion and work, and based on the definitions above, I will take the ideas of Living Labs as: real-world contexts and experimental environments where users and producers collaborate in the development of innovations (cf. ENoLL, 2014; 2017a; 2017b); approaches that help users influence open innovation processes (cf. Bergval-Kåreborn el al., 2009); and organisations aimed at supporting all involved stakeholders in the value chain to create new products or services (cf. Ståhlbröst, 2012).

The focus of this research is the process through which Living Labs are brought to life. Taking the example of Living Labs working in developing Independent Living solutions as the subject of my study, I ask the following question: How are Living Labs set up?

In the context of independent living, Living Labs can be perceived as contexts in which the focus is no longer to decide whether the solution for an ageing population is a technological-deterministic or a participatory/ user-centred approach. Instead, with Living Labs, both approaches can be jointly promoted and developed, and the solutions created do not have to be necessarily technological. As noted by Bygholm and Kanstrup (2017: 78):

"[Living Labs] have become increasingly popular approaches since they hold promise of a close relationship between technology designers and users via long-term innovation rooted in natural use environments". Figure 1, below, summarizes the relationships between those concepts and shows how Living Labs may relate to the ageing threat discussed above.

An in-depth critical analysis of the Living Labs research literature will be presented in Chapter 3. However, for now, I just want to highlight some thoughts to be kept in mind whenever the name "Living Labs" is mentioned. Namely, the idea portrayed in the literature of Living Labs as open, people-centred, multiple stakeholder, real-life initiatives where citizens, companies, developers, research and development institutions and governments, all collaborate in the creation of innovative solutions better suited to the contexts and needs of those using them. Before presenting the Living Labs literature it is, however, necessary to analyse the theoretical concepts behind the framing and interpretation of the research literature and data analysis work developed throughout this PhD. Such is the aim of the next chapter.

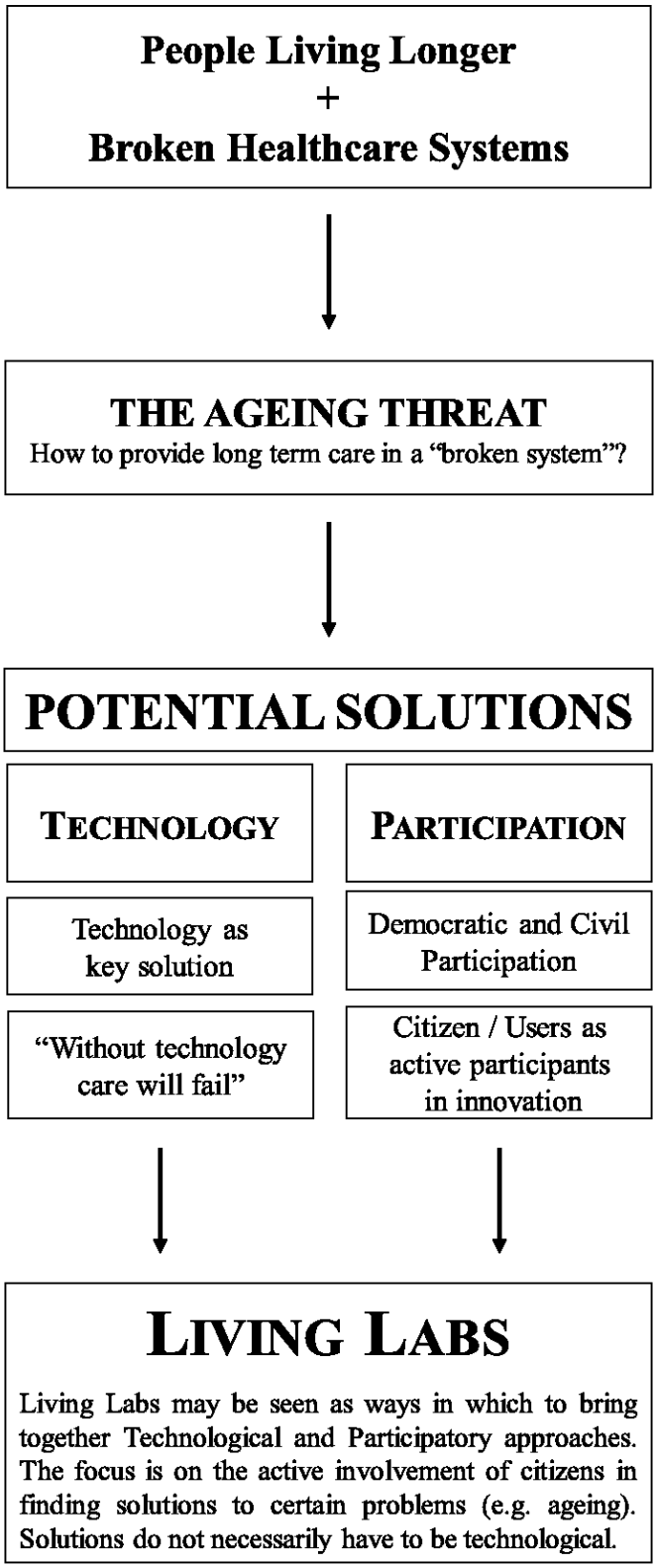

Figure 1. Living Labs and the "Ageing Threat" (Author's Own)

2 Theoretical framework

> The world is constructed at each moment out of many actants, and most of these actants are not "social" in the narrow sense, since they can just as easily be made of cement or geometric solids as of human conspiracies.
>
> — Graham Harman, *Prince of Networks. Bruno Latour and Metaphysics.*

This chapter is about the theoretical lenses that guided my interpretation of both academic literature and research data. The reasons to present it at this moment are as follows. Firstly, this chapter should help with making better sense of my views of the world *out-there* (cf. Law, 2004; 2007) and contextualise the underlying arguments behind some of the ideas already put forward in Chapter 1. Secondly, to help making 'theoretical' sense of the research literature on Living Labs presented in the next chapter. Finally, the chapter explores the theoretical underpinnings of my methodological choices.

I am aware that this chapter is lengthy. At the same time, I believe it to be crucial to make sense of and contextualize what I discuss throughout this thesis. Because this chapter is focused on theory, I opted by starting it with a brief anecdote to help understand the lens adopted when studying the world out-there that interested me: Living Labs. I then explore, in detail, the theoretical ideas that influenced my way of looking at the academic literature, research subject and data: Actor-Network Theory and Sociomateriality. In the first section of this thesis – "Context and Introduction" – above, I said that this thesis would be like a visit to a house. This is one of those rooms I mentioned where you may need to go outside for a break or revisit later. The door is open, make yourself at home.

2.1 New York. Wednesday, August 7, 1974.

In the morning of August 7, 1974, in New York, aided only by a balancing pole, a 24-year-old Frenchman – Philippe Petit – walked on a tightrope that had been rigged between the Twin Towers of the World Trade Centre. The event has been widely documented in the press, as well as in a movie production (e.g. Bidelglass, 2015; The Guardian, 2015, Truffaut-Wong, 2015; The Telegraph, 2015) and an award-winning documentary entitled "Man on Wire"[14]. The picture used in the documentary's poster is breath-taking. A tiny blurred man, midway through his tightrope walk, in the foreground. A hazy, light blue sky behind. One can barely see the wire. On the right-hand side, an insignificant fraction of the tower's rooftop Petit is walking towards, but large enough to remind us of how small his human dimensions really are. Petit's body is centred in a way that allows the viewer to feel as if standing at his exact same height: 1,350 feet above a blurry Manhattan.

Pretending, for a moment, that we took funambulism (tightrope walking) as our phenomenon of study, and Phillipe Petit as our subject, what and who would we be studying exactly? Where would we look? What is of interest? What would constitute our unit of analysis? What data should we collect?

For instance, the event described is unique in the sense that Petit "was the first and last man to walk between the twin towers" (The Telegraph, 2015: no paging). The consequences for our research could be serious. Miss the stunt and one is left with no data. But what exactly is the stunt? The reported 45 minutes Petit spent on the wire? The number of times he walked between the towers[15]? Even if we missed that show, we knew that Petit was still performing in other places. Could we study those performances? What is so special about the World Trade Centre stunt that we could have not found with his other (perhaps, less risky) performances? Could we just study, in-depth, the photo used for the documentary's poster? Also, would we want to study

[14] See http://www.magpictures.com/manonwire/
[15] That was eight, in case you may be wondering (see Bindelglass, 2015)

several small performances, or a once in a lifetime one? How would that influence our results?

What fascinates me about Philippe Petit's story, and the documentary about his New York achievement, are the parallels I find between that event and the research I was conducting in the social sciences. The most important for me is the fact that to truly understand one event – in Petit's case, tightrope walking; in my case, Living Labs – ignoring the wider social, political and economic contexts seems a (dangerously) reductionist approach.

Watching "Man on Wire" reveals how the 45 minutes Petit spent on the wire (that some may regard as the key event) were, in real terms, almost seven years. The event of that morning was not born there and then. It took nearly seven years to prepare. From the moment a 17-year-old Petit spotted a picture of the Twin Towers in a magazine at a dental practice waiting room in Paris, to the arrest by the police when he stepped out of the wire seven years on, in New York, many events (some of them illegal) unfolded that contributed to the materialization of the stunt. It may be, in fact, that the tightrope, the balancing pole and Petit are the least relevant actors in this story. The help of his friends during the countless training sessions; the illegal access to the buildings to rig the cables; the copious visits to the towers, where it was necessary to pose either as a journalist or a tourist; the need to persuade one executive working in the towers to forge security passes (The Telegraph, 2015). An interconnectedness of actors and circumstances, prior to and following those 45 minutes on the wire, played some sort of role. Without some of them the stunt may have never had happened. For instance, replicating that same stunt today would be impossible, as the towers no longer exist. Also, all the movies, documentaries, books and press articles that followed from what became known as the "artistic crime of the century" (ibid: no paging), may have never existed if it was not for its performance.

For now, I would just like to draw attention to the fact that, in the approach adopted in this work, to study the phenomenon of 'setting up a Living Lab'

out-there was to acknowledge that the data collection stage was only a specific moment in the life-cycle of that same phenomenon. Like the picture of Philippe Petit described above, I approached data collection as a moment only able to offer a snapshot of what was going on. Simply looking at one photograph could not tell me much about what was before, or what happened afterwards. The same holds true if one was to focus and describe the 45 minutes Petit spent on the wire. Even if producing a thorough description of everything that was happening at *that* time, a lot would be unknown.

Data collection felt comparable. As a social researcher, it felt as if, every time an interview was arranged, a workshop attended, or a project meeting observed, I was landing at specific points in time, trying to make sense and understand events that were already finished, midway through happening or about to start. It was thus important to enrich my understanding of this world *out-there* and of the experiences of those I interacted with (there and then) by looking at them within a wider context: political, economic and social. This implied collecting information not only about the specific Living Labs studied but also about the wider contexts in which they came into being. Chapter 1 is thus a way to enrich and recognise the wider contexts in which the Living Labs studied were being created. Also, it offers some structural basis in which to frame the Living Labs literature and the data analysed for this PhD.

For the time being, the point to be made is that the Living Labs studied (similarly to Petit's stunt) did not appear spontaneously and should be viewed as arrangements of interconnected elements within wider systems of social, economic and political contexts and agendas. To help better understand these ideas, the following two sections will introduce the theoretical lenses used as framework to this work: Actor-Network Theory (ANT) and Sociomateriality.

2.2 Actor-Networks.

The previous section (2.1) describes a stunt performed by Philippe Petit, a 24-year-old Frenchman who, in 1974, walked on a wire rigged between the Twin Towers in New York. I used it to illustrate how: a) such an event is more complex than that what is visible, unfolding as an arrangement of interconnected personal, social, political, technological and economic elements; and b) to highlight that to try and understand it in isolation would (most likely) be a simplistic approach.

In its essence, Petit's stunt is analogous to the description of an automatic door-closer given by Bruno Latour in his resolve to show how sociologists could enrich their accounts of society if non-humans were seriously considered as active mediators in the shaping of the social fabric (Latour, 1992). A "gradient of aligned setups" (ibid.: 240) needed to be present in the case of Petit's stunt in the same way that Latour's door-closer[16] is part of its own aligned setup. As Latour explains: "(…) the groom closes the door only if there are people reaching the Centre d' Histoire des Sciences; these people arrive in front of the door only if they have found maps (…) and only if there are roads leading under the Paris ring road to the Halle (…) and of course people will start bothering about reading the maps, getting their feet muddy and pushing the door open only if they are convinced that the group is worth visiting" (ibid.).

Petit's stunt and Latour's door-closer illustrate some of the principles of ANT (cf. Callon, 1986; Latour, 1991; 1992; 1999 and 2005a; Law, 1986; 1987; 2008; 2009; Mol, 1999; 2010). Although its name suggests otherwise, ANT is not really a theory. Contrary to social theories that intend to offer explanations, ANT is more concerned with describing "socially and materially heterogeneous systems" (Law, 2009: 143), telling the stories of whether (and how) some relationships assemble, or not. Or, to use Latour's

[16] Latour uses the term "groom" (Latour, 1992)

wording, describing how that "gradient of aligned setups" becomes aligned in the first place.

John Law exemplifies this with the example of the Portuguese, and how they were able to control half of the world, for almost 150 years, by shaping and holding together a web of actors – e.g. ships, merchants, navigation methods, winds[17], mariners, stars and guns – that worked to their advantage, allowing them to control the Indian spice trade without much antagonism (Law, 1986; 1987; 2009). This was a consequence of the fact that, as Law notes, the "right documents, the right devices, the right people properly drilled - put together they would create a structured envelope for one another that ensured their durability and fidelity" (Law, 1986: 254). The argument being that to properly understand the Portuguese expansion, the interconnectedness of the natural, social, political, economic and technological elements needed to be acknowledged.

With ANT, there is no divide between social and non-social (e.g. technical) dimensions and to try to explain a phenomenon (be it technological development; funambulism; the Portuguese expansion; or Living Labs) based on such a distinction is a limited approach. Latour, for instance, criticizes the work of Pinch and Bjiker (1984) for keeping the social and the technical as two distinct dimensions, where the "social is kept stable all along and accounts for the shape of technological change" (Latour, 2005a: 11). ANT researchers avoid giving the social the power of explaining anything, as for them the social is exactly what needs to be explained (Latour, 2005a).

ANT is, thus, focused on networks constituted by a multitude of actors placed at the same level of importance, in interaction with one another, "brought together in the same analytical view" (Alcadipandi and Hassard, 2010: 419), and where there is a recognised symmetry between the social and

[17] Interestingly, wind was one of the actors in Phillipe Petit's web that needed to be controlled. When Petit realized the Towers swung with the wind, and the potential (negative) effect for his stunt, he starts practicing with some of his friends hanging from (and swinging) the practice wire.

the technical, the human and the non-human. For Latour (1991) this bringing together of humans and non-humans is what allows society to hold together as a durable whole. Also, the term actant is introduced, as it refers to both humans and non-human elements of a network (see also Latour, 1994). An actant is thus "whatever acts or shifts actions" (Akrich and Latour, 1992: 259), and may be a molecule, an atom, a computer, a train, a doctor, an elderly person, a door closer or a tightrope[18].

The critical point to bear in mind is that, in ANT, even though "humans and objects are clearly distinct (…) a difference is not a divide" (Latour, 2005a: 76, footnote 88) and non-human actors are able to "do as much ontological work as people do" (Harman, 2009:101). As Latour notes: "ANT is not, I repeat is not, the establishment of some absurd 'symmetry between humans and non-humans'. To be symmetric, for us, simply means *not* to impose a priori some spurious *asymmetry* among human intentional action and a material world of causal relations" (Latour, 2005a: 76; emphasis in original).

ANT's level of analysis is not to question "where the activities of actors come from, but rather where they go" (Mol, 2010: 255) and its aim is not to "catch reality as it really is". Instead, ANT aims at making "specific, surprising (…) events and situations visible" (ibid.). It is, thus, the heterogeneous network of relations between actors – an *actor-network* – that is responsible for the (re)shaping of its elements. By acting on the actor-network and being acted upon, its constituting elements (actants) acquire their own relevant identity. This does not mean, however, that there is a causal explanation (i.e, a passive role) for the existence of each actor, in the sense of them being caused by those surrounding them. In an actor-network, whilst being enacted upon by their surrounding elements, actors are still an active

[18] It should be noted that the terms actor and actant are sometimes used interchangeably. The important thing to bear in mind is that, within ANT's parlance, what is at stake is the ability to act and that this ability is not exclusive to humans. The term actant presupposes an ontological position in which no *a priori* asymmetry between social / non-social is assumed. In this sense, a computer and a clerk are both actants.

part in the process. As stressed by Mol: "actors are afforded by their very ability to act by what is around them" (ibid.: 258). In the case of an actor-network collapsing, its actors are likely to become unsteady.

In the analysis of complex social situations, ANT helps with understanding how, due to the relationships established, both humans and non-humans actants manage to mutually influence and constitute each other in the process, and how the social fabric is itself constituted by the (unavoidable) entanglement between the social and the technical. Trying to decide in advance "what is social and what is technological" (Latour, 2000a: 12) is regarded as a pointless endeavour, as these are performative dimensions that emerge from chains of association and substitution between humans and non-humans[19]. Latour summarizes this interconnectedness as follows: "Consider things, and you will have humans. Consider humans, and you are by that very act interested in things" (ibid.: 20). In this view, despite the difficulty in defining what is human and what is technological there is something one is still able to do, and that is "*to document* precisely their modifications and replacements, their rearrangements and their alliances, their delegations and representations" (ibid.; emphasis mine).

And this is exactly how ANT presents itself as such a powerful and useful tool for the goals of this research: to document and support the framing and interpretation of the inherent modifications, rearrangements, alliances and representations that take place in designing a complex socio-technical system, such as the Living Lab. Specifically, ANT is used as a tool for considering the heterogeneous relationships established between the multitude of different actors that take place in the process of making that *actor-network* of humans and non-humans. Through the enactment of those relationships, the actors mutually define their roles and identities whilst bringing a Living Lab to life. ANT reminds us that not only is the divide between a social and

[19] See Latour (2000a) for an in-depth account of these issues regarding the ways in which keys (and keyholes!) in Berlin are more than simple tools and can assume "all the dignity of a mediator, a social actor, an agent, an active being" (ibid.: 19). Also, Latour (1991).

technical world an artificial one, but also that no explanatory aim is sought. Mol suggests that although ANT may "not necessarily offer a coherent framework" it "may as well be an adaptable, open repository. A list of terms. A set of sensitivities." (2010: 265).

2.2.1 Translations, inscriptions and (hybrid) *collectifs.*

Building a network of relationships between heterogenous elements is not an easy accomplishment and one may be led to ask how the "gradient of aligned setups" (cf. Latour, 1992) and the "structured envelope" (cf. Law, 1986; 1987) that warrant the durability and fidelity of the web of actors is achieved in practice? Two concepts have been proposed that contribute to illustrate how this is possible: translation and inscription.

Translation refers to "all the negotiations, intrigues, calculations, acts of persuasion and violence, thanks to which an actor or force takes, or causes to be conferred on itself, authority to speak or act on behalf of another actor or force" (Callon and Latour, 1981: 279). An in-depth account of network building and how the process of translation is achieved in practice is given by Callon (1986). Describing the attempts of three marine biologists in developing a conservation strategy for the declining population of scallops in St Brieuc Bay, Callon guides us through the four moments the biologists went through to gain the authority to speak and act on behalf of scallops, fishermen and their scientific peers.

The four moments of translation (cf. Callon, 1986) are as follows. The first one, *problematization*, is described as the attempt by some actors (in Callon's example, the marine biologists) to establish themselves as indispensable resources in problem solving, by forcing into others their definitions of the issue at hand. The way those actors define the situation is such that will cause the other elements in the web of relationships to perceive them as *obligatory passage points*, without whom their own identities will be

in doubt. As Callon notes they will not be able to "attain what they want by themselves" (ibid.: 206). The second moment is *interessement*. Here, a set of actions is undertaken to bring other elements of the actor-network into accepting the problematization proposed by a particular set of actors. It is important to note that interessement is a process happening to (and across) all the elements of an actor-network. For instance, A will be able to interest B only if C and / or D will not catch B's interest first and, consequently, redefine A's position in the actor-network. Interessement is, thus, an attempt to disrupt "potential competing associations and to construct a system of alliances" where "social structures comprising both social and natural entities are shaped and consolidated" (ibid.: 211). The third moment that Callon identifies is that of *enrolment* and can be understood as a result of successful interessement[20]. This is achieved through a process of multilateral negotiations where each actor tries to define and attribute a set of interrelated roles to the other actors in order to achieve a desired endpoint. For instance, A defines and attributes roles to B and C. At the same time, B is defining and attributing the roles of A and C. The same goes for C, who defines and attributes A and B's roles. Because the success of a project is dependent on it following a desired path, this means that those multilateral negotiations will (eventually) come to a close[21] whenever one actor is able to convince the others to accept the roles defined and attributed to them. Callon and Latour (1981) summarised this process remarkably well stating that "in order to grow we must enrol other wills by translating what they want and by reifying this translation in such a way that none of them can desire anything else any longer" (Callon and Latour, 1981: 296). Finally, the fourth moment is that of *mobilisation*, and it is a mechanism through which actors ensure that those who they were

[20] See Callon and Law (1982) for an analysis of the process of enrolment.
[21] I am aware that the idea of closure may be misleading when talking about network building. If anything, as acknowledged by Callon (1986), the process may achieve a *temporary stabilisation* that might be contested at any time. I am simply using the term to help making sense of the four moments of translation.

previously able to enrol are genuine representatives of the collectives they belong to and will not betray their interests.

It is important to note that the process of translation plays a significant role in this thesis and should be kept in mind throughout. In Chapter 8, for instance, the notion of *interessement* (following from Akrich et al., 2002a; 2002b) will be used as a framework to explore how, in designing a Living Lab – Link-UK – some of the actors tried to gain support from other elements of the heterogeneous network of which they were part to guarantee the project followed a desired path. In fact, all the Living Labs studied were, in one way or another, faced with the same challenge: the setup of an actor-network – a heterogeneous arrangement of humans and non-humans – where negotiations, acts of persuasion and intrigues took place. As actor-networks, Living Labs are webs of relationships that need to be held in place, ensuring the sustained interconnectedness of natural, personal, social, political, economic and technological elements long enough to reach a desired endpoint. The concept of translation is, thus, important for this thesis because this study is not only about the way in which a concept – Living Lab – is set up, but also about how it passes "from hand to hand", how it is translated (Law, 2006: 53). In fact, to work with ANT is to work within a "sociology of translation" (Callon. 1986; Law, 2006), a process that is not about shifting between vocabularies or languages, but about creating links. Links that were not there before and may, to some extent, modify "two elements or agents" (Latour, 1994: 32).

Following from what was discussed in section 1.4, Living Labs may also be understood as what Callon and Law (1997) refer to as the "hybrid *collectif*". In this view, there are no "things by themselves", only relations, "relations which (sometimes) make things" (ibid.: 98). The hybrid *collectif* is, thus, constituted by the relations between those "materially heterogeneous bits and pieces" (ibid.: 101). All the various elements (natural; social; technical; economic, etc.) play their role in setting up a Living Lab, and their identities and properties result from them being part of the *collectif*. The *collectif* is, in

fact, "an emergent effect created by the interaction of the heterogeneous parts that make it up" (ibid.: 98).

An important clarification. What Callon and Law (1997) refer to as *collectif* is not be confused with the term collectivity (i.e. a group of individuals brought together with a common purpose). The *collectif* refers to *the relations* that are established between various heterogeneous elements in a network. This means that each element in a network belongs to and represents a particular hybrid *collectif*, regardless of whether they represent a collectivity. For instance, my role as a social researcher is an emergent effect that derives from a particular "arrangement of bits and pieces" (e.g. the papers I read; the Institution I attend; the course I am enrolled in; the data I collect; the fact that I changed jobs; the fact that I am writing this thesis, etc). That arrangement forms the (hybrid) *collectif* to which I belong and defines me as a social researcher. Yes, I also belong to a collectivity (that of social researchers) but that is, in itself, an element of the hybrid *collectif* defining me. By themselves, the papers, the course, the data, even the writing of this thesis, would probably not grant me the status of social researcher. It is the existence of this *collectif* of relations that helps me to act as a social researcher. Also, these arrangements are always temporary in nature. For instance, the arrangement that allows me to be *this* social researcher, at *this point* in time, would have been a different one if the course attended was different, if the papers read were different, or even if different data had been collected. The "Ricardo c*ollectif*" we know today would have been a different "Ricardo c*ollectif*". Also, the Ricardo *collectif* is not a stable entity but one that will be different in the future to the one it is today. The contingent and temporary nature of this *collectif* is a defining characteristic of the contingent and temporary stabilisation achieved by any (successful) translation process, a process that can be contested at any time (cf. Callon, 1986; see Footnote 19 above). As noted by Latour (1991: 126) those "things composed and linked by the translation operation might disperse themselves like a flight of birds".

Finally, the idea of inscription is, together with that of translation, one of the key concepts in ANT that helps with understanding how a network of heterogenous relationships may be built and sustained overtime. Madeleine Akrich's influential work offers the basis in which to understand how the idea of inscription has been applied to the study of building heterogeneous networks (cf. Akrich 1992). Taking the analysis of technical objects (e.g. photoelectric lighting kits and generators) as her point of departure, Akrich (1992: 222) shows how those objects and people "are brought into being in a process of reciprocal definition in which objects are defined by subjects and subjects by objects". Key to this process of reciprocal definition, constitutive of network building, is what Akrich defines as "script": the outcome of a process whereby designers inscribe representations of users (and uses) in the design of technical objects. Designers make assumptions about the morals, motivations, ambitions and politics of the "entities that make up the world in which the object is to be inserted" whilst, at the same time, accept that society, "technology, science and economy will evolve in particular ways" (Akrich, 1992: 207-208). This is important to network building because scripts will end up influencing the way in which different actants in a network define and relate to one another. As John Law puts it, this "means that one may read a script from, for instance, a machine which tells or prescribes the roles that it, the machine, expects other elements in the network to play" (Law, 2006: 52).

Analogous to the script idea is the notion of "configuring the user", as developed by Steve Woolgar (1991) who showed how technology developers follow certain programs of action that end up being included in the technology – for instance, the way a device is to be used and by whom. In his influential ethnography of a manufacturer of microcomputers for the education sector, Woolgar found that the company had no specific definition of who, or what, the user of the microcomputer could be because users were simply not brought into the development process. This meant that developers had to work with an imagined user in mind and adapt the development of the product to what a represented user would want from (and do with) the product. The

relationship between user and machine was, thus, configured based on an imagined set of characteristics that the company assumed belonged to a potential user. However, building a machine under the assumption that users would use it in a specific way does not account for the fact that "some users will not find unexpected and uninvited uses for the machine" (Woolgar, 1991: 89).

Although the perspectives of script and user configuration are similar, Oudshoorn and Pinch (2003; 2008; also, Oudshoorn et al. 2004) have drawn attention to the differences between them. If it is true that both perspectives deal with the way in which designers inscribe technological objects with represented views of use(r)s, this is achieved differently. In Woolgar's perspective, configuration appears as a one-way process, where the technological experts have the power to dictate who the users may be and want. The user is, thus, someone passive (virtual, in fact) whose role is configured by those designing the technology. Akrich's perspective, in turn, treats both users and designers as active participants in the process of technology development (Oudshoorn and Pinch, 2003; 2008). Compared with Woolgar's, Akrich's perspective acknowledges that users may be able to contest and resist the roles inscribed in the technology by the designers (Akrich, 1992).

It is worth noting that underlying those two concepts is the idea of "program of action" (Latour, 1991; 1992; Akrich and Latour, 1992), which can be perceived as those actions, contained in a particular inscription, to be performed by the user. Latour (1992) gives the example of a road bumper which carries with it the underlying instruction "slow down" – the program of action to be followed by drivers. Another classic example is the heavy weight that hotel managers attach to room keys (Latour, 1991). One can think of the weight as an inscription of the following program of action: "Please bring back your keys" (ibid.)[22]. Once a program of action is incorporated into

[22] Once again, I would like to draw attention to Latour (2000a) for an in-depth account of the ways in which inscriptions and programs of action are materialized in the daily routines

a technology, it allows the technology to define the roles to be played by its users and, from that moment, the technology (a non-human actant) becomes an actor (Leonardi, 2009). As Kallinikos et al. (2012) remind us, the intentionality of an artefact reflects the intentions designers work into them.

In summary, I would like to highlight how this process of "heterogeneous engineering" (cf. Law, 1987) needed to build an actor-network, requires both social and technical actants to be aligned in a process of mutual influence. Even if stability is achieved, this is a temporary feature of the actor-network that can be contested and changed at any time. Akrich (1992: 207) notes how "new technologies may not only lead to new arrangements of people and things. They may (…) generate and 'naturalize' new forms and orders of causality and, indeed, new forms of knowledge about the world". I would argue that the same holds true for Living Labs. Not only do they put together "new arrangements of people and things", they may also be sources of "new forms of knowledge about the world" (ibid.). If we recall the issues dealt with in Chapter 1 (and represented in Figure 1), one can also see how politics, economics, technology and participatory approaches to ageing are all part of the "gradient of aligned setups" (cf. Latour 1992) in which the Living Labs studied for this thesis appeared.

2.2.2 Intermediaries.

So far, and in following ANT, I have shed light on how, for the purpose of this thesis, the social fabric may be better understood as a product of heterogeneous network building. In this process of translation (Callon, 1986; Law, 2006) both humans and non-humans have to be aligned in (relatively) stable arrangements of relationships, indicative of how "society, organizations, agents and machines are all effects generated in patterned networks of diverse (not simply human) materials" (Law, 1992: 380). And

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of doors, gates, keys, keyholes, Berliners and concierges – an interconnected chain of associations between humans and non-humans.

although all the actors in a network "define one another in interaction" (Callon, 1991: 135), they do so through the "intermediaries that they put into circulation" (ibid.). An intermediary is, here, understood as "*anything passing between actors which defines the relationship between them*" (ibid: 134; emphasis in original). Examples include texts, "scientific articles, computer software, disciplined human bodies, technical artefacts, instruments, contracts and money" (ibid.).

With ANT, non-human actors play an active role in the making of complex social situations (e.g. Latour, 1992; 1994 and 2005a). Material stuff[23] is, thus, part of those situations, and can also be an actor that shows itself. Even if, as suggested by Pentland and Singh (2012), we took the view that material is *what matters* in a given context, an ANT description only matters whenever actors are able to signal their presence – i.e. if they act. In the case of an actor not acting, then no connection is made and the actor is not relevant to the description (i.e. it does not matter). There are also situations where an actor may not be materially visible but can still cause something else (i.e. another actor) to transform or move. From that moment, the actor becomes visible[24] (Latour, 2005a; Law, 2009; Mol, 2010). Taking on Callon's (1991: 140) suggestion we may also consider that, in the process of making each other visible, actors are intermediaries that put *"other intermediaries into circulation*" (ibid.: 141; emphasis in original). Intermediaries seem, thus, key

[23] In this sentence, "material stuff" is used with reference to that which is non-human.
[24] Law (1987: 117-120) provides a great example of a materially invisible actor. During the Portuguese expansion, wind (an actant not materially visible) caused the Portuguese network to transform itself. If the Portuguese wanted to reach India, they needed to be able to turn adverse winds into one of their allies. Ships were built that could endure stronger winds from different directions, which allowed the sailors to convert them into forward motion and made long-distance return journeys possible.
More recently, Leonardi (2010) showed how computer software, a digital artefact without matter, is able to influence the process of organizing even though no physical (i.e. material) features are visible. It is through the interaction with the software that its consequences are brought to life. More on this in section 2.3.
Also, see Endrissat and Noppeney (2013) for a fascinating account of how immaterial ideas are turned into tangible products (in this case, a perfume). Their study helps with understanding the influence an immaterial concept (e.g. an emotion) has on the actor-network of perfume making and on the product development process, from idea through to visual concepts, fragrance development, advertising campaigns and market entry.

for successful translation processes: as they circulate between actors they help to define the relations between them.

In “Reassembling the Social”, Latour (2005a) introduced a distinction between intermediaries and mediators – a term that Latour seems to favour (cf. Harman, 2009). Intermediaries are, for Latour, relatively stable, in the sense that they transport “meaning or force without transformation” (Latour, 2005a: 39). Mediators, on the other hand, “transform, translate, distort and modify the meaning or the elements they are supposed to carry” (ibid.). There is, however, an interesting feature in Latour’s definition: intermediaries and mediators are not fixed qualities, i.e. an intermediary can become a mediator and a mediator can become an intermediary. To be one (or the other) is, as with any translation process, only a temporary accomplishment. It is not definite. It may change. An example. A computer is usually taken as an intermediary. It is a relatively stable object, “determined by its function” (Latour, 1994: 36). However, if it breaks, all its complexity will be on show. To repair it one may need to open it, which will cause previously silenced – “black-boxed” – components to make themselves ‘heard’. A previously “mute intermediary” is now able to speak. Formerly “black-boxed” components are now on show: microchips, drives, motherboards, cables, etc. The broken computer, whose existence was a given, is now able to remind us of how complex (and tangible) its existence can be. It becomes a mediator, an actor-network linking heterogeneous bits and pieces. In a similar fashion, a person, usually treated as a mediator, usually active and unpredictable, usually able to link and transform information from various levels, can become an intermediary. One just needs to think of a soldier trained to follow rules and be subjected. In fact, Callon’s definition of intermediary, above, includes the term “disciplined human bodies” (Callon, 1991: 134), which Foucault would define as “docile”, bodies that “may be subjected, used, transformed and improved”. (Foucault, 1995: 136).

A clarification. Regardless of their more or less stable structure, actors, mediators and intermediaries are all constitutive elements of materially

heterogeneous networks, where everything relates to everything else (Callon, 1991; Latour, 1994 and 2005a). Mediation is the process by which those elements come together and how they transform (i.e. translate) each other. Importantly, whenever two elements come together they create a new element that did not exist before[25]. For instance, whilst writing this thesis, a link needed to be established between myself (Ricardo) and the computer (PC) in which I am writing it. Latour (1994) would say that this link, that did not exist before, creates a new element (a hybrid actor) and transforms the linked elements in the process. A "Ricardo-PC", or a "PC-Ricardo" is formed, which is more than the sum of two different elements, a new entity altogether. By using the computer, I am a different subject. The computer, in turn, is a different object from the relationship established. The computer on my desk is now a computer in which I write. But it could also be a computer in which I play a game. I can either be a social researcher writing a thesis or a passionate gamer trying to improve my personal best. Humans and non-humans are all part of this process. Sometimes they are intermediaries, other times mediators. Sometimes unpredictable, other times stable. Harman reminds us that "nothing is a mere intermediary. Mediators speak, and other mediators resist" (Harman, 2009: 15). Their status, however, can be changed or contested at any time.

Throughout this thesis, intermediaries are referred to as those heterogenous elements (humans and non-humans) that circulate *between* the elements of an actor-network that *help to link and define* them. Particularly, I would like to highlight how the idea of texts as intermediaries and actors (e.g. Callon, 1991) is crucial for this thesis, and how it caused my views of the academic literature, political documents and project descriptions to change dramatically. This was, for me, a breakthrough moment. It allowed me to start

[25] Latour (1994) analyses the slogans "Guns kill People" and "People kill People". He argues that a link needs to be established between guns and people, creating a hybrid actor – a "gun-citizen" or a "citizen-gun" – that modifies the linked elements and subsequent actions. Latour concludes that "[it] is neither people nor guns that kill" (ibid.: 34). Instead, "responsibility for action must be shared among the various actants" (ibid.).

reading the texts I came across (from academic literature through to project notes and policy documents) as what Latour describes as “little bit less and a good deal more than information and document” (Latour, 1993: 129). Noortje Marres, for instance, describes how Bruno Latour would, throughout her PhD[26], tell her to approach the literature as “never just literature, but an exploration of real problems” (Marres, 2005: vii). In this view, texts are able to shape a "world of their own that can be studied as such in relative and provisional isolation from the other aspects” (Latour, 1993: 129). They become “localized events” with “the same activity, the same materiality, the same complexity, the same historicity as any other event” (ibid.: 130).

Following from this, and throughout my research, texts (political documents; academic literature; project brochures; Living Labs research literature; etc.) were interpreted as intermediaries and actors able to link and align heterogeneous elements in various actor-networks. For example, the literature discussed in Chapter 1 has helped to shape my thinking about the wider political, social and economic contexts in which the subject of this research – Living Labs – appeared. I have also presented evidence on how policy documents helped to shape discourses of healthy ageing (cf. Neven, 2010 and 2015; Mort et al. 2013; Aceros et al. 2015) and promoted technology as the best way in which to address the ageing challenge (e.g. Oudshoorn et al., 2016). In the next chapter, each paper / document discussed in the literature on Living Labs may be interpreted as an intermediary able to define and link together different researchers within the same research field. Callon (1991:135-136), for instance, reminds us that every time we cite texts we “insert them into new relationships” of “words in a text that refer to other texts, and rework and extend the networks to be found in these”. It should also become clear how policy documents trigger the start of a Living Lab process and are, to an extent, the medium through which different actors are defined and kept together (i.e. translated). Harman (2009: 15; emphasis in

[26] Latour was one of Marres supervisors.

original) notes that "actants gain in strength only through their *alliances*". For this thesis, I took the view that texts are no exception. For instance, project bids written in response to calls for proposals by funding organisations (e.g. Interreg Europe, 2017) are good examples of texts that act as intermediaries linking several stakeholders together. This is exactly the argument put forward by Vines et al. (2013), in their effort to find how participatory projects are initiated. The Living Labs studied for this research are also a case in point, as the majority were started because of proposals submitted to Interreg Europe or similar funding organisations. Those proposals, and the funding thus obtained, became intermediaries in the sense previously discussed, able to link a number of materially heterogeneous elements in an actor-network of relations: a Living Lab.

From the above discussion, I am aware of how complex the terminology used may appear. One may be led to question: are intermediaries, mediators and actors the same, or do they mean different things? I would argue that both options may be acceptable. On the one hand, mediators, intermediaries and actors are all constitutive elements of actor-networks. On the other, whether something is a mediator, an intermediary or an actor depends on the specific circumstances to which they belong at a given time. Callon (1991:141) would argue that the answer "has nothing to do with metaphysics, ontology, or the rights of 'man'. Rather, it is empirical". As shown above, an intermediary can become a mediator and a mediator can become an intermediary. Also, the fact that something belongs to either class "does not mean that they are not also actors!" (ibid.: 157, footnote 24). Some have argued that Latour's (2005a) idea of mediator seems to generate some confusion (see Stewart and Hyysalo, 2008). I would say, however, that that idea is exactly what helps to clarify whether some elements are active (mediators) and may cause a network to change, or whether they are passive (intermediaries) and the network stays the same.

For Stewart and Hyysalo (2008) such diversity of terms is unfortunate, as it leads to some discrepancies in the way they have been used differently

across literatures. For instance, in the Innovation and Organisational Studies literature, attempts have been made at defining the term "innovation intermediary". For Howells (2006: 720, emphasis mine), an innovation intermediary is "an organization or body that *acts* [as] an agent or broker in any aspect of the innovation process between two or more parties" whose activities include the provision of "information about potential collaborators; brokering a transaction between two or more parties; acting as a mediator, or go-between, bodies or organizations that are already collaborating; and helping find advice, funding and support for the innovation outcomes of such collaborations". In their own work, Stewart and Hyysalo (2008) extend the definition of innovation intermediary to include those actors that help the relationship between users and designers but do not fit the usual categories of user, developer, producer and consumer. Their definition includes, for instance, "retailers, media companies (…) advertising agencies (…) and management consultancies" (ibid.: 296). Within the Science and Technology Studies (STS) literature, and with an example from popular music, Hennion (1989) describes how music producers can be seen as intermediaries that link together the world of the public with the world of the singers. For Hennion (1989: 406) the intermediary (i.e. music producer) is not a passive actor "at the interface of two known worlds: he or she is the one who constructs these worlds by trying to bring them into relation". According to Stewart and Hyysalo (2008), all these definitions are much closer to what Latour (2005a) would define as mediator (see above), especially considering the active status underlying the definitions, where the intermediary seems able to act in ways that shape "the translation of forces from one point of reality to the next" (Harman, 2009: 15).

For now, I would just like to acknowledge Stewart and Hyysalo's (2008) concerns. Particularly, because some definitions of and research on Living Labs have analysed them as open innovation intermediaries (e.g Almirall and Wareham, 2008; Hakkarainen and Hyysalo, 2016; ENoLL, 2017b; more on this on Chapter 3). I would, nevertheless, like to note that, in this research, I

accept all terms as valid. Most importantly, I accept that actors, intermediaries and mediators are all present in the process of actor-network building. In this thesis, the terms 'intermediaries' and 'mediators' refer to that which links several elements within an actor-network, and they are not fixed traits able to sustain forever. As seen above, sometimes we have mediators (active), other times intermediaries (passive). Their status is always open to contestation.

I do, however, have a concern with regards to looking at Living Labs as intermediaries. And this is because, in doing so, one is already attributing a specific role to the Living Lab. However, as Latour (2005a: 38) reminds us, it is never certain whether "the means to produce the social" are behaving as mediators or intermediaries. This will only become clear in interaction, through performing the mediation steps and links that build up a network. Only then it will be possible to identify which elements add "predictability to the setting" and which "make it bifurcate in unexpected ways" (ibid.: 202). My view is that Living Labs can be treated as mediators, intermediaries, actors, passive or active entities. It all depends on the particular arrangement of elements that one focuses one's analysis on, at any given time. In this thesis, Living Labs are perceived as actor-networks made up of materially heterogeneous actants, whose stability can be contested at any time. As such, a Living Lab will be interpreted as that "what is made to act by a large star-shaped web of mediators flowing in and out of it. It is made to exist by its many ties" (ibid.: 217).

2.3 A note on Socio(-)material(ity)[27]

Before continuing to the next chapter, I would like to highlight one concept that relates with and draws on ANT: sociomateriality. This "umbrella term" (Orlikowski and Scott, 2008: 434), has been extensively used by those willing to understand the intertwining between the social and the technological /

[27] I am using Matthew Jones's term as presented in Jones (2013: 221).

material dimensions within Information Systems (IS) and Organisation research streams (Cecez-Kecmanovic et al, 2014). It may also be taken as a response to a call for social scientists to better attend to "the world of objects, machines and materials" (Pinch, 2008: 461; also, Latour, 1992), a call that has recently been renewed with a particular focus on the degree in which "material elements are involved in social structuration or performative process[es]" (Carlile et al., 2013: 7).

Even though sociomateriality, as a theoretical framework, appears to have gained momentum in the fields of IS and organisation research (Leonardi et al., 2012; Carlile et al., 2013), it is important to acknowledge some of its similarities with ANT. As with ANT, a relational ontology is present, and "saying that something is social and another thing is material is a fantasy concocted by disciplinary pundits for political or practical reasons" (Leonardi, 2013: 61). The compound term sociomateriality has, however, been used in different forms: with hyphen, without hyphen, as a name, as an adjective (Jones, 2013). What one can be sure is that it brings together the terms 'social' and 'materiality' (Leonardi, 2012).

Research on sociomateriality has been influenced by an application of the guiding principles of practice theory (cf. Schatzki, 2001; Scott and Orlikowski, 2014), namely that "*everyday actions are consequential* in producing the structural contours of social life" (Feldman and Orlikowski, 2011: 1241; emphasis in original); rejecting dualisms (e.g. subjectivism/objectivism; agency/structure) and recognizing "the inherent relationship between elements that have often been treated dichotomously" as well as the relational and mutual constitution of phenomena (ibid.: 1242).

Scott and Orlikowski (2014: 874) highlight the importance of thinking about the concept of "sociomateriality" as a work in progress, "part of ongoing projects focused on theorizing relationality and performativity", opening up the way in which "to think more broadly about organizing, innovation and uncertainty". With this lens, the focus shifts from a discrete

account where artefacts, people, technology, organisations and work are conceptualized as separate "self-contained entities that influence each other", either through direct impact or by mutually shaping each other in interaction, to a focus "on agencies that have so thoroughly saturated each other that previously taken-for-granted boundaries are dissolved" (Orlikowski and Scott, 2008: 455).

Usually associated with the "state of being physical or material" (Collins, 2013), materiality is normally linked to the physical characteristics, matter and substance of objects and artefacts (e.g. the fact that a chair is made of plastic is part of its materiality). However, within a sociomaterial framework, materiality *per se* does not account for much, and it is only in relation with the social that it becomes consequential and able to show itself (e.g. Orlikowski, 2000; Leonardi, 2010). For example, if no one used a computer, its potentialities (or weaknesses) may never be discovered. Also, there are situations where materiality does not necessarily have to be on show to influence and be an intrinsic part of the actions of those interacting with artefacts.

Materiality can thus be perceived as consequential and analysed in terms of its significance in each context (Leonardi, 2010; Carlile, 2015). Pentland and Singh (2012), looking at how the term is used in practice, found that in some contexts (e.g. accounting) materiality is not treated as an intrinsic property of an object / technology but relates to the consequences of action. The idea of materiality as something that matters in a specific context led the authors to approach it through the lens of pragmatism (c.f. James, 1982[1907]), a philosophy that acknowledges values and consequences, instead of intrinsic properties (ibid.). In that sense, "something is material insofar as it has consequences we value in a particular context" (Pentland and Singh, 2012: 292). They argue that, according to pragmatism, because something may work in one context but not in another the same would be true for materiality (i.e. something may be material in one context / for someone, but not in another context / for someone else). Pentland and Singh conclude

that materiality is not about "artefacts, people, ideas, or *any* thing. Or rather, it is about all of them, but they only become material when they influence a particular course of actions or events that we value. Materiality is all about actions, values, and consequences *in context*" (ibid: 294, emphasis mine).

This takes us to the idea that sociomateriality is not so much something that structures have, or a process that can be studied in isolation, but more what structures are – an ontology (cf. Leonardi, 2017). It is, thus, the practice in which an artefact (and its materiality) is embedded with a social element that is sociomaterial, not the artefact itself. Even though we may say that a technology / artefact has materiality, within a sociomaterial framework that only means that its physical traits are produced, intertwined and used in social contexts (ibid.). The notion of "technology-in-practice", presented by Orlikowski (2000), may help to clarify this. Orlikowski argues that the repeated encounters between humans and the material properties of a technology, in certain ways and in certain conditions, makes some of the technology's properties "implicated in an ongoing process of structuration. The resulting recurrent social practice produces and reproduces a particular structure of technology use" (ibid.: 407). This structure of technology use, that Orlikowski terms "technology-in-practice", emphasises how the mere presence of a technological artefact is not enough to be of consequence. Instead, it is "whether and how people interact with technology in their day-to-day activities" (ibid.:425) that matters. It is important to note that this process is not stable. It may vary with different people using the same technology differently, or with the same people finding different uses for the technology as a consequence of "various technological visions, skills, fears, and opportunities, influenced by specific interpretations and particular institutional contexts, and shaped by a diversity of intentions and practices" (ibid.).

It is the practice that results from the interaction between two elements (social and material) that we may name sociomaterial. Also, an anti-deterministic ontology is present, in the sense of no *a priori* power of

influence existing between technical and social elements, or vice versa. This, in fact, is not much different to ANT's symmetry principle (cf. Latour, 2005a: 76) as already discussed above (see section 2.2). As noted by Pinch (2008:463) the "human and the non-human are always mixed up together and it is this fundamental duality that needs to be attended to". As previously discussed, things (material) and humans (social) define their identities through the interactions established between them and, through their enactment, relationships are materialized in practice. This idea underlies Suchman's (2007: 257-258) "configurations of always already interrelated, reiterated sociomaterial practices" where, for instance, persons can be understood as "entities achieved only through the ongoing enactment of separateness and always in relation with others". It is, in practice, that the process of organizing happens and practice is itself both social and material (Leonardi, 2013).

Take, for instance, the act of "playing the violin". It may be understood as a sociomaterial practice. Material (violin) and social (violinist) elements are "inseparable" and "constitutively entangled" (Orlkowski and Scott, 2008: 463). However, bringing these two elements together (violin + violinist) is not enough to constitute the sociomaterial practice that is "playing the violin". Exchanges need to happen, adaptations need to be made. For example, the instrument needs to be tuned; the position of the violinist's shoulder adjusted; the rotation of his/her head and chin to hold the violin in place has to be comfortable; the pressure of the bow on the strings needs to be right. Of course, it would help if the person holding the violin is able to play it! On their own, violin and violinist are not sociomaterial. Only after being in relation with one another, in ways that can be described as "playing the violin", can we talk of a sociomaterial practice. The *violin-in-practice* helps to constitute the practice that is "playing the violin", an encounter that also defines and constitutes the violinist as such. Once more, this resonates with ANT, its translations and mediations (e.g. Callon, 1986; Latour, 1994; Latour, 2005a; Law, 2006). Links that did not exist before are established, modifying

the elements brought together into a "composite and shifting assemblage" (Orlikowski and Scott, 2008: 455).

For this research, and also following from ANT, the idea of a world that is sociomaterial is appealing as it allows one to think about how heterogenous elements are brought together and how this enactment of relations contributes to materialize specific and situated practices. At the same time, as reinforced by Scott and Orlikowski (2013), the sociomaterial approach is not better or worse than other approaches but just seems better suited to shed light on some of the problems that we, as researchers, look at. In the particular case of this research, such an approach inspires a view of Living Labs as sociomaterial practices, dependent on the establishment of heterogeneous relationships between social (human) and material (non-human) elements. This inspires a new way of looking at the Living Lab phenomenon, which has been extensively studied with a focus on simple descriptions of *who* does *what* and *when* in the process, rather than trying to focus on understanding *how* exactly the different elements that constitute the Living Lab are brought together in a relatively stable arrangement.

2.4 Summary

Let me return to the example with which I opened this chapter: Philippe Petit's stunt across the Twin Towers. It would have been difficult to study that event with ANT or a sociomaterial lens if the different elements that made the event possible were considered separately. For instance, trying to understand the effects the wire may have had on the artist, or vice-versa, would have been a simplistic (even though valid) approach. The very act of "tightrope walking" implies the coming together of heterogenous (material and social) elements and their mutually constitutive relationship. The wire (the material element) may, in this case, be taken as a technological artefact. Although Petit and the wire exist separately, to be classed as a "tightrope

walker" our artist needed to be able to walk on the wire and engage with a "repeatedly experienced, personally ordered and edited version of the technological artefact" (Orlikowski, 2000: 408). Also, the wire may be "experienced differently by different individuals and differently by the same individuals depending on the time or circumstance" (ibid.). By the same token, one cannot talk of "tightrope walking" if the relationship established is between a tightrope walker and an electric wire. The sociomaterial practice of "tightrope walking" is different "because of the set of relations activated to produce that practice and to sustain its legitimacy and value" (Gherardi, 2010: 505).

The reason for bringing the concepts of ANT and sociomateriality into this thesis is to reinforce the idea of relationality that seems constitutive of some social arrangements, such as Living Labs. Throughout this thesis, Living Labs are referred to as actor-networks and sociomaterial practices, in the sense discussed in this chapter. It is through the links established between the heterogenous elements that constitute them that they become what they are: Living Labs. As actor-networks, their stability can be contested at any time (Callon,1986). Their status is never definite and they "do not exist in and of themselves" (Law, 2004: 83). Some would call this a "state of perpetual becoming", a state in which organisations live "because situated action within them is inherently creative" (Tsoukas and Chia, 2002: 576). The consequence being that any established category and practice is "potentially on the verge of turning into something different for new experiences to be accommodated" (ibid.).

3 Living Labs.

The aim of this chapter is to critically analyse the research literature on Living Labs as well as giving an overview of the primary areas in which research in the area has taken place. Living Labs have already been defined above (see Section 1.4), where I summarised the main points stemming from the research literature that sees them as open, people-centred, multiple stakeholder, real-life initiatives where citizens, companies, developers, research and development institutions and governments, all collaborate in the creation of future innovative solutions better suited to the contexts and needs of those using them.

This chapter will present the areas in which most of the research on Living Labs has focused and critically discuss its relevance for the present research. So far, most of the research seems to have developed the idea that Living Labs promote user participation and multiple stakeholder collaboration through the development of future products and services in real-life and experimental contexts. The healthcare sector is one of the areas in which this type of social arrangement has been used to develop user-centred solutions to future problems, such as ageing. However, not much is known about how exactly the relationship between the different stakeholders is mediated, managed and enacted in practice. Also, knowledge about how the links between the heterogenous elements are established seems to be lacking.

As in the case of Philippe Petit's stunt, introduced in the previous chapter, I argue that Living Labs cannot be understood as isolated and independent phenomena. In other words, the widely accepted idea of Living Labs as open innovation structures that combine the development of innovative future solutions with direct participation of users and other stakeholders in the innovation process does not exist in a vacuum. Rather, it is the result of wider social, economic and political contexts and influences in which Living Labs exist.

The theoretical framework presented in Chapter 2 should help with clarifying how Living Labs ought to be perceived in this work: as actor-networks and sociomaterial assemblages[28]. I argue that Living Labs should be treated as sociomaterial arrangements of heterogeneous elements (human and non-human) that are defined, in practice, through the establishment of those (heterogeneous) relationships. As the hybrid *collectif* of Callon and Law (1997: 98), they are not "things by themselves" but are things made of relations, "relations which (sometimes) make things". Also, in the position adopted in this work, they are not stable. More importantly, they are the product not only of the local and constitutive heterogeneous relations that shape them but are also included in wider contexts of influences. The research literature on Living Labs, the political initiatives calling for public participation in developing healthcare solutions (e.g. Foot et al. 2014) as well as European wide initiatives providing structural funds that support the development of solutions for an ageing population (e.g Interreg Europe, 2017) are examples of such contexts. As actor-networks, Living Labs are, themselves, actants in wider actor-networks. They are the product of heterogeneous relationships but are themselves part of other (and wider) heterogeneous relationships.

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[28] The idea of assemblage is Deleuze and Guatarri's (2004). I have already argued how Living Labs are the result of links between heterogeneous elements. Links that did not exist before and, from the moment they are established, transform those elements linked (cf. Latour, 1994). This is close to the notion of assemblage, defined as "precisely this increase in the dimensions of a multiplicity that necessarily changes in nature as it expands its connections" (Deleuze and Guatarri, 2004: 9).
I am aware that the term assemblage is considered by some an unfortunate translation of the French term *agencement* (Callon, 2006; Hardie and MacKenzie, 2007; Gherardi, 2015). Although similar in meaning, assemblage is said to lose the sense of emergence (i.e. the process of connecting) and heterogeneity depicted by the former (cf. Gherardi, 2015: 8). Also, *agencement* denotes distribution of agency, which is said to be lost with the term assemblage (e.g. Callon, 2006; Muniesa et al., 2007).
However, the term assemblage is widely used by Latour (2005a), and Law (2004: 42) sees it as a "process of bundling (…) of recursive self-assembling". My use of the term agrees with this idea: bundling elements not previously bundled. Within an ANT context, one may argue that the use of the term assemblage has the notion of agency implicit, not prioritised – "attachments are first, actors are second" Latour (2005a: 217) would say. Finally, Suchman (2007) uses the term "sociomaterial assemblage" throughout her work with a similar meaning to the one used here.

Inspired by ANT and a sociomaterial perspective, this thesis will propose a more reflective and critical analysis of the Living Lab phenomenon. A conception of Living Labs not as something that exists in and for itself, but rather, as something that is made to exist through the different links established between a diversity of elements will be presented. This should help to clarify the contribution of the present thesis to the research field.

3.1 The story so far. On mapping the field.

Looking at the available academic literature on Living Labs, one appreciates that most of the research conducted has, thus far, been focused in mapping the phenomenon in terms of: the type of actors and how their roles in the Living Lab influence the innovation development process (Nyström et al., 2014); how the Living Lab type is influenced by the actors that drive its activities (Leminen et al., 2012; Leminen, 2015); what key principles and components should underlie Living Labs' activities (Bergval-Kåreborn el al., 2009); whether Living Lab activities fit with those principles and components and the impacts this has for the innovation process (Ståhlbröst, 2012); or how, as a research tool, Living Labs may benefit user involvement and participation in the design process of new products and services (e.g. Ståhlbröst, 2008).

3.1.1 Living Labs as a method of user involvement.

Some authors have focused on mapping Living Labs within a wider landscape of design research methodologies (e.g. Pallot et al., 2010; Dell'Era and Landoni, 2014). When compared to other human-centred design research methodologies, the typology offered by Sanders (2006, cited in Dell'Era and Landoni, 2014) seems to help with defining Living Labs in the wider landscape and describing their distinctive characteristics (Pallot et al. 2010).

Sanders's typology has thus been used to map and compare the degree of user involvement in R&D projects within Living Labs (Salminen et al., 2011). Dell'Era and Landoni (2014), for instance, offer an extremely useful visualisation of the position occupied by Living Labs when compared with other design research methods (see Figure 2 below).

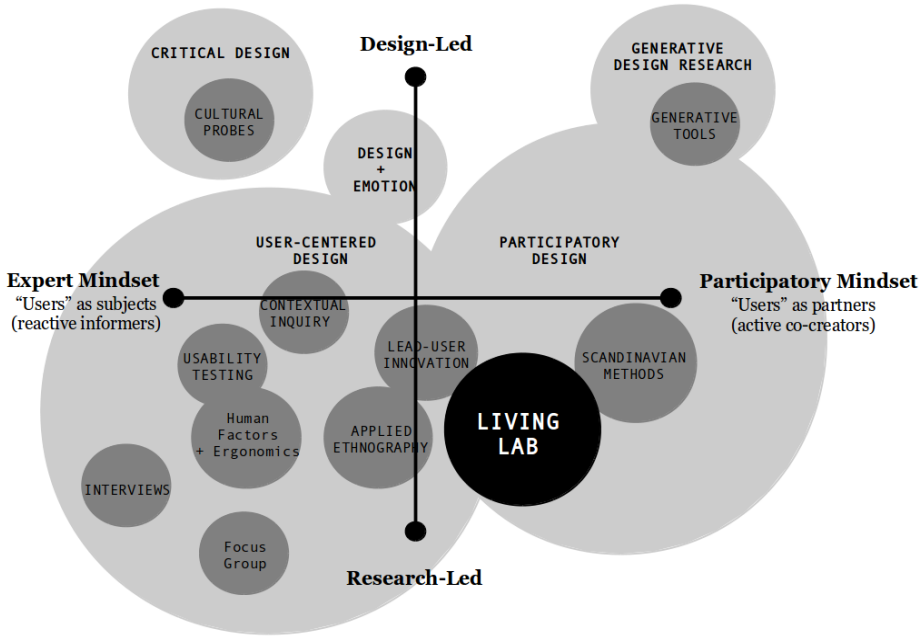

Figure 2. Living Labs and HCD methodologies (cf. Sanders, 2006; Adapted from Dell'Era and Landoni, 2014)

Making use of Sanders' mapping of human-centred methodologies, Dell'Era and Landoni (2014) help us to understand Living Labs as a method of user involvement, situating them across two dimensions. The vertical dimension (Design-led vs. Research-led) tries to understand whether the method is directed by a focus on research or a focus on design. The horizontal dimension (Expert Mindset vs. Participatory Mindset) "describes the mindsets of those who practise and teach design research" (ibid.: 140). In this framework Living Labs are seen as a method where: users are active contributors to the innovation process; the needs of users are affected by the context of use, and physical tools are used as thinking tools.

3.1.2 Living Labs as Open Innovation networks.

Another popular description is given by Leminen et al. (2012), who defined Living Labs as open innovation networks and have characterized them based on the type of actors driving their activities. As a result, their analysis proposes four distinct kinds of Living Lab: utilizer-driven; enabler-driven; provider-driven and user-driven. These are described as follows:

1. Utilizer-driven Living Labs – Created and promoted by companies (utilizers) interested in developing their businesses, where products and services are developed and tested. Their main activity creates value for the companies, and the Living Lab acts as a test bed and market research tool to reach goals that end up supporting the companies' development efforts. With a focus on product development, help from other elements in the Living Lab is key to developing new products. The utilizer's focus is in co-creating knowledge in the quest for information about future scenarios. With a focus on generating rapid results to be incorporated in the business strategy, these Living Labs are characterized by a short life span.

2. Enabler-driven Living Labs – Here, non-governmental and public-sector organisations, towns, regional development agencies (i.e. enablers) create projects to improve society (e.g. promote independent living). Enablers' interests are served by developing regional areas. Their goal may just be the activation of collaboration between different stakeholders, and not the creation of a product. Low involvement from local business communities suggests firms are unable to predict the potential benefits of participation. Regional development initiatives are usually behind the creation of these Living Labs. Universities and other research institutes try to make sense of the development work by bringing it close to the user community. The information obtained in the Living Lab is shared across the network via the participant actors. Slightly longer lifespan when compared with utilizer-driven initiatives.

3. Provider-driven Living Labs – These originate in initiatives from universities, educational institutes or consultants. The aim is to promote knowledge, research and theory development to tackle and solve specific issues. They create useful knowledge to be used by, benefit and improve the daily activities of everyone in the network. However, providers may have difficulties to involve utilizers and enablers in the network. These Living Labs have a variable lifespan – ranging from short to long lived – because companies have demands of faster development cycles and rapid results. The knowledge created is usually reutilized in future activities.

4. User-driven Living Labs – Set up by user communities, their aim is to find solutions to specific everyday life problems, based on the needs of users and their communities. An example is a housing association focused in specific community needs where elements of the community organise themselves to try and solve the issue at hand. Although users are the direct beneficiaries of the solutions created, businesses may also benefit indirectly. These Living Labs tend to have a long lifespan, as they focus on the needs of those communities driving them. Due to their bottom-up structure their management needs support from some type of provider. Also, although users contribute in developing solutions, the innovation created may be later developed in a completely different context, by the companies in the network.

3.1.3 Living Labs as facilitators of Quadruple and Quintuple Helix innovation models.

The work of Anita Füzi (2013) tried to understand the practice of Living Labs in different contexts and maps them in terms of the Quadruple Helix theory (Carayannis and Campbell, 2009; Leydesdorff, 2012), where the public, or society, plays the role of a fourth helix in the triad of relations between university-industry-government. Füzi acknowledges that Living Labs work in ways that resonate with the concept of the Quadruple Helix, which involves cooperation between four actors leading to knowledge

production and innovation development. Interestingly, there seems to exist a parallel between Füzi's mapping of Living Labs activities and the typology developed by Leminen et al. (2012) typology. In her analysis, Füzi (2013) considers three types of Living Labs: *firm-driven*, which corresponds to Leminent et al.'s (2012) utilizer-driven; *public sector-driven*, which finds parallel in the enabler-driven Living Lab of Leminent et al. (2012); and *academia-driven*, which compares to Leminen et al.'s Provider-driven. Interestingly, although the typologies are very similar, there is no reference to Leminen et al. (2012) in Füzi's work. Also, Füzi does not present a typology equivalent to the user-driven Living Lab in Leminen et al. (2012).

More recently, some authors have tried to go beyond the Quadruple Helix framework and look at Living Labs through a Quintuple Helix perspective. For example, Baccarne et al. (2015; 2016) use the concept of Urban Living Labs to materialize, in practice, the Quintuple Helix innovation model. In a Quintuple Helix model (Carayannis and Campbell, 2011; Carayannis et al. 2012; Parks, 2014), the natural environment and social ecology are added to the dynamics of relationships between the four helices of "Government-University-Industry-Civil Society" driving innovation in the Quadruple Helix model. The Quintuple Helix brings to the fore the idea that "the natural environments of society and economy not only challenge, but also encourage and inspire knowledge production and innovation" (Carayannis et al, 2012: no paging). Those environments are "being identified as opportunities for driving further and excelling the sustainable development and coevolution of knowledge economy, knowledge society, and knowledge democracy" (ibid.). Taking on this notion, Baccarne et al. (2016: 24) consider Urban Living Labs ideal ways in which to understand how the Quintuple Helix model of innovation translates to practice, as they focus on "civic participation, and [their] output is aimed at increasing quality of life in the city rather than the development of a commercial product or service". Baccarne et al. (2016) found that Urban Living Labs are initiatives able to lower "the barriers for collaboration" and work as catalysts for "knowledge exchange and

collaborations within and outside the project and involved organizations" (ibid.: 27). However, they note that regardless of their potential to "activate and reinforce the quintuple helix ecosystem, it is still hard to harness the creation potential within the city in a sustainable way" (ibid.).

3.1.4 Some organizing principles of Living Labs.

Attempts have also been made to advance the literature on Living Labs and open innovation, whilst contributing to a better definition of the Living Lab phenomenon. Bergval-Kåreborn el al. (2009) have, in their seminal work, described a set of key underlying principles of Living Labs. Their work is based on the experiences of 30 R&D projects that took place in two Swedish Living Labs. The authors acknowledge that Living Labs agree with some open innovation principles (Chesbrough and Appleyard, 2007) such as the reliance on external ideas as sources of innovation. However, they point to a few differences between the two approaches (Bergval-Kåreborn et al., 2009). On the one hand, Living Labs are perceived as business to consumer initiatives focusing on user involvement, products and services with external input being used across the entire innovation process. On the other hand, open innovation is business to business, its focus is on business models and the external input is focused on ideas and technology. This differentiation is, nevertheless, tricky, as in the work of Leminen et al. (2012), for instance, Living Labs were framed as networks of open innovation, with no difference being described between the two concepts (i.e. Living Labs vs Open Innovation). The five key underlying principles of Living Labs identified by Bergval-Kåreborn el al. (2009) are as follows:

1. Openness – In line with an open innovation discourse, this is about firms opening to the outside and getting external knowledge to develop new products, services, or spread to new markets. Openness may also happen at a more localized level, as well as at organisational and individual levels. Openness is important to Living Lab, as they require a multitude of

perspectives (governments, academia, businesses, and society) to be brought together to create innovative user-centred products or services.

2. Influence – Under this principle, users are active partners and co-creators. Although it is acknowledged that users should take part in the innovation development process to shape society, one needs to note that participation and influence are two different matters. One thing is for users to be involved in a project, another is for them to influence the project's outcomes. It is thus necessary that different stakeholders in a Living Lab have harmonized perspectives with regards to the degree of participation, influence and responsibility of one another.

3. Realism – This principle sustains the basic idea of Living Labs. It means that innovation and solutions are explored in real-life settings. An important aspect is that realism applies to both physical and online worlds, as long as "the activities carried out in both worlds are as real and realistic to its actors" (Bergval-Kåreborn el al., 2009: no paging).

4. Value – This principle that deals with two issues: value creation and those to whom value is being created. For instance, businesses, economy and users/consumers perceive value differently. Living Labs can shed light on how value is created as well as perceived among stakeholders.

5. Sustainability - This principle deals with the extent to which Living Labs initiatives are viable as well as their degree of responsibility towards the wider community, and their social, economic and environmental effects. It is important to keep in mind that, for instance, time plays a determinant factor in the sustainability of Living Labs. To guarantee effective cross collaboration between stakeholders, leading to an improved innovation process, time is needed to allow for trust building across stakeholders.

It is important, for the purposes of this research and discussion, to keep in mind how some of the principles and findings just discussed have influenced a great deal of definitions and research about Living Labs. For instance, the

idea of Public-Private-People Partnership (Westerlund and Leminen, 2011; Schuurman, 2015) as used in ENoLL's definition (ENoLL, 2014) is heavily influenced by the Quadruple Helix model of innovation and recent developments towards Smart Cities show how the Quintuple Helix model has started to influence the field (e.g. Baccarne et al. 2016).

3.1.5 Open and User Innovation. An influential paradigm.

As already pointed out, the Living Lab research field has been influenced by the idea of Open and User Innovation, where innovation is regarded as a process open to a diverse network of stakeholders (from users through to producers, local governments, regions) and where users and citizens are considered as active partners in the process (von Hippel, 1988; 2005; Chesbrough and Appleyard, 2007). In line with this approach, Living Labs are presented as open innovation networks (Leminen et al. 2012) trying to surpass potential innovation barriers amongst stakeholders (Schuurman, 2015) and as innovation intermediaries that, among other things, act as "broker[s] or agent[s] between companies and research centers (…) connector[s], facilitating networking between actors; and (…) coordinator[s], setting up projects and providing technological, project management and administrative support" (Almirall and Wareham, 2008: 40). Interestingly, a number of systematic literature reviews (Følstad, 2008; Schuurman, 2015; Schuurman et al., 2015) shows that, regardless of the influence that Open and User Innovation paradigms have on Living Labs literature, most papers seem to take those paradigms for granted without ever reflecting on the literature or showing a deep understanding of their theoretical underpinnings (Schuurman et al., 2015). This may, however, be due to the fact that most "papers are descriptive single or multiple case studies, or conceptual papers relying on desk research, without a rigid methodology being used or explained" with no "well-grounded empirical research on Living Labs" (ibid.: 19).

The research field has also been influenced by a focus on citizen driven-innovation (e.g. Eskelinen et al., 2015), shifting from an emphasis on developing specific technologies and services, to using the process of technology and services development as an opportunity for new modes of participation. And even though some caution is called for, with some authors acknowledging that "setting up a Living Lab with all the right components does not guarantee that it becomes a Living Lab" (Ståhlbröst, 2008: 35) or that the aim of some documents is not the provision of "a 'cookbook' on how to establish a Living Lab or how to execute a Living Lab project" (Bódi et al., 2015: 10) it still seems that the way in which most of these outputs are presented and shared tries to turn them into best practices (e.g. Niitamo et al., 2006; Ståhlbröst and Holst, 2012; Eskelinen et al., 2015). For instance, Schuurman (2015: 125) highlights how a constellation of Belgian Living Labs – iMinds – "has played an important role in the Living Labs community and is regarded as a 'best practice' example". The issue I have with the idea of best practice is that to consider that there is a best practice of "Living Labbing"[29], one is left with the feeling that other types of practice may exist (e.g. bad practices) that are to be avoided.

However, with Orlikowski (2002) we have learned how the idea of best practices seems to be flawed, urging us to think more in terms of useful practices. I would argue that this is also valid for Living Labs. Firstly, because it is neither easy to transfer best practices nor to define what best means (Orlikowski, 2002). Also, as practices, Living Labs should be perceived as "situationally constituted" and "generated through people's everyday action" (ibid.: 271). In that sense, research in the area may gain from avoiding the view of Living Labs as transferable best practices of innovation, and adopt the idea that what matters is a view of "useful practice", a practice that is "contextual and provisional" in nature and generated by people's activities "in their own particular situations" (ibid.).

[29] The term is Ingrid Mulder's (Mulder, 2012).

The important thing to bear in mind is that most research seems to have been preoccupied with framing and mapping the field. From an actor-network perspective, one could go as far as claiming that the resulting charting of the Living Lab field is itself a product of wider connections and contexts of influence, such as the links established between previous definitions, political initiatives, academic literature and concepts (e.g. Open and User Innovation; Quadruple Helix) that contributed to frame our present understanding of the field. From what has been discussed, Living Labs have, so far, been defined and studied as open, user-centred social networks, where users and producers are brought together to actively cooperate in real-life contexts by testing and/or developing innovative products or services. These collaborations occur across the entire innovation cycle and are focused on catering for the needs of people. However, there are some challenges to this way of framing Living Labs. These will be discussed below.

3.2 The untold story.

What becomes clear from the above discussion is that most literature on Living Labs has been focused on describing what Living Labs are and the ways in which they are organized, be it in terms of finding who are the players driving their activities, the type of characteristics that define Living Labs or whether their use / applicability positively affects the process of user involvement in the development process of new products or services. Nonetheless, as noted by Füzi (2014: 2, italics in original), most of the research on Living Labs seems to show "its benefits in order to create values and opportunities in society, but almost nothing is said about the *drawbacks* and *bottlenecks*".

Apart from the difficulty in finding a common definition, as previously discussed, another criticism that could be made of the existing literature is that there seems to be a lack of critical appraisal of the phenomenon. Although

this may be due to the novelty of the phenomenon as a subject of academic research (Ståhlbröst, 2008; Dell'Era and Landoni, 2014; Leminen, 2015; Schuurman, 2015), it still seems that most research is undertaken to try and capture evidence in favour of the model, promoting Living Labs as a best practice of user involvement that can easily be transferred whenever a Living Lab needs to be developed (e.g. Guzmán et al., 2013).

Finally, and from a policy making perspective, Living Labs appear to be promoted in such a way that those willing to create them think "everybody else is doing it, so why can't we"? As of early 2017, the number of participating elements in ENoLL – 395 (and counting!) – is a good illustration of how appealing this concept appears to be (EnoLL, 2017a). One may be led to ask why did Living Labs become such a popular concept with such a steady growth? According to Duttileul et al. (2010), 2006 appears to have been the year that contributed for the development of the European Living Lab movement. One the one hand, the European Commission was promoting a European innovation system based on Living Labs (ibid.: 63) and, on the other, the Helsinki Manifesto (2006), product of the Finnish EU's presidency, was promoted as a way in which to materialize the renewal of the European innovation system with a more "open, user-centred and networked" (Helsinki Manifesto, 2006: 3) approach. There was a direct call to create an "European-wide network of Living Labs" to "provide a platform and infrastructure for innovation services to SMEs, international corporations, public sector agencies and individual citizens" (ibid.: 3-4). ENoLL would become that network.

This growth on the number of Living Labs was coupled with an increase of research in the area (Schuurman el al. 2015). As already described, this research appears to have been focused on trying to map the field as well as structure it in theoretical terms (Leminen, 2015a; Schuurman, 2015; Shuurman et al., 2015). I would like to emphasise, however, that as much as this type of literature may be needed (and it is!), it is also necessary to have a

more reflective, in-depth and critical view of the phenomenon (Eriksson et al., 2005; Pallot et al. 2010; Hakkareinen and Hyysalo, 2013).

This thesis is thus an attempt to join recent efforts (e.g Kommonen and Bottero, 2013; Sauer, 2012; 2013; Hakkareinen and Hyysalo; 2013; 2016; Bygholm and Kanstrup, 2017) that extend the understanding of Living Labs beyond simple description of *who* does *what* and *when* in the process, and offer an in-depth account of *how exactly* that process is set up. In particular, this thesis aims to understand how the links between the heterogenous elements that shape the Living Lab actor-network are brought to life. Additionally, this research is an attempt to fight a perceived tendency in the literature of approaching "Living Labs in a neutral or overtly positive way, which is an indication of the absence of a critical attitude towards Living Labs as a concept" (Schuurman et al., 2015: 19). Such critical approach may help with revealing some of "the *drawbacks* and *bottlenecks*" of the concept (cf. Füzi, 2014: 2, italics in original).

For instance, Hakkareinen and Hyysalo (2013) present one of the very few attempts to try and understand how user-developer interactions happen in the practice of Living Labs. The authors conducted an in-depth longitudinal case study (4 years) of a Living Lab collaboration in a nursing home. Their aim was to understand what learning occurred between participants, as well as the type of conflicts and challenges that happened and how they were overcome. The fact that their research took place in a healthcare technology environment is also a novelty, as most Living Labs appear to develop their activities in areas other than health (cf. Mulvenna and Martin, 2012) – Digital Cities, Tourism, Smart Energy Systems, Future Media – with most research on them being conducted accordingly. Hakkareinen and Hyysalo (2013) found that, in contexts that require great collaboration, such as health and social care, Living Lab stakeholders should, from the very beginning: outline their different priorities; be prepared to deal with and resolve conflicts; and find innovation intermediaries willing to mediate between users and producers. Because most Living Labs entail collaboration between a complex network

of stakeholders (see Leminen et al. 2012 and Füzi, 2013 for a detailed analysis), Hakkareinen and Hyysalo (2013: 21) highlight "how laborious and volatile such long-term and intensive collaborative undertaking[s] can be". Their case study is one of the few efforts to shed light on how incompatible interests and competences between stakeholders can be turned into interdependent ones. Also, they suggest future research should look at "innovation intermediaries (…) to better support and enhance learning processes"; and at the daily practice of Living Lab collaborations and its changes over time "to give managers, and workers of Living Labs a better sense of the processes at stake" (Hakkareinen and Hyysalo, 2013: 22).

More recently, the same authors studied Living Labs as "co-design infrastructures" acknowledging that their potential for collaboration "does not realize automatically", which led them to focus the research "on the crucial work done by innovation intermediaries in Living Lab networks" (Hakkareinen and Hyysalo, 2016: 46). Their aim was to go beyond previous research on intermediation in Living Labs (e.g. Almirall and Wareham, 2008; Lapointe and Guimont, 2015) which seems to fail "to describe in detail how individuals tackle the challenges posed by everyday life in Living Labs" (Hakkareinen and Hyysalo, 2016: 47). Their main finding seems to show that intermediary activities and roles are not fixed and indeed change across the innovation process and the duration of the Living Lab project. Due to the longitudinal nature of their study, we understand that a Living Lab evolves across time and that the roles actors play in those initiatives are not fixed but likely to change throughout the duration of an innovation project and beyond.

Other important research is the work of Sabrina Sauer (2012 and 2013). Sauer's is, by far, one of the most ground-breaking works I found on the subject. Strangely, it is rarely cited in the wider Living Lab literature. Still, it is extremely relevant for this thesis. Firstly, because of its theoretical approach. For Sauer, Living Labs are "socio-technical networks that require the enrolment of different actors" (Sauer, 2012: 65). To my knowledge, Sauer's work is one of the very few works on Living Labs where concepts

from STS and ANT are also taken as interpretative frameworks (see also, Björgvinsson et al., 2012b; Ehn et al., 2014). Sauer, however, draws specifically on Andrew Pickering's (1993; 1995) concept of the "mangle of practice" to characterise the relationships established between the heterogeneous elements in an actor-network, with a focus on user-technology relationships. In that framework, Living Labs, and the interactions within, are interpreted as the result of a dance of agency "where the dynamic between actors is viewed in terms of situated sociomaterial performances and practices" (Sauer, 2013: 178). Secondly, Sauer aimed at disentangling the process of user innovativeness in Living Labs. She looked, specifically, at how users were involved in a Living Lab and how that involvement helped to identify where "the *innovative potential* of users lies" (Sauer, 2012: 65; emphasis in original). It is a shame, however, that her work is not given more credit in the wider Living Lab research landscape. It is one of the first works to properly break the mould of research focused solely on mere description of activities with no theoretical background (Schuurman et al., 2015), and to delve deeper on understanding how exactly the practice of Living Labs unfolds.

3.3 Why tell a new story?

As already mentioned, this thesis builds on previous work on Living Labs (e.g. Sauer, 2012; 2013; Kommonen and Botero, 2013; Hakkareinen and Hyysalo, 2013; 2016; Bygholm and Kanstrup, 2016) and continues to question the promises and practices of Living Labs, fighting a common tendency in the existing literature that "fails to explicitly address its research paradigms or epistemological or ontological backgrounds" (Leminen, 2015a: 134). Sauer's research, as discussed above, dealt with the development of technologies in a Living Lab context, and her focus was to understand the interrelations between human and material agencies. Hence her use of Pickering's model (Sauer, 2013). As it will become clear in the finding chapters of this thesis, technology is not always the main focus of the Living

Labs investigated, nor it was my intention to focus the analysis solely on how users took part in its development. My aim is to understand, in a wider sense, how exactly the links needed to make a Living Lab are formed. Is it a straightforward process? Are there challenges? How exactly are Living Labs brought to life? How are they made? Yes, the research discussed so far shows that links are established between humans and technologies and that a myriad of actors participate in the innovation process with specific roles (Nyström et al., 2014; Leminen, 2015; Schuurman, 2015). But there are also links between documents and people, funding providers and regional development agencies, municipalities and local businesses, European policies and health providers, citizens and local governments, and between different stakeholders / people. In fact, all those elements are linked. What needs to be understood is how those links are established and sustained in practice. For instance, what happens when people and policy documents come together? How easy is the process of bringing together different stakeholders in a common, cross-border collaboration effort? What happens when they do not see eye to eye? This research is focused on helping to answer those questions.

Before continuing it is important to mention the research of Stefan Verhaegh, Ellen van Oost and Nelly Oudshoorn (van Oost et al., 2009; Verhaegh, 2010; Verhaegh et al., 2016). Although they do not refer directly to the idea of Living Lab, the context in which their research took place resembles the "user-driven Living Lab" in the typology of Leminen et al. (2012; see section 3.1 above). Verhaegh and colleagues explore how innovation by user collectives is set up and sustained in practice, taking as their starting point the idea of "community innovation", a concept that stems from the fact that communities are part of the innovation process and where innovation is depicted as "an evolving sociotechnical network in which both human and nonhuman actors are active and become aligned" (van Oost et al., 2009: 200). In their research, they followed the development of a wireless network infrastructure by a user community in the Dutch city of Leiden. They use the concept of hybrid *collectif* (Callon and Law, 2007) to interpret the

process of innovation by user communities (Verhaegh, 2010; Verhaegh et al., 2016). In their view, innovation is a collective effort, a network building activity where the "resulting heterogenous networks" (Verhaegh, 2010: 22) and the "resulting community innovation[s] can be described as [a] *hybrid collective[s]*" (Verhaegh et al., 2016: 197; emphasis in original). The wireless network in Leiden is thus a result of network building and it is itself a "hybrid entity of technical elements (such as antennas, cables, software, Wi-Fi devices, the roof) and human elements (for instance sponsors, builders, node adoption volunteers, the roof-top owner)" (Verhaegh, 2010: 42). Each of those elements is vital for the functioning and existence of Wireless Leiden. Here, technical and social elements are entangled in practice, and both the innovation and the community are "developed in mutually interconnected ways" (ibid.: 41).

I have previously mentioned that, in my work, Living Labs could also be perceived as hybrid *collectifs* (see section 2.2.1). My use of the term is, however, more of a reminder that there are no "things by themselves", only relations, "relations which (sometimes) make things", to use Callon and Law's (1997: 98) term. This is important, as the Living Labs I studied were not there by themselves. They were the product of specific relations between heterogenous elements (e.g. political documents; citizens; care professionals; regional development initiatives; housing associations; cross-border collaborations). Sometimes those relations would make things. At other times they would not. Also, some of the Living Labs studied had goals that went beyond the exclusive development and creation of specific products. Therefore, although the idea of the hybrid *collectif* should be kept in mind, it is the idea of the Living Lab as an actor-network and a sociomaterial assemblage that is favoured throughout my work. Finally, my research focus is not on the innovations created in the Living Labs. Rather, it is the process through which the Living Labs are set up that concerns me. How are the links between the heterogeneous elements that constitute the Living Labs assembled in practice?

In the work of Verhaegh et al. (2016; also, Verhaegh, 2010) the argument is that the task of building and sustaining hybrid collectives is only possible thanks to the work done by different actors, some of whom are usually forgotten in descriptions of innovation development. They follow a research approach focused in fighting a Machiavellian tendency in ANT that seems to favour giving voice to the most visible and powerful actors, keeping the least visible and least powerful actors silenced (e.g. Star, 1991; Suchman, 1995; Star and Strauss, 1999). Following Star and Strauss (1999), Verhaegh and colleagues describe the invisible work done by such actors. For instance, Wireless Leiden was built and sustained because several actors (from lead users to end users) carried out distinct types of work: alignment, domestication and care work. This work was necessary to initiate, develop and sustain the innovation in the long run. A focus on work was important in their research as it dealt specifically with a community innovation – Wireless Leiden (Verhaegh, 2010). Also, a community innovation is normally a back-stage affair, being initiated, developed and maintained by people that would normally be forgotten in mainstream descriptions of innovation efforts (e.g. descriptions focusing only on the role of lead-users, leaving the role of end users behind).

I accept the idea that, in the context of Living Labs, there is work being done by a multitude of actors. In fact, some research is already contributing to explore this idea by focusing on actors' roles in the innovation process in Living Labs (Nyström et al., 2014), describing the work of intermediaries in Living Labs (Hakkareinen and Hyysalo, 2016) or analysing the work done by carers, residents and management staff when a Living Lab is set up in a care home (Kanstrup, 2017). In my thesis, however, describing that work was not the aim. The main reason being that, in contrast to the research of Verhaegh et al. (2016) for instance, I did not have access to all the actors, and needed to rely on the stories of those who were willing to make themselves visible (be it a project manager or a policy document). From the beginning I accepted that it would not be possible to gain access to every single actor. Even when

I had the chance to observe project meetings directly, there were always people or things that would not be present. Also, a focus on work would imply a definition of what work could mean in a Living Lab context and which type of work would be worth making visible. For instance, although Living Labs may be perceived as heterogenous practices, are these *work* practices? I cannot answer this question with absolute certainty. Why? Because, as discussed above, it is still difficult to define what a Living Lab is. Is it a method? A way of working? A process? A partnership? A place? What was clear to me, however, was that in the Living Labs I studied, I listened to stories of events that seemed to differ markedly from the research literature, policy and project documents I had read. Whereas the present research landscape portrays Living Labs in a too perfect, non-critical way (cf. Schuurman, 2015), in my work I will try and articulate those stories of how the setup of Living Labs may not be such a fluid and trouble-free enterprise.

This research may also be interpreted as an attempt to bring Living Labs research to new areas. Making use of ANT and sociomateriality is already a step in that direction. The fact that I am interested in telling how Living Labs come to life, with a focus on stories that are normally not described, even more so. Yes, I accept that some of the descriptions I give could be interpreted in terms of work that is invisible. My focus, however, is on describing how some of the relationships between the heterogenous elements of a Living Lab are formed and trying to be as thorough as possible in presenting them. To recall Annemarie Mol's words (see section 2.2) the level of analysis in ANT is not to question "where the activities of actors come from, but rather where they go", not to "catch reality as it really is", but to make "specific, surprising (…) events and situations visible" (Mol, 2010: 255). There was some messiness (Law, 2004; 2007) in the practice of Living Labs that did not match the tidiness of formal narratives, research publications and project documents I found along the way (Star, 2010). I shall try and tell about that messiness the best I can. If we are to understand Living Labs in their entirety, it is worth starting to share some fresh stories. That way we may learn something new.

3.3.1 Looking beyond Open and User Innovation.

We have already seen how research on Living Labs is influenced by the open and user innovation paradigms, highlighting how collaborations between different stakeholders across the entire innovation process are key to its success. In a process of open innovation, the benefits stem from both inter and intra-organizational activities, and capabilities are needed to effectively manage the innovation process and increase inter-firm collaboration. The consequence being that for innovation processes to succeed, one needs exploration and exploitation of external knowledge through the interaction between firms and their surrounding environments (Lichtenthaler, 2011). Nevertheless, perceiving Living Labs as open innovation spaces is not without challenges.

Consider, for instance, some of the criticisms directed at the idea of open innovation, claiming that it is nothing more than "old wine in new bottles" (Trott and Hartmann, 2009; 2013; Trott et al., 2013). In their criticism of the open innovation literature, Trott and Hartmann (2009; 2013) show how its underlying concepts are nothing new and have, in fact, been around for many years, with firms already practising them without explicitly calling it open innovation. Their work describes how firms have, for many years, been aware that not all knowledge and expertise reside within their boundaries. For Trott and Hartmann (2009; 2013) the success of the open innovation discourse stems from a false dichotomy created between a paradigm of closed versus open innovation, and although such dichotomy works in theory it has no sustainability in practice. In their words "the new concept of Open Innovation had been widely praised but no critical analysis existed of the origin of the ideas it contained and the reality of the dichotomy it pretended to solve" (Trott and Hartmann, 2013: 19). Trott et al. (2013) have also found limitations to the idea of users as innovators. They claim that most research on users as innovators is not aimed at a deep understanding of *how* the innovations are being developed but looking, instead, at *who* develops them: users or

producers? They also note how open innovation research is more focused on the outcomes of the innovation process, describing who plays a lead role in developing new ideas.

The relevance of Trott and Hartmann's work for my argument is twofold. On the one hand, as with open innovation, Living Labs literature and research are missing a critical lens (e.g. Schuurman, 2015; see section 3.2 above). On the other hand, the research focus may start shifting towards understanding *how* Living Labs are designed and set up, instead of trying to map *who* does *what* and *when* in the innovation process that takes place within the Living Lab. It thus seems fair to accept the criticisms of the open innovation literature in the realm of Living Labs. Not only does the research on Living Labs need to be more critical towards the phenomenon, it is also important to focus on a deep understanding of how those collaborative practices evolve. As noted by Hakkarainen and Hyysalo (2013: 16), in collaborative contexts such as Living Labs "learning for interaction is needed before effective learning in interaction is possible".

The need to go beyond open and user innovation in Living Labs is also justified by evidence that seems to suggest that the user involvement mantra found in the Living Labs discourse may not be what it seems. Kommonen and Botero (2013), for instance, draw our attention to the fact that literature on Living Labs may be confusing *user involvement* in innovation processes with *user driven* innovation. They show that, whilst it seems to be true that users are indeed *involved* in Living Labs, contributing knowledge and inputs to the development of new products and services, it is hard to believe those users are actively *driving* any innovation process. In fact, it seems that innovation processes in Living Labs are still driven by producers, who go on to decide whether users are to be involved in a specific innovation effort. This shows how the role of users is not active, but rather passive. More recently, Vanmeerbeek et al. (2015) analysed user involvement in the innovation process of twenty Living Labs working in the healthcare sector across Europe. They found that user driven innovation, as promised in the Living Lab

literature, is quite difficult to come across. Yes, user involvement happens, but it is usually through feedback provision for specific innovations and at a later stage of the innovation process, not from the beginning nor throughout the entire process. And even though users are involved, their ability to drive an innovation from the start or influence its path (e.g. through co-creation) is quite limited. Bygholm and Kanstrup (2017), in their analysis of eight Danish Living Labs developing care technologies, have also concluded that involving real users does not guarantee their needs will be met nor will it ensure real cooperation among stakeholders.

Research on Living Labs should also be open to new and different paradigms. The influence that the Open and User Innovation paradigms have had in the current Living Labs literature (Leminen, 2015; Schuurman 2015; Schuurman et al., 2015; Robles et al., 2015) needs some rethinking. I argue that the main reason for this shift has to do with the fact that Living Labs do not seem to be structured, stable enough arrangements that afford being studied with a specific theoretical framework / lens. In fact, trying to structure Living Labs research within a particular theoretical lens may be a step against the openness that the literature seems to proclaim. In the same way that Living Labs are considered to be open to the outside world, research on the phenomenon should also open up to new lenses and approaches. I would say that studying the Living Lab phenomena with different lenses contributes to accepting them as evolving structures, with no fixed existence and dependent on the context in which they develop. As the "technology-in-practice" of Orlikowski (2000), so the *Living-Lab-in-practice* will be (per)formed differently in different contexts. If, as seen above, the presence of a Living Lab is no guarantee of collaboration, it may as well be that having people collaborating is not enough to have a Living Lab. Most importantly, and in the same way that people use the same piece of technology differently, the same model of Living Lab may not be transferable across settings.

Finally, the need to go beyond the idea of open and user-centred innovation when studying Living Labs may also be justified by an ever-growing

influence of two areas: social innovation (Mulgan et al., 2007; Murray et al., 2010; Mulgan, 2012; Tracey and Stott, 2017) and free innovation (von Hippel, 2017).

Social innovations are characterized by meeting social needs through the development of "new social relationships or collaborations that are both good for society *and* enhance society's capacity to act" (Mulgan, 2012: 35; emphasis in original; also, Murray et al., 2010). With the exception of some research efforts (Edwards-Schachter et al., 2012; Björgvinsson et al., 2012a; Sauer, 2013; Ehn et al. 2014; Emilson, 2014; Franz et al., 2015; Leys et al., 2015) social innovation has not been an area of focus in the Living Lab literature, and most research still focuses on how technological innovation may be improved by means of a Living Lab methodology. The idea of social innovation is relevant for my research because, as it will become clear, some of the Living Labs studied did not have as their primary aim the development of technology but, instead, focused on finding a solution to social problems (cf. Tracey and Stott, 2017). In the wider Living Lab research landscape, the use of a social innovation approach is also justified by its "underlying ethic, which is one of collaboration, acting *with* rather than only *to* or *for*" (Mulgan, 2012:61; emphasis in original). It is surprising that with its focus on collaboration and user-centeredness, research on Living Labs is yet to turn away from an economic, producer-focused model of innovation – very much linked to von Hippel's (1988; 2005) user innovation and Chesbrough's open innovation (Chesbrough and Appleyard, 2007) paradigms – and embrace the potentialities of a social economy with its "growing emphasis on the human dimension" (Murray et al., 2010: 5) where people and their needs are placed at the centre of innovation efforts. While the idea of democratizing innovation (von Hippel, 2005) suggests that more and more users can innovate by themselves, that concept is not democratic in the social sense of everyone gaining from or actively taking part in the innovation process. Von Hippel's model has, in fact, been criticised for being too linked to a lead-user approach (Björgvinsson et al., 2010; 2012a; Ehn et al., 2014; Verhaegh et al., 2016) and

very focused on an economic model where innovation equals more products and more profit.

Interestingly, Eric von Hippel has recently called for a new paradigm, which he termed "free innovation" (von Hippel, 2017a; 2017b). This concept is interesting for two reasons. Firstly, for being closer to the idea of social innovation, in the sense that it deals with "innovations developed and given away by consumers as a 'free good', with resulting improvements in social care" (von Hippel, 2017a: 1). Secondly, for being proposed as a new, challenging and complementary paradigm to the user and producer-innovation paradigms. It is a proposal to understand innovations created by users with *no intention* of being commercialized[30]. In this sense it is slightly different (and an upgrade) from the user innovation paradigm, as it is restricted to innovations where no monetary or "compensated transactions of any kind" occur and requires that "innovation development work be entirely self-rewarded" (ibid.: 142). For instance, these free innovators can be self-rewarded by using the innovation they created, learning a new skill when developing it or by sharing it with someone (e.g. friend or family member) who benefits from their creation. The reason to develop this paradigm is related with the fact that these "innovation wetlands" (Torrance and von Hippel, 2016) are growing fast and cannot be ignored anymore. In fact, they need to be protected and helped to flourish (ibid.). However, the catch with this model is that, even though the idea of social welfare is promoted, this seems to be done with an underlying interest of increasing producers' gains. The second part of the title in von Hippel's (2017b) article translates that idea quite well (even if unwillingly doing so): "Free Innovation by Consumers – How Producers Can Benefit". The free innovation paradigm acknowledges

[30] Examples of free innovations can be found in the website "Patient Innovation" (https://patient-innovation.com/). This website was launched in early 2015 as a result of research initiated in 2011. Founded and led by Pedro Oliveira and Eric von Hippel (see https://patient-innovation.com/faq#n81) this platform was created to allow for patients around the world to share and/or develop innovations related to specific health conditions. The solutions are created by patients / carers, or anyone with an idea, and shared freely in the platform, with no economic transaction taking place.

that producer companies should learn from free innovators to see which designs, products or services are in demand. If producer companies, usually wealthier and able to afford costly development efforts, decide to adopt the free design they may feel inclined to support the free innovators (for instance, by creating collaborative online platforms). This move, in turn, allows producers to direct the design efforts towards a route that interests them, improving their in-house product offering (von Hippel, 2017b). Underlying the model is the idea that, in innovation contexts where an ever-larger share of the market is being taken by individual free innovators, producer firms should accept that, in order to increase their benefits, they may perhaps (re)consider supporting those same free innovations, contributing to "a division of labor in innovation between users and producers" (Gambardella et al., 2017: 1451). Even though the free innovation paradigm still seems influenced by an economic framework it is, nonetheless, a very interesting attempt of upgrading the user innovation model as well as shifting from a producer innovation approach focus on in-house innovation efforts, to one where issues of social welfare and the improvement of individual lives are given prominence.

It should now be easier to understand why research on Living Labs should move beyond open and user innovation and embrace some of the ideas behind social and free innovation. Such a move may be a way to embrace some of the principles that although acknowledged in Living Lab theory seem difficult to pursue in practice. Following from this, in the next section, I draw upon and explore a stream of research that looks at Living Labs as assemblies of heterogeneous elements (cf. Latour, 1994; Latour 2005b), where participation is an end in itself and where innovation is more about allowing people to have a say in the innovation process and not about the creation of more (and more profitable) products and services (Björgvinsson et al., 2010; 2012a; Ehn et al., 2014; Emilson and Hillgren, 2014; Manzini, 2015).

3.4 Crazy little 'Thing' called Living Lab.

From the above discussion one may understand that user involvement in innovation processes (Living Labs included) is not a new idea and has been looked at from different angles yielding various results (Oudshoorn et al., 2004; Edwards-Schachter et al., 2012; Trott et al., 2013; Hyysalo and Johnson, 2016). Some have argued how the role of the user appears to have evolved in the literature since the 1980's (e.g. Edwards-Schachter et al., 2012). From someone with an outside role in the innovation process, who would buy, consume and provide feedback on already available products, the representation of the user appeared to have evolved to someone acting as a co-creator of innovation, with a more active role in the innovation process (ibid.; von Hippel, 1988; 2005; 2017), a change which may also deem the separation between production and consumption stages unnecessary (Oudshoorn and Pinch, 2003 and 2008; Leonardi, 2009).

Within a Participatory Design (PD) perspective, the underlying idea is that users of a specific service, product, or improvement, who are most likely to be affected by it, may have a say in its development (Kensing and Greenbaum, 2013; Robertson and Simonsen, 2013). Highly influenced by a Scandinavian tradition, PD has its origins in the 1970's, when there was a turn to participation and joint decision making in the introduction of technology at work (ibid.; also, Bjögvinsson et al. 2012a; Bergval-Kåreborn el al., 2014). Its initial focus was on empowering workers and promoting workplace democracy, with people able to have a say on their work situation and in the development of the technologies used to do their work. However, there was a shift from such an organisational approach to PD, with a focus on workers and their interactions with ICT systems, to an approach more focused on community contexts (Le Dantec and DiSalvo, 2013), such as those forming an integral part of Living Labs. Bergval-Kåreborn el al. (2014) describe two main foundational principles in PD: The *Political* and the *Technical*. In the *Political Principle*, issues of power and control are at stake. The motivation

is one of democracy, and it is believed that if people are likely to be affected by a decision they should have the opportunity to influence it. Although based on the idea of democracy, this principle does not presuppose that consensus is possible when collaborating in the design process. Instead, controversies and contradictions are to be expected. *The Technical Principle*, on the other hand, conveys that by having the right users taking part in the design process better products and systems will be developed, which contrasts with the belief of developers acting as experts when developing new systems. Also, it is acknowledged that users have something to say and co-design is the way to get to know both their knowledge and experiences (ibid.).

From the characteristics of Living Labs previously discussed, it is easy to perceive them as spaces of participation. Not only are end-users empowered to become part of the innovation process, but a diverse group of stakeholders (business, academia, governmental institutions) is also brought together to collaborate in real-life situations (e.g. working to find a solution to a specific problem). However, to guarantee this participatory effort delivers, it is crucial that Living Labs allow for "continuous iterations between development and evaluation, and an open innovation consortium involving partners with different backgrounds" (Mulder, 2012: 39). Living Labs are "not just a network of infrastructures and services, but a network of real people with rich experiences and a new way to deal with user-driven innovation" (ibid.). The trouble is that, as already discussed, although Living Labs preach user involvement, the practice of *active* user involvement appears to be scarce (ibid.; also, Mulder and Stappers, 2009; Kommonen and Botero, 2013; Vanmeerbeek et al., 2015). It is as if Living Labs end up not delivering the promised participation and co-creation, not taking full advantage of what they can offer. According to Mulder and Stappers (2009) there seems to exist a paradox between theory and practice. Although the Living Lab idea is 'sold' as a way to practice co-creation, user involvement and experimentation between stakeholders, the reality of Living Lab practices shows a completely different picture, where users have a more reactive role (e.g. as reactive

informers) than what was to be expected. Mulder draws our attention to the fact that one should be careful when considering Living Labs as potential arenas of participation, an idea that seems to work better in theory than in practice. This corresponds to what Steen (2008; 2012) described as the "fragility of Human-Centred Design", a consequence of the difficulty to turn theoretical principles into practical uses, especially with the world not being a linear place and where the encounters that the practice of design promotes are characterized by inherent tensions that can lead to the rupture of the relationships established.

An interesting (and ironic) consequence is that, even though Living Labs are presented as "a democratic force to end-users and citizens involved in innovation projects" (Robles et al., 2015: 22) that same democratic ideal seems to be lost when it comes to being practiced. As a result, and in line with a sociomaterial view, one may argue for Living Labs to be perceived as settings of "situated actions" (cf. Suchman, 2007), actions that take place "in the context of particular, concrete circumstances." (ibid.: 26). In this sense, all the work, activities, collaborations and links that take place within a Living Lab (or in the design of one) are situated actions and, as such, dependent on their "material and social circumstances" (ibid: 70). Also, all the definitions and underlying principles of Living Labs discussed above can be taken as what Lucy Suchman would call "ordering devices" (Suchman, 2007). They are nothing more than prescriptive representations, plans of what a Living Lab should (or could) be. The problem is that there is an inaccurate tendency to treat those plans as "specification[s] for a course of action" (ibid: 187). Such tendency ignores the fact that a "situated action is an emergent property of moment-by-moment interactions between actors and between actors and the environments of their action" (ibid.: 177). This may suggest that no matter how much planning goes into a Living Lab, its practice will (most definitely) not go according to plan.

There has also been wide recognition of a design reorientation towards a focus on everyday life and public issues (Ehn 2008; 2012; Björgvinsson et al.,

2010; 2012a; 2012b; Emilson and Hillgren, 2014). The development of assistive technologies and independent living solutions are good examples of areas where everyday life and public issues are a stake. Also, as discussed in Chapter 1, demographic changes and the resulting demands of an ageing population are further examples of such issues. At the same time, there seems to exist a generalized acceptance that innovation has become dispersed across contexts where citizens, businesses, public organisations and academia collaborate (cf. Carayannis and Campbell, 2009; 2011; Carayannis et al., 2012). Because innovation is a heterogeneous process that engages stakeholders across different contexts, as is the case with Living Labs, some authors (e.g. Björgvinsson et al., 2010; 2012a; Ehn, 2008; 2012) suggest that one should think of Living Labs not as places to design projects (or specific objects) but as spaces to design "Things". This line of work, which this thesis also advocates, is influenced by a call towards an "object-oriented democracy" (Latour, 2005b) where things are not treated as mere objects – what Latour (2004) calls matters of fact – but as Things (capital 't'), assemblies of heterogeneous elements and relationships[31]. The etymological exploration of the word 'thing' was developed at length by Heidegger (1971), who tells us how, in its German origin, "*thing* means a gathering, and specifically a gathering to deliberate on a matter under discussion, a contested matter" (ibid.: 172, emphasis in original). In this gathering, those who are brought together work on solving a specific issue that concerns everyone involved. As a sociomaterial assemblage of humans and non-humans (cf. Latour, 1994;

[31] The differentiation between Thing (capital 't') and thing (lower case) is also a way in which to distinguish between a taken for granted object (usually referred to as a thing), and an object taken as part of the endless chains of association between everything that sustains it as a *Thing* (Latour, 2004; 2005b). Latour (2000a) considers that only associations exist, and it is thus quite difficult to perceive things as mere objects that just lie there, like fossilised bones. For Latour, from the moment one analyses a fossilised bone, we take it out of its status of bone-as-object and bring it back to the "world of people, circulating from hand to hand right at the site of the excavations, in the classroom, in the scientific literature" (ibid.: 11). In this sense, a fossilised bone may be perceived as a Thing, around which an association of heterogenous elements and relationships assembles. The challenge of an object-oriented democracy is to transform things into Things (Latour, 2005b). In this case, objects are taken as those issues that people care for, those matters of concern able to bring various elements together, such as an ageing demographics, global warming or the rise of cryptocurrencies.

2005a), a Thing is a common place where controversies are dealt with, a place where simple "matters of fact" become "matters of concern" (cf. Latour, 2004). Those matters of concern are brought about, and made public, by science and technology as issues that can affect society (Marres, 2007). For instance, following from the discussion in Chapter 1, ageing may be one of such issues. Things[32] are also taken as the equivalent to "the governing assemblies in ancient Nordic and Germanic societies (…) assemblies, rituals and places where disputes were resolved and political decisions made" (Björgvinsson et al., 2012b: 102).

These ideas appear useful for my view of Living Labs in two ways. Firstly, in terms of their practice, and as already discussed, Living Labs need a variety of perspectives to be brought together to deal with an issue (for instance, all the Living Labs studied in this thesis were, in one way or another, constituted by a diversity of stakeholders involved in the creation of solutions for ageing). They are thus a gathering of heterogeneous actors and relationships. Secondly, the research field may itself be taken as a Thing, a place where controversies can be resolved. As already seen, the quest for a common definition of what a Living Lab is, and the inherent difficulty in finding one, seems to be a case in point, presenting itself as a controversy for which an agreement is yet to be reached. Instead of objects (i.e. those matters of fact given and undisputed) Living Labs may gain from being approached as gatherings, centres of controversies, Things where a variety of actors assembles to try and deal with specific issues. Similarly, the research field may also be taken as a Thing, a gathering in which various elements (from policy documents through to

[32] Latour (2004) would criticise Heidegger (1971) for making a distinction between things-as-objects and things-as-Things. For Latour (2004), the same word – thing – refers to both matters of fact and matters of concern, there should be no distinction. An object is only an object when "it is still under the ground, unknown, thrown away, subjected, covered, ignored, invisible, in itself. In other words, there are no visible objects and there never have been. The only objects are invisible and fossilised ones" (Latour, 2000a: 11).
It is also worth recalling the idea of intermediaries and mediators as presented in section 2.2.2 above. Those were not pre-given traits of particular elements but resulted from the ways in which they were performed in practice. The same is valid for matters of fact / matters of concern, where things can be one or the other. It all depends on the particular arrangements of heterogenous relations of which they are part at a given moment.

researchers) assemble to try and deal with a specific issue (e.g. structuring the research field itself). So far, and by simply describing actors, successful stories or studying Living Labs with certain theoretical lenses, researchers appear to be treating Living Labs as matters of fact, looking for undeniable and uncontested truths. However, as Latour (2004; 2005b; 2008) explains, matters of fact do not allow for arguments or controversies to take place, because "matters of fact" are seen as unquestionable matters. According to Latour, the tendency is, still, to settle controversies by reminding potential opponents of the undeniable existence of facts: "[t]he facts are there, God-dammit, whether you like it or not" (Latour, 2008: 34). However, this may be a flawed view, since objects are always part of wider chains of associations, gathering around them "different [assemblies] of relevant parties" (Latour, 2005b: 15).[33]

As discussed in chapter 2, I take the view that Living Labs should be treated as assemblies of heterogeneous elements and relationships. From the present discussion, they also seem to fit the idea of Things. Moreover, they should become a matter of concern for researchers who, like me, try to understand "how many participants are gathered in a thing to make it exist and to maintain its existence" (Latour, 2004: 246). My argument is that Living Labs should not be taken as simple *objects of research*. In fact, the focus of the research must shift, and they should, instead, be taken as *Things of research*, these gatherings of heterogenous elements and associations where humans and non-humans come together to settle controversies. As Latour (2008: 39) notes: "a matter of concern is what happens to a matter of fact when you add to it its whole scenography, much like you would do by shifting your attention from the stage to the whole machinery of a theatre". I would

[33] Latour notes how for "too long, objects have been wrongly portrayed as matters-of-fact. (…) They are much more interesting, variegated, uncertain, complicated, far reaching, heterogeneous, risky, historical, local, material and networky than the pathetic version offered for too long by philosophers. Rocks are not simply there to be kicked at, desks to be thumped at. 'Facts are facts are facts'? Yes, but they are also a lot of other things *in addition*." (Latour, 2005b: 19-21; emphasis in original).

argue that this whole scenography seems to be missing from the research on Living Labs. So far, this research seems to have focused on showing us some of the actors in the play, other times it focuses on the stage, others, still, on the audience or the plays on show. We need, however, a wider focus to understand how all these things are connected and kept that way. From the play's manuscript, through to the box office sales and the press reviews.

As with any translation process (cf. Callon, 1986; see section 2.2.1), where an actor-network is only able to achieve temporary stabilization, the inherent challenge with the notion of Thing is the constant alignment needed to keep the heterogenous elements in the gathering stable enough across time. This led some authors (Björgvinsson et al., 2010; 2013; Le Dantec and DiSalvo, 2013; Björgvinsson, 2014a; 2014b) to call upon the notion of infrastructuring (cf. Star and Ruhleder, 1996; Star and Bowker, 2002; Karasti and Syrjänen, 2004) to help explain the need for the constant alignment of conflicting interests, diverse contexts and practices in any design effort. The idea of infrastructuring gains relevance in such a context because the boundaries of design have become blurred, and the idea of separate stages of development, design, implementation and use as well as differentiation between designer and users becomes obsolete (Ehn, 2008; Leonardi 2009; Björgvinsson, 2014b). Infrastructuring is related with the fact that an infrastructure is not a 'what' but a 'when' (Star and Ruhleder, 1996), not something that is built, "sinks into the background" and on which something runs. Instead, it is a relational accomplishment, it occurs in practice (ibid.) and involves the "integration of new tools and technologies with existing people, material and tools" (Karasti and Syrjänen, 2004: 20). Star and Bowker (2006) highlight that although an infrastructure only exists if it is properly built and supported, there is a tendency to overlook the maintenance work needed to preserve the infrastructure. The relevance of this idea for design work is that "infrastructures come about through situated politics as agreements and stabilizations are negotiated and performed by the various partners gathering around a particular sociomaterial issue" (Björgvinsson, 2014a: 191). At the

same time, and within participatory contexts such as Living Labs where future products and services are co-created, the idea of infrastructuring reminds us that activities such as the design of a product (or, indeed, the design of a Living Lab) should be taken as open ended and flexible activities, activities that last beyond their development, implementation and use, in what Leonardi (2009) referred to as "crossing the implementation line".

This also reminds us that the innovation process is open to a variety of actors outside the normal user-producer duo, as well as to different contexts. More than allowing different actors to take part in innovation development, modern PD design efforts (e.g. Living Labs) should be extended to "new political forms and objectives" (DiSalvo et al., 2012: 60) and framed in ways to "constitute a public rhetoric", enabling participants "to increase their visibility and the volume of their voices" as well as capturing "the imagination and attention of others in support of their agendas" (ibid). In this line of inquiry, notions of public participation and the idea of public as defined by John Dewey[34] (1927) have been extensively used by some authors in PD research (Marres, 2005; 2007; 2015; Le Dantec and DiSalvo, 2013; Linde, 2014; Lindström and Ståhl, 2014a; 2014b; Le Dantec, 2016). For instance, in the work of Le Dantec and DiSalvo (2013: 243), the public is taken as a "configuration of individuals bound by common cause in confronting a shared issue (…) a plurality of voices, opinions, and positions" (ibid.)". It is important to note that Dewey's 'public' is not a device to guarantee the will of the people is fulfilled, but to ensure, instead, that an issue is dealt with (Marres, 2007; 2015).

[34] For Dewey individuals and other elements are associated with one another and these associations form the constitutive nature of everything that exists. It is through associations that actions are produced as "[N]othing has been discovered which acts in entire isolation. The action of everything is along with the action of other things" (Dewey, 1927: 23). These associated actions, and human associated action in particular, are "universal trait[s] of the behaviour of things" (ibid.: 34) and they produce results and consequences. When considering the results of human action, Dewey notes that these consequences may sometimes affect way more individuals than those "immediately involved in producing them" (ibid.: 35). It is thus this "community of the affected" (Marres, 2015: 41), formed by those "indirectly and seriously affected for good or for evil" (Dewey, 1927: 35) that form a group that requires "recognition and a name. The name selected is The Public" (ibid.).

Nevertheless, solving a problem in a context where so many different voices need to be heard is easier said than done. This is exactly the scenario one is presented within a Living Lab: different stakeholders with different ideas, agendas and interests try to find a solution to a future problem (e.g. sharing a common cause, developing an innovation). Some have argued that in scenarios where pluralities are likely to exist, one should not expect neither consensus nor rational conflict resolutions (Bjögvinsson et al., 2010). One is left with "agonistic public space[s]" (ibid.: 8), spaces where "a polyphony of voices and mutually vigorous but tolerant disputes among groups united by passionate engagement" is allowed to exist (ibid). The notion of agonism is taken from the work of Chantal Mouffe (2000; 2013) and it is not to be confused with antagonism. In agonistic spaces, the relations established are not between adversaries but between what Mouffe (2000: 13) calls "friendly enemies (…) persons who are friends because they share a common symbolic space but also enemies because they want to organize this common symbolic space in a different way". From the perspective of formation of publics and considering that consensus is not possible[35] (Mouffe, 2013), democracy is about enhancing "democratic practices or living conditions" (Bjögvinsson et al., 2010: 8). In this view, innovations are judged by the degree in which they trigger "constructive and sustainable questions" (ibid.; see also, Ehn et al., 2014). Callon et al. (2009) call for dialogic democracy, a collaborative model of participation where those affected by controversies are able to be represented as they deserve and to actively collaborate in finding solutions for socio-technical problems.

[35] For Mouffe, democracy as we know it will always imply a "we" versus "them" approach. The idea of reaching a consensus, for instance, always implies the success of a "hegemony of an hyper-power" (Mouffe, 2013: 22) leading to some people (i.e. those against it) being excluded. Mouffe's proposal is the abandonment of an "illusory hope for a political unification of the world" and to "advocate the establishment of a multipolar world", which calls for a "pluralization of hegemonies" (ibid.). The idea of agonism is thus a way in which to acknowledge that conflicts are intrinsic to the democratic process and that these should be allowed to "manifest themselves as agonistic confrontations between adversaries" (ibid.: 41).

However, the difficulty with participatory methods (Living Labs included) is not solely the challenge of creating an arena sensitive to the expression of a wide range of stakeholders' perspectives. It is also the way in which decision-making processes take place. In their inspiring effort at "Disentangling Participation", Bratteteig and Wagner (2012) show us how decision-making in PD can be perceived as nothing more than sharing of powers between developers and users and how these actors share and exercise their power. These issues seem relevant for Living Labs because, here, participants need to reach mutual understanding and it is inevitable that some stakeholders have more power than others. Often, there are players with more "power of making" things happen (Bratteteig and Wagner, 2014: 32) than others. The challenge is to guarantee that final users (the elements around whose needs Living Labs are usually set up) are aware of their "power to" influence a particular decision (ibid).

3.5 Summary

In the literature reviewed for this chapter, Living Labs have been investigated with a focus on mapping the *who*, *what* and *when* of innovation development. Presented as an almost perfect system, Living Labs appear to be portrayed as the next big thing in terms of participatory design efforts – a practice that guarantees open and collaborative innovation outcomes are achieved. However, as discussed, the research field seems to lack a critical approach and the promised democratic and open principles advocated in theory do not appear to be matched in practice. I argued that to learn something new about Living Labs, we need to start incorporating new concepts into the research field. I pointed to the importance of looking beyond ideas of open and user innovation, and to seriously consider concepts such as social and free innovation as new lenses in which to frame the research. This should contribute to develop a model where Living Labs are analysed outside economic and technology focused representations of innovation. For instance,

innovation stops being about creating more products and starts to be about creating the conditions that lead to active (and real) involvement of people in the process. I then went on to explore the notion of Living Labs as assemblies of heterogenous elements and products of situated actions – Living Labs as *Things*. By extending the concept of *Thing* to the wider research field, I argued that the research field may, itself, be taken as an assembly of various elements (researchers, policy documents, regional policies, etc.) brought together to solve a specific controversy: in this case, structuring the Living Labs research field. Living Labs are much more than simple arrangements existing in and of themselves. They are (per)formed in practice and through the links established between the heterogenous elements that bring them together. Such an approach helps to look at Living Labs as situated practices that are the product of their own material and social contexts. As such, one needs to acknowledge that the extent to which they are open, truly participatory and democratic is never a guaranteed end result by itself, but a product of the heterogenous relationships established between different elements at particular moments in time. Sometimes they might end up as open, participatory and democratic arrangements. Other times less so.

Part II — Research Aims and Methods

4 This research, its question(s) and aims

> An alphabet is letters, and 'society' is individuals in their connections with one another.
>
> — John Dewey, *The Public and its Problems.*

This work uses notions of ANT and sociomateriality as a framework to analyse how Living Labs come to life. As presented in the preceding chapter, most research seems to have looked at Living Labs in terms of mapping the research field, describing the participant actors and defining the characteristics that make them successful collaborative and open innovation contexts. Living Labs have been perceived as effective ways in which to merge technological and participatory approaches to address challenges such as those caused by an ageing population (see section 1.4). With an increased call for solutions that tackle the ageing threat (see Chapter 1), this thesis focuses on Living Labs that develop Independent Living solutions. This focus is a way to also understand how popular the creation of initiatives aimed at responding to the urgent calls for participatory solutions for an ageing society may be (e.g. Interreg, 2017). For instance, Robert Picard has recently edited two books (Picard, 2017a; 2017b) that result from work developed by a French initiative connecting 24 Living Labs working in healthcare and independent living: The Forum LLSA (www.forumllsa.org). Even though Picard's work offers an extensive variety of testimonials and descriptions of those initiatives, it is still very much focused on describing those projects and their processes (some of them still in progress) of co-designing healthcare and independent living solutions. Picard acknowledges, however, that before any Living Lab comes into existence thorough work from different actors is necessary, a point that, according to Picard, does not seem to have been "sufficiently emphasized by academic authors" (Picard, 2017a: 28; my translation from French). It is this understanding of the links established between the heterogenous actors that make a Living Lab that interest me.

By joining recent research efforts (e.g Kommonen and Bottero, 2013; Sauer, 2012; 2013; Hakkareinen and Hyysalo; 2013; 2016; Bygholm and Kanstrup, 2017) that extend the understanding of Living Labs beyond simple descriptions of *who* does *what* and *when* in the process, my aim is to offer an in-depth account of *how* the process of setting up a Living Lab evolves. The focus is in understanding how the links between the heterogenous elements that shape the actor-network of a Living Lab are built. This research dissociates itself from a perceived tendency in the literature that approaches Living Labs in "neutral or overtly positive" ways, lacking a "critical attitude towards Living Labs as a concept" (Schuurman et al., 2015: 19). It tries to offer a critical approach, which may help to reveal some of "the *drawbacks* and *bottlenecks*" (Füzi, 2014: 2, italics in original) of Living Labs.

My purpose is to understand how the different elements that make a Living Lab are linked as relatively stable sociomaterial assemblages. In Chapter 2, I have shown how Living Labs may be perceived as the product of associations between heterogenous elements (documents, people, money, governments, technologies, etc). It is, however, necessary to reveal how exactly these associations happen in practice. The aim is to shed light on how the heterogeneity constitutive of Living Labs comes to life, and how it is sustained in practice. Answering these questions may clarify why Living Labs are better understood as products of heterogeneous and unpredictable connections. Therefore, instead of researching Living Labs as entities that, for instance, facilitate collaboration among several stakeholders, where innovations are developed and openly shared (i.e. the Living Lab as cause), I approach Living Labs as the product of associations and the result of diverse links between heterogenous elements (i.e. the Living Lab as effect). These links did not exist before and, once established, transform all the elements that are linked (Latour, 1994; Callon and Law, 1997; Orlikowski and Scott, 2008; Sauer, 2013).

The view taken in this work is that a Living Lab is not something made and then used, as if these were two consecutive stages that could be sequentially analysed. Rather, it is through its use that a Living Lab is made in a certain way. Living Labs may be perceived as *Things* in the making (see section 3.4.1). The term "in the making" has been used by Lindström and Ståhl (2014b) in their concept of *publics-in-the-making*[36]. These are "publics that come out of making things together, and in which issues, relations, actors and procedures are not preset, but continually in the making" (Lindström and Ståhl, 2014b: 134). Here, the emphasis is on the "co-emergence and inseparability of publics, their members and issues" (ibid.: 52). Similarly, Living Labs are not structures in and of themselves, with a predetermined set of characteristics in which specific types of collaborations, innovations and realities come to life. Rather, they are structures made to exist in a variety of ways as the product of specific heterogenous arrangements at particular moments in time. These heterogenous relations are (per)formed in practice and it is through their enactment that they achieve a temporarily stable status that we may call a Living Lab.

As shown in the previous chapter, whilst most research seems to consider Living Labs as conditions of possibility for something to happen (e.g. to facilitate user participation and promote collaboration among stakeholders), my approach is to interpret Living Labs as the product of particular conditions of possibility. For instance, in the perspective adopted in this work, the idea of a Living Lab as a facilitator of collaboration between different stakeholders is not a result of the Living Lab itself. Rather, it is the way in which various heterogenous elements are arranged and linked in practice that allows the Living Lab to act as a facilitator. Such an approach makes it easier to understand and account for different Living Lab practices. For instance,

[36] Hennion (2013) notes how the world is constantly in the making, which is exactly what characterizes ANT's relational ontology – "Things are but relationships" (ibid.: no paging, my translation from French). These relationships / associations characterise the world we live in and, in their diversity and heterogeneity, they are never definite, only tentative. The world is thus ontologically varied, and these ontologies are always in the making.

endorsing the idea that a Living Lab promotes open innovation and citizen participation may lead to the (erroneous) conclusion that whenever collaboration is needed a Living Labs will definitely guarantee it (regardless of where and with whom it is set up). However, as already discussed, the idea of Living Labs as best practices seems flawed, because the same arrangement may yield contrasting results when applied in different contexts. Adaptations must be made locally and, as a product of situated actions, one needs to consider the sociomaterial circumstances in which a Living Lab is developed. Because situated actions are emergent properties of the continuous "interactions between actors and between actors and the environments of their action" (Suchman, 2007: 177) it becomes easier to understand how and why a Living Lab is never pre-set or determined. Rather, it could always be otherwise. By using an ANT and sociomaterial approach, my aim is to document and support the framing and interpretation of the inherent modifications, rearrangements, alliances and representations that take place in the design of a complex socio-technical system such as the Living Lab.

One question guided me throughout the entire research process:

- How are Living Labs set up?

There were three reasons for asking this question. Firstly, the development of the literature on Living Labs and how these seemed often portrayed as best practices for user and open innovation, promoting the development of solutions that would answer the real needs of people. However, from the moment I started to work as research assistant in a project where a Living Lab was being developed, it soon became clear how the reality of setting up a Living Lab did not match the prescriptive, recipe-like nature of the academic literature and earlier project reports. Secondly, and in terms of my focus on Living Labs working in independent living, I was interested to see how easy it was to answer the various calls for participatory initiatives aimed at solving the demographic challenges posed by an ageing population (as discussed in Chapter 1). If it was true that a network of support seemed to exist to kickstart

those projects (e.g. through the attribution of regional development funding), it was important to see whether they would live up to the expectations. For example, how exactly were these projects built? How open and participatory were they? How easy was it to interest different stakeholders? If solutions were created, how sustainable would those be? Would the projects sustain after funding? If so, how? If not, why not? Finally, and taking the view of Living Labs as assemblies of heterogeneous elements and relationships where controversies are dealt with (i.e. Things), they should become matters of concern for those trying to understand exactly how different elements "are gathered in a thing to make it exist and to maintain its existence" (Latour, 2004: 246).

One clarification. Even though some gaps have been identified and discussed at length (see Chapter 3), the way in which I approached my research question(s) was not so much to focus on trying to find and fill a research gap. My approach was to try and incorporate a problematisation strategy in building a research question. This idea stems from Alvesson and Sandberg (2011), who say that problematisation allows one to ask interesting questions without necessarily having to pinpoint a specific gap in the research field.

In summary, taking into account the prescriptive nature of the research field, one may be led to think that Living Labs should follow particular sets of characteristics, exist and develop in predetermined ways, leading to specific (and more or less expected) scenarios. It is thus valid to assume that expectations are created whenever a Living Lab is developed. However, from the lens adopted in this work and based on previous research findings, my view is that this is not a straightforward matter and it is likely that expectations may never materialise in practice. Also, Living Labs are often portrayed as conditions of possibility for better collaboration, more participatory initiatives and more open innovation. I take the view that Living Labs should, instead, be explored as the result of specific conditions of possibility, dependent on particular sociomaterial arrangements established

between heterogeneous elements at specific points in time. In this view, whether they are amenable spaces for collaboration will be a consequence of the links established between the elements in the actor-network. Sometimes they may lead to collaborative spaces, other times not so much. It is however important to know how exactly all of this is achieved in practice. To understand it, I asked the following sub-questions:

- To what extent are expectations for Living Labs (as presented in previous academic literature, project reports, political documents and discourses) fulfilled in practice?
- How are the conditions of possibility for a Living Lab performed in practice (i.e. how and why the links between heterogeneous elements lead to some arrangements but not others)?
- Considering that several elements are associated, how are their interests managed and negotiated (e.g. how is the enrolment of actors performed and sustained in practice)?

The answers to these questions are given in Chapters 6, 7 and 8 respectively. Answering them should offer a fresh understanding of the process of setting up Living Labs. It should provide an alternative view to the prescriptive lens that treats Living Labs as relatively stable structures, acting in predictable ways, and whose existence determines some innovation outcomes (e.g. Living Labs as spaces of value-creation, active user participation and influence and open innovation). Living Labs, this research argues, are not stable enough structures that are easily transferred from one context to the other. Law (2006: 48-49) argued that technologies "do not originate at a point and spread out. But instead that they are passed. Passed from hand to hand". I hold the view that the same is true for Living Labs and that during this process of passing from hand to hand "they are changed. Become less and less recognizable" (ibid.). There are no pre-set ingredients nor predetermined conditions that deliver a specific, programmed and planned outcome. In line with other research evidence (e.g. Kommonen and Botero, 2013; Vanmeerbeek et al., 2015), the fact that a Living Lab exists,

does not guarantee that collaboration is possible or even facilitated. Nor will it guarantee that users are able to actively influence the outcome of an innovation process. It is only through their situated practice and the enactment of the heterogeneous relationships between the various sociomaterial elements that constitute the Living Lab that some arrangements will reveal themselves able to sustain more than others.

In the next chapter I will be discussing the methodological choices that helped me to answer the research questions just presented.

5 Methodology.

> Do your methods properly. Eat your epistemological greens. Wash your hands after mixing with the real world. Then you will lead the good research life. Your data will be clean. Your findings warrantable. The product you will produce will be pure. It will come with the guarantee of a long shelf-life. (Law, 2007: 595)

I need to start this chapter with a (risky) confession. From an early stage in my research journey, the thought of choices of methods, research philosophies and world views would make me freeze. Mostly, because it seemed an effort not worth pursuing. Choose positivism, and a myriad of critics shows up ready to challenge you (Flyvbjerg, 2001; 2005). Choose constructivism and more critical voices are expected (Kallinikos, 2004; Latour, 2000b) [37]. I would often engage in conversations with my research peers and what started as an innocent exchange of ideas about methods would (most often) end up in a methodological war battlefield. My readings of research methods (hand)books would leave me with the sense that any choice made would decide (and forever dictate) my research life (e.g. Bryman and Bell, 2007; Creswell, 2007; 2014). No middle ground seemed possible. Also, these choices seemed to inevitably dictate which methods to follow, what design to choose, and the ways in which to interpret and discuss research data. I felt lost and uncomfortable with the way in which to make a methodological choice. The world out there did not seem as certain, linear and predictable as the world portrayed in some of the books and articles I read. Was there a real world out-there, singular and independent (cf. Law, 2004) waiting to be discovered? Did I believe, for instance, in ontological separations between social and material elements (e.g. Leonardi, 2013)? Or did I consider them to be entangled in such a way that the idea of separating them made no sense

[37] See Kallinikos (2004) for a brilliant account on how to bid farewell to constructivism. Latour (2000b), in turn, provides an assessment of the constructivist promises and suggests how everything appears to be wrong with the constructivist idea.

(Barad, 2003; Orlikowski and Scott, 2008; Scott and Orlikowski, 2013; 2014)? Was a representational view of the world something easy to work with or was a non-representational approach more appropriate (Baert, 2005)? Moreover, were these the choices I wanted to carry throughout my research life? Or could they be momentary and (research) context dependent? Would I want to be known as a "social constructionist" amongst my peers? Or would it be better (and safer) to be introduced as a "postpositivist" at the next research conference? In this chapter I aim at answering these questions.

I have already presented the theoretical ideas underlying this research – ANT and Sociomateriality – and how they shaped my views of and approach to Living Labs (see Chapter 2). I may now focus on discussing the methods used throughout my research to find the answers to the questions presented in the previous chapter. I do, however, need to briefly clarify my epistemological, ontological and philosophical choices. This is done in the next section, which I opted to call "Ologies". I will then justify the research strategy and design used in this study as well as the methodological strategies used in my data collection and analysis. The chapter will end with a discussion of the ethical considerations of this research.

5.1 Ologies.

Any research project is based on ontological and epistemological considerations (Tsoukas and Chia, 2011). Ontology concerns the state of what exists out there (i.e. what constitutes reality), and epistemology is about what one accepts as suitable knowledge about that same "out-thereness" (Law, 2004; 2007). These choices are influenced by paradigms, theories, and worldviews that yield different interpretations of how the world may be organised and known (Bryman and Bell, 2007; Saunders et al., 2009; Cresswell, 2007; 2014). Some note that it is "our 'system of picturing' of the

world that guides the questions we raise and the explanatory forms we deem plausible." (Tsoukas and Chia, 2011: 3).

As already made clear in the former chapters, this research is focused on understanding the links among the heterogeneous elements that constitute a Living Lab. Specifically, how these are established in order to sustain in practice. Following from chapter 2, and the idea of Living Labs as actor-networks and sociomaterial assemblages, this research is heavily influenced by ideas of relationality, performativity and enactment (Law, 1999; 2004; 2008; 2009; Schatzki, 2001; Latour 2005a; Orlikowski and Scott, 2008; Mol, 2010). What becomes clear is that whatever arrangements we have at a certain moment (e.g. Living Labs) are the product of heterogenous relationships between sociomaterial elements and are only temporary in nature and open to contestation (Callon, 1986; Callon and Law, 1997) – they can "always be otherwise" (Law, 1999; Woolgar and Lezaun, 2013; Woolgar, 2014). This "longstanding core slogan" (Woolgar and Lezaun, 2013: 322) of STS, I suggest, may also be taken in methodological terms. In this sense, methods are not right or wrong, nor are they definite, and should not be taken as aligned with specific epistemological and ontological considerations (Law, 2004; 2007). Instead, they are valid for the setting one is dealing with. David Silverman notes that "[T]here are only methods that are *appropriate* to your research topic and the model with which you are working" (Silverman, 2013a: 125, italics mine). Surely, the data one chooses to analyse may be dependent on the research problem, and the methods one picks to do so reflect a research strategy (Mason, 1996, cited in Silverman, 2013a) however, to consider one method right and another one wrong is to miss the point.

Traditional epistemological and ontological dualisms are, within ANT and sociomateriality, thought unnecessary, for the world is seen as performed differently at different moments, and no order exists independent of the events that contribute to that same ordering (Law, 2004; 2007). Although choices between social constructivism or positivism may, in such cases, be deemed obsolete and not worth pursuing, one clarification is needed: selecting ANT

and sociomateriality as interpretative frameworks still comprises a choice. However, because of their unique ontological stances, such choice is no longer between classical ontologies and epistemologies (e.g. realism vs interpretivism; objectivism vs subjectivism; Guba and Lincoln, 1994; Saunders et al., 2009). The choice is one of new *ologies* altogether. As a result, this research follows Annemarie Mol's "philosophical tale" and takes the view whereby an "*ontology* is not given in the order of things, but that, instead, *ontologies* are brought into being, sustained, or allowed to wither away in common, day-to-day, sociomaterial practices" (Mol, 2002: 6; emphasis in original).

I also draw upon the argument put forward by Cordella and Shaikh (2006), who highlight the fact that ANT, with its own ontology and epistemology, should be taken as a comprehensive framework of analysis in its own right. Even though considered a method, "a set of sensitivities" (Mol, 2010: 265) in which to interpret the world, ANT's relational and performative idioms bring with them a new set of rules to the table. In this sense, the world is not out-there waiting to be discovered. It is, instead, through the relationality of different elements including those that try to understand it, that it becomes visible (Law, 2004; 2008; Law and Urry, 2004). Karen Barad puts this idea beautifully: "['We'] are not outside observers of the world. Nor are we simply located at particular places *in* the world; rather, we are part *of* the world in its ongoing intra-activity" (Barad, 2003: 828; emphasis in original). A performative idiom is thus about waving goodbye to representational ideals and embracing a world of "matters of practices / doings / actions" (ibid.: 802).

As shown by Creswell (2007; 2014) and Saunders et al. (2009), not to engage in dualistic choices of ontology and epistemology is possible and a characteristic of a pragmatist worldview. However, a pragmatist choice is usually depicted as a logic of non-commitment "to any one system of philosophy and reality" (Creswell, 2007: 23) or a way in which researchers avoid "engaging in what they see as rather pointless debates about such concepts as truth and reality" (Saunders et al., 2009: 109). Allow me to

disagree. A pragmatist worldview requires deep and wide consideration of the arguments underlying alternative worldviews. I would argue that the ideas depicted by authors such as Creswell (2007, 2014) and Saunders et al. (2009) seem to take pragmatism in a practical sense, which is a very simplistic view in which to interpret the philosophy as well as a literal take on the meaning of the word pragmatic. Besides, a pragmatic worldview is usually presented as leading to a mixed methods approach to research (e.g. Creswell, 2014), which also seems to miss the point of what pragmatism really is about. In fact, as argued by Morgan (2014), pragmatism is robust enough to offer a philosophical basis for social research, regardless of the type of methods used (i.e. qualitative, quantitative or mixed) and may as well replace the "older philosophy of knowledge approach (…) which understands social research in terms of ontology, epistemology, and methodology" (ibid.: 1045).

I would also like to call for Mouffe's (2000; 2013) idea of agonism, previously discussed (see section 3.4, footnote 35), to be applied to method. In this sense, I argue in favour of an epistemological and ontological agonism. This means that dualisms such as those between positivism and social constructivism, should not be treated as matters of "either / or" but should, instead, be acknowledged in terms of how various perspectives are valid and can be considered (sometimes simultaneously) as elements of an epistemological continuum in which we, as social researchers, might move. This is in line with the pragmatist notion that ontological and epistemological arguments are nothing more than "discussions about two sides of the same coin" (Morgan, 2014: 1048).

The theoretical choices of this thesis are thus much closer to the idea of an "ontological politics" (cf. Mol, 1999), a term that refers to the fact that "reality does not pre-cede the mundane practices in which we interact with it, but is rather shaped within these practices" (ibid.: 75). Ontological politics takes the idea that "nothing has reality or form outside the enactment" (Law, 2009: 141) of heterogenous sociomaterial relationships, and proposes that no singular and fixed reality exists. In fact, if one reality is enacted rather than another,

there may be reasons, including political ones, that favour specific types of enactment (Law, 2004). Law and Urry (2004; also, Law, 2004) extrapolate the idea of ontological politics to method and argue that social science methods are themselves responsible for the creation of specific realities. Methods, they claim, are not innocent. Methods are political, in the sense that "[they] help to *make* realities" (Law and Urry, 2004: 404). This takes us to the quote which opens this chapter, a quote that fascinates me and helped me come to terms with the fact that my discomfort with methodological choices is a valid one. Law's quote wittily describes how structured and ordered the research choices within a Euro-American tradition of social science ought to be made and how hygienic they must be (Law, 2007). What seems to be forgotten in that tradition is that the world is often messy and if social research is to know that mess it will need to be messy in the same measure (ibid.). Law criticizes the fact that most social science research seems to favour a view of the world where the real is perceived as "independent, prior, definite and singular" (Law, 2007: 602). Everything that is not within those parameters and reveals the messiness and multiplicity of the world (Mol, 2002; Law, 2004; 2007) tends to be repressed, othered. Bent Flyvbjerg (2001; 2005) blames this on the (mistaken) tendency to import a scientific, positivistic and objective model of inquiry into the social sciences.

Following from Chapter 3, and considering the ideas just discussed, one may argue that the way in which Living Labs research developed has itself contributed to the enactment of particular ideas of the Living Lab phenomenon. However, and this is my argument, the relational and performative character of Living Labs, achieved by a sociomaterial view of the phenomena, makes it easy to see how their reality shall not be taken as independent, prior, definite, nor singular. Living Labs are (per)formed in practice in a messy and multiple fashion and to think of an "ordered ground separate from practices and their relations" (Law and Lien, 2013: 366) is inaccurate. As was the case with Mol's (2002) study of atherosclerosis, so too Living Labs are "more than one and less than many" (Law, 1999: 11). They

are performed differently by different elements in different contexts. As a research phenomenon and enacted reality Living Labs are multiple. They are part of a performative idiom, a practice that is made in practice and, as argued by Mol, whenever "practice becomes our entrance to the world, ontology is no longer a monist whole. Ontology-in-practice is multiple" (Mol, 2002: 157). The consequence is that any choice of method will have "to be made in ways that are specific and local" (Law, 2004: 103) considering the "provisional and specific effect of practices and their ordering relations" (Law and Lien, 2013: 366).

My choices are thus based on the performative character of Living Labs and the acknowledgment of their uncertainties. My argument is that previous research tends to study Living Labs in a much orderly way. For instance, Living Labs are widely portrayed and defined as open and user-driven innovation initiatives, facilitating user-producer collaborations and citizen participation. My contact with the field, however, alerted me to its unstructured nature. Living Labs are not out-there, definite and prior. From a relational ontology, "classical" worldviews (e.g. realism / objectivism; interpretivism / social constructivism) do not work and embracing a performative view of the world seems the right thing to do if one is to properly understand the process of setting up Living Labs. As "objects-in-practice" Living Labs "have complex relations" (Mol, 2002: 149) and it is through everyday activity that they are (per)formed (Feldman and Orlikowski, 2011).

5.2 Research Strategy.

Based on the theoretical arguments made thus far, the research strategy that seemed most suitable to follow in this thesis was a qualitative one. Qualitative research is "characteristically exploratory, fluid and flexible, data-driven and context-sensitive" (Mason, 2002: 24) and seems better suited whenever issues of "description, interpretation, and explanation" (Bluhm et al., 2011: 1869) are at stake and when one tries to answer "how" questions (Silverman, 2013a). Also, it seems to be the preferred choice whenever a complex phenomenon is to be studied in detail, producing fresh understanding of the realities being investigated (O'Toole and Were, 2008), or simply due to its practical relevance (Alasuutari, 2010). Some argue that the secret of good qualitative research is the extent in which the researcher has the chance to actively engage with "their own set of research questions" (Mason, 2002; vii). For others, qualitative research is a way to oppose a quantitative and "scientistic" model of social sciences (Flyvbjerg 2001; 2005), in which only a quantifiable way of knowing the world is deemed appropriate. However, such a quantitative approach may "rule out the study of many interesting phenomena" (Silverman, 2013a: 15).

In this research, as already explained, the focus is on describing how the heterogenous elements that make up a Living Lab are linked in practice. A clear majority of Living Labs studies reviewed for this thesis (see Chapter 3) has followed a qualitative research strategy, which seems to be an acceptable way to study the field. There is, however, one warning with regards to the way in which this strategy has been used to study Living Labs: some studies seem biased in their use of a qualitative research strategy. As previously discussed, Hakkareinen and Hyysalo (2016) also noted that most research on Living Labs has focused on answering "what" questions, overlooking an approach to research able to explore "the situatedness and context-specific aspects" (ibid.: 47) of Living Labs as well as understanding the phenomenon by asking (and answering) "how" questions. Examples of this tendency are

found in the works of Leminen (2015a; 2015b; also, Leminen et al., 2012), who provides a typology of Living Labs as open innovation networks; Nyström et al. (2014) who identify the different type of participant actors and their roles in Living Labs; as well as Bergvall-Kåreborn et al. (2009) and Ståhlbröst (2012) with their organizing principles. Although these works are extremely needed and useful, they seem only focused in describing and mapping the field. Methodologically, and this is the argument by Hakkareinen and Hyysalo (2016), they appear to lack a theoretical depth, limiting themselves to the creation of taxonomies (cf. Gregor, 2006) and producing what is known as "naming theory" (Gregor, 2002; cited in Hakkareinen and Hyysalo, 2016), considered the lowest level of theory development (Gregor, 2006). The argument is thus that Living Labs research may gain from studies with a more in-depth focus on answering questions that aim at explaining "how, why, and when things happened" (ibid.: 619). Silverman (2013b) notes that given the way in which some qualitative studies are conducted, they would have been better performed by using a quantitative strategy. There are situations in which the qualitative element of a study is simply its use of semi-structured interviews as method of data collection. However, when the data is analysed and presented, it is done in a way that could have been achieved by a quantitative survey (ibid.). This is indeed my perception of some Living Lab studies (e.g. Leminen et al., 2012; Ståhlbröst, 2012; Nyström et al., 2014) which, regardless of their use of interviews and 'adoption' of qualitative strategies, present their results in ways more compatible with a quantitative approach (e.g. by creating typologies of Living Labs users; actors and guiding principles).

Finally, I would like to acknowledge that, from an ontological politics perspective on method, even though a qualitative research strategy seemed to me the most appropriate for the objectives of this study, it needs to be accepted that this strategy still helps to "produce the realities that it describes" (Law and Urry, 2004: 397). In this sense, it is not an innocent strategy, as it brings with it the need to "enact forms of order" of the world out-there (Law,

2008: 641). However, due to their multiplicity and complexity, realities tend to escape that ordered ideal (ibid.). In the spirit of ontological politics, I am aware that social science needs to be more than plain representations of the world, and I hope that this work is able "to interfere, to make some realities realer" (Law, 2004: 67). This is what Law (2004) refers to as "method assemblage", a process in which it is acknowledged that to engage with the world (and its descriptions) is to enact it in specific ways. Ways that will inevitably lead to descriptions of phenomenon where some things are made present, while others are made absent, repressed even (Othered). Law (2007) considers this to be a defining and constitutive feature of the process of knowing, and that it is important to acknowledge how difficult it is to make everything present and comprehensible – "the knowable is dependent on, related to, and produced with the unknowable" (Law, 2007: 600) and the process of "knowing is constitutively incomplete" (ibid.: 601). Admitting to this is a step in the direction of knowing, enacting and acknowledging a non-coherent world (Law, 2004; 2007; 2008), a world that is "vague", "imprecise", and "multiple" (Law 2007: 603). And if the world may be described that way it is not because of methodological flaws but because it is the way the world is. The challenge for ontological politics is thus to find ways in which to start knowing, enacting and make manifest the non-coherence of the world (Law, 2008). Such is the aim of this thesis regarding Living Labs: to show that these are non-coherent, multiple and imprecise arrangements and that to try and order them under some guiding principles (Bergvall-Kåreborn et al., 2009; Ståhlbröst et al., 2009; Ståhlbröst, 2012), defining typologies of actors (Nyström et al., 2014) or providing some guidelines on how to set up and benefit from Living Labs (e.g. Bódi et al., 2015; Eskelinen et al., 2015) is still an attempt at ordering the field around specific areas that help in producing specific realities / descriptions of Living Labs (e.g. Living Labs as open innovation networks that guarantee successful collaborations among stakeholders).

5.3 Research Design and Sampling.

Considering the theoretical choices made and the research questions explored in this thesis, the research design chosen was the case study. Case studies are preferred strategies whenever the focus is in understanding an "issue explored through one or more cases within a bounded system" (Creswell, 2007: 73). I selected this design as I am analysing in-depth the phenomena of setting up Living Labs, "a contemporary phenomenon in its real-life context" (Yin, 1981: 59), which for me is "an object of interest in its own right" (Bryman and Bell, 2007: 63) and I am also interested in answering "How" questions (Yin, 2009a). Also, case studies have been one of the most used and acknowledged research approaches within ANT and sociomateriality (e.g. Callon, 1986; Akrich, 1992; Mol, 2002; Leonardi, 2010 Orlikowski and Scott, 2015) as well as in Living Lab studies (e.g. Björgvinsson et al., 2012a; Sauer, 2013; Ehn et al., 2014; Nyström et al., 2014; Leminen, 2015a; Hakkareinen and Hyysalo, 2016). Moreover, they do not need to be "limited to any single type of evidence or data" (Yin, 2009b: 261), with both qualitative and quantitative strategies being relevant for the case study approach.

Three different cases are presented and discussed in this thesis and a more detailed description of each will be given in their respective chapters (below). For now, I would like to briefly outline the rationale behind their choice and the questions they help to answer. All the Living Labs studied were, in one way or another, involved in the development of independent living solutions. Two reasons led me to focus on this type of Living Labs. Firstly, independent living solutions are regarded as one of the strategies in which to fight the demographic challenges discussed in Chapter 1, namely the fact that people are living longer and that healthcare systems seem unable to respond efficiently to the demands caused by an ageing population. Secondly, Living Labs have been developed focusing in health and/or social care (Vanmeerbeek et al., 2015; Bakker et al., 2017; Bygholm and Kanstrup, 2017;

Kanstrup; 2017; Picard, 2017a; 2017b). Due to its underlying principles of collaboration, openness and citizen-centred innovation the Living Lab model is considered fit for purpose when it comes to contribute to the innovation of future healthcare solutions (e.g. Pino et al., 2015; Bakker et al., 2017; Kanstrup, 2017; Picard, 2017a; 2017b).

In Chapter 6, the data stems from a multiple case-study, that I opted to call Lake-EU[38], where eleven different Living Labs across Europe (Belgium, Germany, the Netherlands and the UK) were studied. Nine of these Living Labs belonged to a European health cluster of Living Labs working in the field of independent living[39]. The other two – OLIGO and LIFT – were UK based Living Labs that, although not part of the European health cluster, ended up serving as sources of comparison for issues related with the sustainability of Living Labs. OLIGO and LIFT had been in existence for longer periods when compared with the other elements in the sample. Chapter 6 is focused on understanding the extent to which expectations of Living Labs, as presented in academic literature, project reports, political documents and discourses, are fulfilled in practice.

Chapter 7 zooms in on one specific Living Lab in the Netherlands – Soul-NL – an initiative that was already in existence for over a year when I started studying it. This case describes how the conditions of possibility that bring a Living Lab to life are established (i.e. how and why the links between heterogeneous elements lead to some arrangements but not others). Finally, Chapter 8 describes the case of adapting the Dutch model studied in Chapter 7 to develop a Living Lab in the UK – Link-UK. This was an excellent

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[38] All the names of Living Labs and people used throughout this thesis are pseudonyms. Any names that may match the real names of other projects and people is thus unintentional. Lake-EU is the acronym for "Living Labs Across Europe".

[39] The Health Cluster they belonged to was called e-UCare Portal (http://portal.e-ucare.eu/). It was from this website that I was able to approach some of the Living Labs studied in this case. The website was a product of INTERREG IVB Recap project and it was a way to "provide a sustainable platform for cooperation and information flows (…) to capitalise integrated, innovative and transferable health care models and solutions for healthy ageing and independent living in NWE [North-West Europe] and beyond" (e-Ucare, 2015: no paging).

opportunity to follow the development of such an initiative from scratch, with a focus in understanding how exactly the interests of the heterogeneous elements associated in the Living Lab were managed and negotiated. For instance, how was the enrolment of different actors performed and sustained in practice?

As already pointed out the use of case studies is suitable whenever one is interested in obtaining an in-depth understanding of a phenomenon. Also, it is important to note that all the cases presented in this thesis are exploratory in nature, as the aim was not only to comprehend a phenomenon not yet very well understood (Baxter and Jack, 2008) but to do so within a new light (Creswell, 2007). The use of a multiple-case study in the case of Lake-EU allowed for a wider variety of perspectives to be obtained with regards to the issues being analysed (i.e. expectations of the Living Lab model).

For the multiple-case in chapter 6, I followed a purposeful sample as I was interested in studying a very specific type of setting and process: the design of Living Labs working in Independent Living. I then needed to look out for "groups, settings and individuals where (…) the processes being studied are most likely to occur" (Denzin and Lincoln, 1994: 202, cited in Silverman, 2013a: 148). This was also true for the data on chapters 7 and 8. However, in these cases, one may also talk of convenience sampling, since I worked as research assistant for two European projects on Healthy Ageing and Independent Living in which LAIBS was a partner and the Living Labs studied were part of these projects. Soul-NL had been developed by a project partner influenced by a previous scheme, whereas Link-UK was a direct outcome in one of the projects I was part of. In this sense, the data was available to me "by virtue of its accessibility" (Bryman and Bell, 2007: 197).

In my rationale to choose the cases to which I had no direct access, as was the case in Lake-EU, I looked at projects specifically defined as Living Labs (in project descriptions, documents and websites) that developed work related with Independent Living. My supervisors also facilitated my contacts with

gatekeepers in the case of four Living Labs. From all the Living Labs studied only OLIGO did not match the intended description but the reason to still include it had to do with the fact that it was an initiative with a wide range of work developed in Participatory Design with top authors in the field of Human-Computer Interaction, which gave a rich view on general issues of PD.

Table 1, below, shows the total number of Living Labs (13) I ended up studying as well as their respective locations. I also identify the chapters in which their cases are presented. The Living Labs identified as LL1 to LL9, are all part of the same European health cluster of Living Labs (see footnote 41, above).

Living Lab	Region, Country	Chapter
LL1	South, The Netherlands	Chapter 6
LL2	South, The Netherlands	
LL3	South, The Netherlands	
LL4	Central, Germany	
LL5	Central, Germany	
LL6	North, Belgium	
LL7	North, Belgium	
LL8	South, Germany	
LL9	South, The Netherlands	
OLIGO	North, UK	
LIFT	North, UK	
Soul-NL	South, The Netherlands	Chapter 7
Link-UK	South, UK	Chapter 8

Table 1. Living Labs studied.

As a research strategy case studies bring with them the creation of "concrete, practical, and context-dependent knowledge" (Flyvberg, 2001: 70), knowledge that does not need to be obtained with representative cases as "the typical or average case is often not the richest in information" (ibid.: 78). In fact, the idea of representative cases is criticised by those who see the aim of case studies as the description of a "particular case in detail" (Hancock, 1998: 7), and for whom the idea of generalisability is a concern not for the case study researcher but "for the readers who want to know whether the findings can be applied elsewhere" (ibid.). Also, the fact that some knowledge is considered non-representative of other cases does not mean that same knowledge cannot form part of the wider body of knowledge produced within a certain academic field (Flyvbjerg, 2001; 2006). Case studies, due to their in-depth approach, offer an effective way to identify situations that do not conform with a generally accepted proposition. Flyvbjerg (2001; 2006), taking Popper's notion of falsification, considers case studies excellent tools to identify "black swans". This means that if one is able to identify a "black swan", then the proposition "all swans are white" is falsified, leading to further investigation and theory building work. This is in line with ANT and its aim at making "specific, surprising (…) events and situations visible" (Mol, 2010: 255). This is also the aim of this research: to identify "black swans" in the field of Living Labs.

5.4 Methods and Data Collection.

Collection of data through fieldwork took place between March 2015 and May 2016. This was the period during which interviews, and observations were undertaken. Secondary data collection, such as analysis of documents and literature (e.g. specialized literature; political documents; project websites) started earlier (2013) and continued throughout the PhD. For instance, as already discussed (section 2.2.2.), I also treated the literature review as a mode of data collection. Texts were, throughout this research,

taken as intermediaries and data, as instruments for the exploration of real problems, able to produce a specific reality, created for specific purposes and audiences by specific authors (Atkinson and Coffey, 2004; Bowen, 2009), as part of the wider actor-network in which both this thesis and the Living Labs studied were produced.

The main methods used for data collection were: interviews (semi-structured); observations; attendance of projects workshops; document analysis; project videos. I also relied on extensive fieldnotes (both handwritten and typed in a word processor document). Pictures were also taken during visits to some of the Living Labs locations and premises, and of some of the meetings attended. By collecting different kinds of evidence, we are able to "triangulate or converge on the same research questions" (Yin, 2009b: 261) making our findings "less open to the criticism that they had resulted from and possibly been biased by a single data collection method" (ibid.).

I tried, as much as possible, to keep in mind the advice of David Silverman who tells social scientists to pay more attention to "naturally occurring data" (Silverman, 2010: no paging). Such data is not dependent on the researcher conducting an interview or organising focus groups, data that Silverman considers to be "manufactured data" (ibid.) as it is initiated by the researcher (who usually organises interviews and focus groups). For Silverman (2013b), qualitative research shall not become hostage of the interview as the main method of data collection, and the opportunity to undertake observations of real-life situations, or to analyse documents that are readily available should be embraced, as these are examples of data that is not dependent on the researcher. For instance, in this research, it is fair to assume that the project meetings observed, the documents analysed, and other existing literature would still exist regardless of me conducting this research. For Silverman (2010), interviews carry the risk of the researcher being told what people tell outsiders about what they do, working more as an account of the phenomena and not the phenomenon as it really happens. Although I take Silverman's

account of the interview process on board, I still believe that interviews are "a key way of accessing the interpretations of informants in the field" (Walshaw, 2012: 323). Notwithstanding his criticism of the interview process, Silverman acknowledges that interviews "undoubtedly give you far more rapid results than observation" (Silverman, 2013b: 38). However, one needs a detailed process of data analysis to avoid falling in the trap of providing "journalistic 'commentaries' or merely reproduce what respondents say" (ibid.).

In the case of this research, where access to the field was, somewhat, limited, interviews were deemed as a great way to obtain information that, after extensive data analysis, could offer interesting insights of the phenomenon being studied (Llewellyn and Northcott, 2007). When I mention that my access to the field was limited, I do not mean in terms of quantity of the information collected, but in terms of the degree to which my access was scrutinised. In this sense and compared to the majority of Living Lab studies discussed in Chapter 3, where most authors were directly involved in the projects that were being studied, in my research I was not a direct active participant in the projects studied. Even in those projects where I was involved as research assistant, I am aware that my access to some elements of the Living Lab network was checked to guarantee that potential issues deemed as "off the record" were not shared without being properly anonymised.

This takes me to the work of Star (1991; also, Star and Strauss, 1991) and her criticism of the potential managerial nature of ANT whereby only powerful actors are given a voice and whereby theirs seems to be the only point of view that matters. In fact, it could be argued that I only spoke with and gave voice to powerful actors. Also, if I had a view of the least powerful actors that was only achieved through those powerful accounts. The truth, however, is that it was not always possible to talk with every single actor and it was necessary to rely on the views of those (avail)able to talk to me.

Even though I am aware of this potential limitation, my argument is that, looking at Living Labs through new theoretical lenses (ANT and Sociomateriality) is a step in the direction of providing a new account of the field, articulating those stories of how the setup of Living Labs may not be the fluid and trouble-free enterprise portrayed in the too perfect, non-critical accounts of the present research landscape (cf. Schuurman, 2015). Such was the aim of my analysis. It could be, however, that the actor-network that is the Living Lab is managerial by nature, with some actors given voice, while others remain silent (Kommonen and Botero, 2013; Bygholm and Kanstrup, 2017). Therefore, to advance our knowledge of the process of setting up Living Labs, it may be necessary to start listening to the powerful voices acknowledging, however, that it is in relation that the elements in a network gain their relevance. The powerful voice is thus a network effect, rather than a shaping force (Callon and Law, 1997; Law, 2009). It may also be argued that, at times, relying on the views of those with a wider knowledge base of a phenomenon may be considered appropriate (Llewellyn and Northcott, 2007). Such is the case with this research, particularly in the case of Lake-EU, where most interviews were with project managers and directors. Not because there was an attempt to privilege their views but because, at times, there are views that "may be based on more knowledge, may be formed on a superior judgement and may be made from a position that gives more insight into 'what's going on'" (Llewellyn and Northcott, 2007: 204).

My views on method make me aware of the unruly nature of the world out-there and of the ways in which it is known. Not only are methods performed in specific ways, they also help to enact certain realities (Law and Urry, 2004). Yet, one thing seemed true throughout my research process, and it was the fact that whatever we are left with are stories and that "what matters is to understand how and where the stories are produced, which sort of stories they are, and how we can put them to honest use in theorizing about social life" (Miller and Glassner, 2004: 138).

In total, and across cases, I conducted 31 interviews with Living Labs representatives. These included: project managers and directors (10)[40]; director of council services for older people and physical disability (1); GP (1); nurse (1); sales representative of Internet Service Provider (1); University Researchers (5); Product Designers (2); librarians (1); Director of Regional Development Agencies (1); commissioner for adult social care (1); responsible for volunteer recruitment (1). Interviews would take place preferably face to face but phone and video call (Skype) interviews were arranged whenever it was not possible to meet in person (e.g. with some respondents based in Belgium, Germany, the Netherlands and in cities across the UK). Most interviews lasted between 60 and 90 minutes each. Only in three cases they lasted between 30 and 60 minutes.

Apart from the interviews, I spent one week shadowing the project manager of Link-UK whilst she conducted meetings with potential stakeholders of the project, and I also had the chance to attend the initial project development meetings, project workshops as well as spending two days interviewing some of its stakeholders. I have also spent five days in the Netherlands conducting interviews and observing project meetings and workshops regarding Soul-NL. For all the Living Labs, project documents were collected, which included brochures, information on websites and project reports.

Interviews were semi-structured and an interview guide (see Appendix 1) was created. However, the questions in the interview guide were rarely asked in the same way they had been written. The guide was used more as an orientation tool, with questions working as cues for themes to be addressed.

[40] Because some interviews took place with the same elements more than once, as well as with two people at once, the numbers in brackets do not add up to 31. Also, in the case of University Researchers, four of these were also Project Directors but I am only counting them as University Researchers to help with identifying the different functions.

5.5 Data Analysis.

All the interviews were audio recorded and transcribed *verbatim* by myself. Only 4 interviews were transcribed by an outsourced professional transcription service to help with time constraints. Even at my fastest, 10 minutes of interview material would take, on average, one hour to transcribe. Meetings were not audio recorded but extensive field notes were taken throughout.

Data analysis for this work was performed in tandem to data collection to facilitate subsequent exploration of themes and to avoid accumulation of non-analysed data. For instance, during and after each meeting, interview or observation I would take notes that I would either jot down in a notebook or directly into my laptop into a Notepad (.txt) document. Transcripts of interviews would usually be transcribed the day after the interview had taken place or on the same day, time permitting. A great part of the analysis was continued and completed after the data collection had finished. For the analysis of data, I followed a four-step strategy across the analysis of all cases.

Firstly, and most importantly, all data was imported to NVivo, a computer-assisted qualitative data analysis software (CAQDAS). The use of CAQDAS has been deemed an excellent choice whenever large amounts of data, as produced in a qualitative study, need to be managed, analysed and easily retrieved (Bryman and Bell, 2007; Gibbs, 2007). This strategy proved extremely effective in my analysis where it was necessary to organise the large amount of data collected through interviews, project documents, field notes. For instance, the software allowed for easy management of the data into different folders for different type of data (e.g. interviews in one folder; observations in another; documents in another). Also, the process of coding data and its subsequent organisation and retrieval of higher level themes / codes is made easier. For each case studied, a different NVivo project was created and the process of data importing and organising replicated.

Secondly, after all the information had been correctly imported to NVivo, I followed Braun and Clarke's (2006; 2013; also, Clarke and Braun, 2013) six phases of thematic analysis (see Appendix 2), which helped me not to drown in the vast amounts of data obtained and was an efficient way in which to code data. The process of coding is taken here as "a deliberate and thoughtful process of categorizing the content of the text. Coding means recognizing that not only are there different examples of things in the text but that there are different *types* of things referred to" (Gibbs, 2007: 39; emphasis in original). Thematic analysis, as devised by Braun and Clarke, is an extremely versatile method as it can be used with different theoretical perspectives and research interests, "works with a wide range of research questions (…) can be used to analyse different types of data (…) large or small data-sets; and (…) it can be applied to produce data-driven or theory driven analysis" (Clarke and Braun, 2013: 120). This proved to be an invaluable strategy that hugely helped me with organising and make initial sense of the data collected. For Braun and Clark (2006: 79) thematic analysis is a "method for identifying, analysing and reporting patterns (themes[41]) within data". There is, however, a very important point in the analysis, and that is the fact that the researcher is himself/herself an active element in the research process and themes do not simply *emerge from* the data, but it is through successive iterations that the themes are organised and presented. This follows from a process of successive readings through the data (e.g. interview transcripts, documents), through to establishing initial codes, organizing them into higher order themes, and reviewing and refining them before producing a written report.

Figure 3, below, illustrates how this process worked in NVivo. The example is taken from Lake-EU, and it shows how an individual interview segment with a designer was coded and how this code is part of a wider theme. In this example, a section of the interview (the text on the lower half of the

[41] The terms 'themes' and 'codes' are used interchangeably. The idea is that they refer to patterns of response and meanings within the data (Braun and Clarke, 2006).

picture) was coded as “Community life improved”. This code, based on its communalities with other codes stemming from other sources, was then grouped and included in a higher order theme entitled “Benefits, Advantages of the LL approach”.

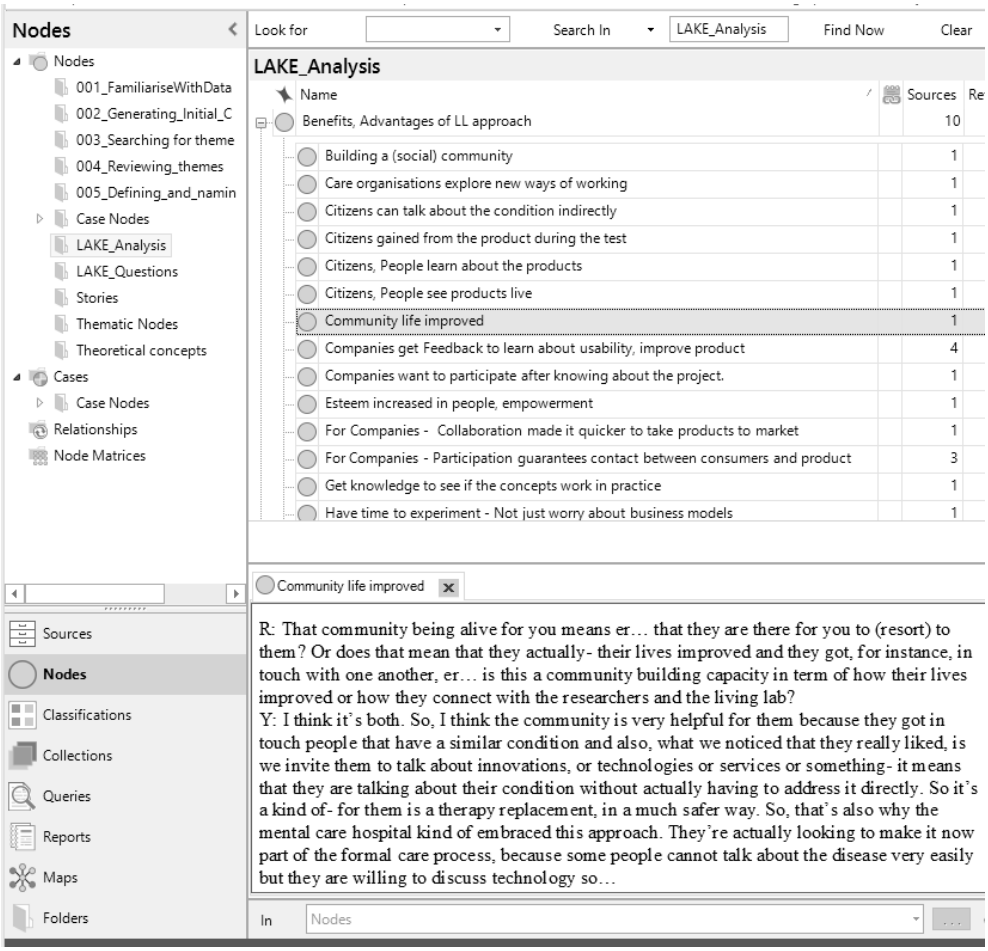

Figure 3. Example of NVivo Theme

The same coding strategy was used across the three cases analysed, with some of the themes serving to organise data across cases. For instance, one higher order theme that appeared in all the cases was the theme “Challenges”. However, what constituted “Challenges” for the Living Labs in Lake-EU (the sub-themes) were not the same issues that would prove a challenge for Soul-NL or Link-UK. It is important, at this point, to reinforce the idea that this

coding process was primarily used to help me organise and make sense of the large amount of data in the three cases.

Enter the third stage of my analysis. Based on the ANT and sociomaterial approach in which I framed this study, I went on to identify the peculiarities of each case and looked for what was unique about them (e.g. what was the data telling me that I have not yet come across in previous literature?). What were the meanings of each theme in the specific contexts in which they were being analysed? As Law (2004: 68) notes: "[We] are caught up in sets of relations that simultaneously have to do with meanings and with materials". The same seemed to be true with the data I was analysing. Also, I was not interested in focusing on those themes with considerable number of instances across the data set because "more instances do not *necessarily* mean the theme itself is more crucial" (Braun and Clarke, 2006: 82; emphasis in original). In fact, different analysis can be performed with the same data, either by asking different research questions or by focusing on certain features of data in more detail (Braun and Clarke, 2013).

For instance, it was only when I organised the themes and after several iterations with the data that it became clear how the data seemed to be telling something "new" when compared with other Living Lab literature. What these stories seemed to be telling me appeared to contradict the idea of the Living Lab as an open, 'easy to replicate', 'do-it-yourself', ordered collaborative arrangement. Certain aspects of the data started to highlight that Living Labs could also be messy (Law, 2004), unruly, unpredictable and surprising practices better understood as the product of local and situated sociomaterial relations between their constitutive elements. An example. It became clear how the existence of some Living Labs was highly dependent on public funding, and that this dependency was higher than one was led to believe by reading some of the earlier literature. However, more than understanding that funding was crucial, I was able to understand exactly how this lack of funding would affect the sustainability of some projects, and the strategies some projects developed to make up for the lack of money.

Finally, and this was the last stage of my analysis process, I was able to return to my research aims, refined the questions that seemed worth asking and began telling the story of the process of Living Lab making in ways that may allow the “reader to feel as if they had been an active participant in the research” (Baxter and Jack, 2008: 555) and determine whether the findings can be applied to their realities (ibid.). Whereas Braun and Clark’s (2006; 2013) framework helped with making sense of my data, it was within the material semiotic approach of ANT (Law, 2009) and its relational and performative idiom that I was able to develop the themes that helped me to answer the questions I explore in each case. As Law (1999:3) notes, it is in mutual constitutive relations that “entities take their form and acquire their attributes”, which means that in order to understand a phenomenon, one needs “to think about how it was practiced in all its material forms” (Law and Singleton, 2014: 382).

It should be noted that ANT and the sociomaterial idiom did not inform this study in a deterministic way. In this sense, they were not a starting point that would influence my specific approach when going out in the field, thinking about interview questions or the choice of a specific method. It was from the moment I started the field research and throughout the analysis of initial data that ANT and Sociomateriality started to stand out as interesting ways in which to interpret the world *out-there* as presented in front of me.

The stories and observations in my fieldwork were my point of departure. On the one hand, I set out to understand how the process of setting up Living Labs was brought to life and, on the other, I wanted to be able to reach out to theories that helped me to make sense of the world I was studying. ANT and Sociomateriality were chosen as the result of an iterative process through my readings of different literature and my interactions with and interpretations of data. They were, thus, the result of an abductive reasoning effort (Bryman 2016) that provided an "account of the social world" (ibid.: 394) in which my findings and observations were taking place. In this sense, these theories presented themselves as original ways to interpret my findings and, most

importantly, to understand Living Labs through a new lens: Living Labs as the product of heterogeneous relationships between heterogeneous elements brought into being by the practices that constitute them

Finally, ANT and Sociomateriality have relevance whenever one is attempting to understand how relationships are established between different elements to create a socio-technical ensemble such as a Living Lab. Throughout my research it became clear how the process of setting up a Living Lab was a collective effort dependent on the successful establishment of relations between human and non-human elements. These heterogenous relations clearly shaped the subsequent Living Lab under investigation. As such, drawing on metaphors of emerging networks and entanglements created a powerful and symmetrical explanatory approach.

5.6 Ethical Considerations.

Research ethics was considered throughout the entire research process. Initially, this project needed to be approved by the Faculty Research Ethics Panel in accordance with Anglia Ruskin University's Research Ethics Policy, and approval was granted in February 2015 (see Appendix 3). Prior to obtaining approval I also attended the compulsory Ethics training provided by the University.

After approval was obtained, and before fieldwork started, all the participants were provided with Participant Information Sheets where detailed information about the study was explained, together with Participant Consent Forms (see Appendix 4) that the participants would sign and return. In this form, the participant acknowledged that he/she agreed to take part in the study and that he/she was free to withdraw from the study at any time. This in fact, happened in one case (OLIGO) where the project director was not able to continue with a set of interviews we were conducting. However, on withdrawal from the project, the participant granted me permission to

continue using the data collected until that moment. Also, I obtained letters of permission to conduct research where project directors acknowledged their understanding of the objectives of the research, the methods to be used and what would happen to the data (see Appendix 5).

Participants were made aware that interviews were being recorded and whenever observations were conducted participants were also informed of my presence and my role as a researcher, with consent always being sought. Whenever photos were taken I would always ask permission to do so, although I opted to digitally edit the pictures in a way that the setting was visible but where no persons could be easily identified. The names of projects and people were anonymised by using pseudonyms. The creation of pseudonyms was facilitated by using the following online tools: Acronym Creator (www.acronymcreator.net) and Behind the Name (www.behindthename.com), a website that allows us to create names based on nationality, which was extremely useful in this work.

All data collected during the research was treated in accordance with the UK Data Protection Act (1998).

5.7 Challenges in accessing the field.

I have already noted how my access to field was, somehow, limited (see section 5.4 above), preventing me to have full access to every element involved in the Living Lab (e.g. accounts of users were difficult to come across). The objective of this thesis, however, was to understand how Living Labs are set up, learning how the relationships between the heterogenous elements that constitute the Living Lab are established.

My focus was thus the upstream process of designing a Living Lab. Such focus meant that all of those elements (both human and non-human) that may be present when a Living Lab is already up and running are not possible to come across in the setting up stage. For example, most of the innovations that

may be later developed in a Living Lab are not yet present during the setting up stages. The same is true for the social elements of a Living Lab. For instance, in the design stage, it is not yet certain which user groups, companies, healthcare organisations or housing associations will be part of the project. In fact, deciding which stakeholders to include in the Living Lab is itself part of the setting up of the Living Lab.

There is, however, always a starting point to every Living Lab. In the examples studied for this thesis most interviews were conducted with those elements that were part of those projects from the beginning. They provided, in their own right, a good source of information on how the projects developed, with most interviews being conducted with project managers and directors. On the other hand, and in cases where users had already been part of the project studied, it was not physically possible to interview them.

In the cases studied in chapter 6, for instance, most of the projects had already ended and the projects locations were all outside the UK. It was thus not possible for me to follow all the actors involved in developing the Living Lab. Regarding the case studied in chapter 7, and even though the project was ongoing, access to users was not facilitated due to language barriers (none of the users spoke English) and it was not viable to arrange for people able to translate to be onsite during the days I was visiting the Living Lab's premises. Finally, Chapter 8 illustrates how a particular project - Link-UK - was developed from scratch. Here, users were not yet present. Those involved in setting up the Living Lab were yet making sense of who the right users and citizens would be for the services and products provided by the Living Lab.

Part III — Data

6 Past Experiences of Living Lab Design.

> "Well… I think, talking about the buzz word… I think the term Living Lab became popular in the last two years [2013-2015]. At least this is my feeling. Because when we started the project it was not that popular. It only came up, you know- we were talking about pilot sites, we were not talking about Living Labs. And I do not think that the term triggered somebody. It was more like… most of our partners are also housing associations, from other countries, and they all have the same problem. Because all of Europe is ageing- actually, all the world is ageing, but we are looking at Europe and er… they all face the same challenge of… how do we house our people in the future? And from a company- or from a business perspective, you want to keep your tenants… but from a social perspective you want to do some good for the people, you know? And I mean… every one of us has parents and grandparents and watch them living and see how they struggle sometimes. So, most of us thought 'Ok, there must be something we can do and, maybe, technology is the solution."
>
> Hilde, Project Manager LL5, Germany

Hilde is one of the project managers I talked to about their experiences of running a Living Lab for independent living. Her quote summarizes some of the underlying issues that triggered the present research. On the one hand, the term Living Lab and associated rhetoric, what for Hilde feels like a "buzz word" that seems to have gained popularity, makes us wonder whether it may simply be a fashionable term that may soon vanish. On the other hand, in the context of the demographic challenges caused by an ageing population, in Europe and across the world, Living Labs are being used and widely implemented (cf. Picard, 2017a; 2017b) as means to help develop future innovative solutions to the ever-present social challenges of independent living and healthy ageing.

The case analysed in this chapter – Lake-EU – comprises 11 Living Labs across Europe focused, in one way or another, in independent living. Nine of

these Living Labs belonged to a European health cluster (e-Ucare, 2015) and were part of different networks of cross border collaborations in Europe. They were financed, in part, through European funding initiatives, such as Interreg Europe.

From the perspectives of those who, like Hilde, experienced setting up a Living Lab first-hand, this chapter will explore some of the images of Living Labs that seemed to stand out in the conversations had, the documents examined, and the analysis undertaken. One question helped with guiding the analysis in this chapter: to what extent are expectations for Living Labs (as presented in previous academic literature, project reports, political documents and discourses) fulfilled in practice?

This chapter will tell the stories of how, in the process of setting up Living Labs, some of the prescribed expectations for Living Labs as presented in previous literature (cf. Bergvall-Kåreborn et al., 2009; Leminen et al., 2012; Ståhlbröst, 2012) are not always realised. It is not possible to know, in advance, what to expect from a Living Lab. Due to their situated nature, I argue, Living Labs are better understood as unpredictable structures that may only be defined, in practice, by the heterogenous relations established between the different social and material elements that constitute them (e.g. producers, users, carers, local governments, policy documents; spaces; technologies; buildings). In this chapter, I focus on the experiences of those who played an active part in developing Living Labs working in independent living. Throughout the analysis, all the Living Labs are interpreted as actor-networks and each participating element (actor) in these heterogeneous arrangements are, themselves, perceived as actor-networks (cf. Callon, 1991; Latour et al., 2012). In other words, all the social and material entities discussed are part of wider networks of associations and it is through the links established between them that they acquire new meanings (Latour, 1994). Consequently, the process of setting up a Living Lab is here understood as more than bringing different elements or actors together. It is important to acknowledge that different actor-networks need to constantly negotiate the

formation of new links and the preservation of old and previously established ones.

6.1 Dataset

The data analysed in this chapter is summarized in Table 2 below. It originates from 17 semi-structured interviews carried out with Living Lab participants (e.g. managers; directors; nurse; designer) of 11 Living Labs across Europe working in the field of independent living. Nine of these belonged to a European health cluster of Living Labs developing independent living solutions (e-Ucare, 2015). At the time the interviews were conducted (July 2015-April 2016) the total number of Living Labs in the cluster was 22, however only 9 project representatives responded to my invitation and accepted to be interviewed for the research. Those who did not respond had, however, some project information publicly available online and some of this was used in a preliminary analysis of common themes across the initiatives. Two other Living Labs were included in the case – OLIGO and LIFT. These were UK based Living Labs and, although not part of the European health cluster, served as sources of comparison on issues such as sustainability and stakeholder collaboration. OLIGO and LIFT had been in existence for longer periods when compared with the other Living Labs in the sample that had only a temporary existence (e.g. 3 to 5 years). Apart from interviews, I also had access to project websites, leaflets and documents available online. Interviews were conducted either in person or via video call (Skype) with project members across Europe (Belgium, Germany, Netherlands, United Kingdom). Interviews were recorded, transcribed *verbatim* and the transcripts sent to the interviewees to be checked for accuracy.

			Data Type	
	Role	***Region, Country***	***Documents***	***Interviews***
LL1	Project Manager	South, Netherlands	Website, Project online Leaflets	1
LL2	Project Manager	South, Netherlands	Website, Project online Leaflets	1
LL3	Designer	South, Netherlands	Project website, online leaflets, research articles	1
LL3	Nurse	West, UK	Website, Project online leaflets, research articles	1
LL4	Director and user	Central, Germany	Project website and online documents	1
LL5	Project Manager	Central, Germany	Project website and online documents	1
LL5	Project Manager	South, UK	Project website and online documents	1
LL6	Project Manager	North, Belgium	Project online documents	1
LL7	Project Manager	North, Belgium	Project online documents	1
LL 8	Project Director	South, Germany	Project website and online documents	1
LL 9	Project Manager	South, Netherlands	Project website and online documents	1
LIFT	Project Directors	North, UK	Project documents	3
OLIGO	Project Director	North, UK	Project Documents, website	3
				17

Table 2. Dataset Lake-EU.

6.2 The treachery of (expected) images of Living Labs.

"The treachery of images" is one of the most well-known paintings by Rene Magritte. In it, the surrealist Belgian artist painted a picture of a pipe with the caption "Ceci n'est pas une pipe" (This is not a pipe) [42]. The story goes that, behind the motivation for the artwork, was the idea that the painting itself was not a pipe, rather an image of a pipe. Magritte thus created a "three-way paradox out of the conventional notion that objects correspond to the words and images" used to describe them (Anon, 2009: para 1). The image betrays our senses. It is treason to the eyes and mind and, in a way, to our understanding of what a pipe really is and looks like.

A similar rationale seems to apply when looking in depth at the practice of Living Labs, which seems far from corresponding to the words and images used to define them. One could argue that the definitions are nothing more than mere (idealized) images of its practice and quite difficult to reproduce. As in Magritte's work, it looks as if what we see (and experience) as a Living Lab may not be one. On the one hand, we have the defining words and orderly images, as given per countless attempts at definition, of the Living Lab as a space of public participation, collaboration, and open and user innovation (see Chapter 3). On the other, we have its practice. And this practice, when looked up closely, seems to show the Living Lab as a closed space, where participation, user engagement and innovations do not develop as swiftly and in the manner in which one is led to believe. Up until this day, very little research seems to have focused on this difference (for some exceptions see Hakkareinen and Hyysalo, 2013; 2016; Sauer, 2013; Vanmeerbeek et al., 2015).

This mismatch between the theory of what a Living Lab should be and look like (Ståhlbröst and Holst, 2012; Bódi et al., 2015; Eskelinen et al., 2015;

[42] Michel Foucault offers an in-depth analysis of Magritte's painting (Foucault, 1998)

Leminen, 2015a) and the principles it should follow (Bergvall-Kåreborn et al., 2009; Ståhlbröst, 2012) versus its performed reality appears to have been overlooked in the literature. However, such mismatch seems to be the reality in the daily practices of those I talked to.

As already argued in this thesis (Chapters 2 and 3), I take the view that Living Labs are situated in practice. Therefore, most of the ideas "expected" from conventional descriptions of what Living Labs should be may never fulfil in practice because Living Labs will, most likely, be performed differently in different contexts. The Living Labs analysed in this chapter bring with them some expectations. For instance, as elements of Lake-EU, these Living Labs were expected to help solve some of the challenges of an ageing population, by co-creating solutions to help people live independently, for longer, in their own homes (Lake-UK website).

In line with the idea of "script" (cf. Akrich, 1992; see section 2.2.1), one may argue that when it comes to make a Living Lab, conventional Living Lab descriptions help to create assumptions about the morals, motivations, ambitions and politics of those entities that form the world in which the Living Lab will appear (Akrich, 1992) whilst, at the same time, accepting that society, "technology, science and economy will evolve in particular ways" (ibid.: 207-208). These expectations may be taken as useful devices in which to interest potential stakeholders, make sense of the research field and perform particular futures. However, even though they may be performative of certain futures (e.g. they are still useful rhetorical tools that help to bring multiple stakeholders around a particular issue such as ageing) they are non-deterministic in the sense that the futures they help to perform will, most often than not, fail to live up to the expectations that created them.

My findings, as discussed below, show that, at times, Living Labs may be better understood as closed, unrealistic and (un)sustainable arrangements.

6.3 Living Labs as shops

Responses to the challenges of independent living seem to have been construed around the idea that effective solutions require the development of assistive technologies (see Chapter 1; also, Oudshoorn, 2011; Pols, 2012; Aceros et al., 2015). Some of the Living Labs studied in this chapter seem to have been, perhaps unwillingly, configured as spaces for the demonstration of technology – a showroom or a shop – in which partner companies are able to display their products in the hope of increasing the number of sales and customers or simply as an opportunity to test them before bringing them to market.

The accounts of some project directors and managers show that the Living Lab space is often referred to as an exhibition of various products, even when the lab was built as a home where people could live or, in some cases, installed in a real house. Pieter, director of a Dutch Living Lab (LL1), told me of his space:

> "when you enter it [the Living Lab] you think 'hey, it's a big shop'. So, all kinds of er… technical improvements people can use, you know… But we are not a shop. We are independent. People can only see, and use and try and then they can ask 'where can I buy it?' And then we say 'ok, look to that website, or go to that shop' (...) The other groups that visit us are groups of older people who are interested- and they're getting older and want some technical support- they need technical support"

Although the products[43] cannot exactly be sold and bought *in loco* Pieter notes that visitors are referred to a specific website / online shop where they

[43] The products / solutions in LL1 include, among others: electronic pillboxes; digital platforms of care; Parkinson support services; home security services; weight management solutions. At the time of interview, the project was awaiting the conclusion of a building that could be called "House of Tomorrow". One particularity of these space is that the products on show are already developed and not in development. The rationale behind this choice, Pieter explained, had to do with the fact that the products need to be available to buy the day after people visit the house, should they intend to do so. The managers of LL1 wanted to avoid expectations being created by showing products that would only be available in a few years down the line.

may later purchase the product they liked, should they intend to do so. In this instance, the Living Lab works as a shop window. In terms of ANT, one could see LL1 as an intermediary that passes between two actors – producers and citizens – defining the relationship between them (cf. Callon, 1991). It is through LL1 that citizens have the opportunity to discover new products and that producers are able to showcase their innovations.

Other attempts exist of coupling the showcase of products ready to buy, with demonstration of prototypes of things to come. Daniel, the director of a German project (LL8), exemplifies how the space he manages is doing it.

> "We have a flat which is fully equipped, you could live in, you know? There is nobody living in because, otherwise, it's difficult to show people around when there's someone living (…) that's just a fraction of the space (…) there is another part where we are showcasing- (…) there is a floor er… where we are having basically space for showcasing prototypes. In the flat itself there are products in there which you can buy on the market. So, it's not science fiction. It is reality what you have there."

Daniel's quote reminds us of two things. Firstly, an IKEA showroom that looks exactly like a room in a home but where no one is living. It would also be "difficult to show people around" if someone was living in IKEA. Secondly, when Daniel highlights that the products on show[44] "are not science fiction" and that it is "reality what you have there" one may be led to question the extent of this claim. The same is true in the case of Pieter, above, and the products on show in LL1. For instance, to what extent are the products on show just a clever way to create expectations on those who visit the room? Visitors may be tempted to think that, one day, they will also be able to live surrounded by those types of products and technologies, in much the same way that one may envisage a comfortable chair from IKEA in one's living room. However, unless we can buy the chair, take it home and use it, we are still in the realm of "science fiction". Otherwise, the chair may be real in

[44] Examples of these products are smart meters, bathroom accessories, telemedicine services.

IKEA or in the Living Lab but will never be a reality in our own home. And this may be a valid supposition regardless of whether a specific product is available today or only in a few years' time. As in the previous example, the Living Lab is also an intermediary between businesses and citizens. In both cases, and through the showcasing of particular products, these Living Labs seem to configure a particular set of expectations towards the future. In this case, the expectation is that the products on show would make independent living a better experience if people bought them.

Another German project (LL4) illustrates how the idea of the Living Lab as a shop seems to persevere. Joachim's involvement with LL4 goes back ten years. He manages a company whose main shareholder is a housing association. He told me how his company was set up with the aim of developing solutions in partnership with housing associations to contribute to tackle the ageing problem by supporting people living at home for longer. Together they set up the Living Lab: a purpose-built house to show the different available products in the market. Joachim is thus not only employed by, but also a full-time resident in the Living Lab. Joachim and his wife live there permanently. It is their home. However, it is one of a kind. There are arranged dates and events when the house is open to the public. On those days, housing associations and citizens can visit the space to see what the market offers in terms of independent living solutions[45]. People are then able to buy some care packages. Below, an extract of my interview with Joachim illustrates how this takes place.

> "R: Is your house… where you live, just a test bed for the housing association? Or do they have other flats where they can test things as well?
>
> J: Yes, we have both. So, the main point is here, in our house, but we have now built more than ten different areas with other housing companies, other consulting companies- or associations where they have little show rooms and- and,

[45] Open days are, possibly, a way to overcome the difficulty pointed out by Daniel (LL8) where it is difficult to show people around when someone lives in the house.

> in the interaction with them, we say 'Ok come here, see what we have, what is your interest?'. And then they collect that and then it's very easy to say, 'Ok, that's nice this area, we can see it works, and we take that, and we have these targets, we have these tenants with these needs", and then they collect, and we install it and we give them technical support. So, that is the process.
>
> R: So, in a way, your experience living in a house with different technology is then used by the housing association to implement that in new developments…
>
> J: Yeah, yeah.
>
> R: So, these new [housing] developments can already integrate these packages in them, is that it?
>
> J: Yeah. And I think we are not in that way a scientific Living Lab allocated to a university or a research institute. We are really, more an intermediate test area from the product to market. So, it's a mixture of a show room where you can see what options, or what solutions are available at the moment (…) The point is we have to finance ourselves by business. We are not financed by any public funding. So, it's only our business (…) that's the point."

From Joachim's explanation two things become clear. Firstly, one understands that the reason for the Living Lab to work as a test area is a consequence of its need to secure finance. Because the project is not financed by the local government, they need to rely on this business model, which works well for them. Secondly, the benefits of showcasing products also appear to be associated with the fact that it is easier to understand the potentialities of products / services whenever one can interact directly with those products / services. Only then are people able to understand and assess issues of usability and quality of the products on trial. At the same time, the act of showcasing allows for feedback about the products to be collected from potential customers. As Joachim puts it:

> "I think it was in 2012... 13… we realised that it's very hard to- to promote concepts where nobody can take them by the hand, to see them (…) that's one point to think about (…) how can we er… demonstrate technical solutions? That's

> one point. And the other point was we had no real experience with what- how the solutions are really… from the point of quality, from usability, from maintenance and so on, from all these important aspects (…) we have no real experience. (…) And the third point was we have no real clear idea of the reaction and the feedback of the consumer (…) of the customers we intend to- to offer our services to. And in that- so, we said, 'Ok, we need a… a better kind of demonstration of solutions'. So, we decided to build a house first, (…) to install all kinds of (actually) available, or in progress, products and services for continuous use by the inhabitants of this Living Lab. And to invite mostly- a lot of people from different target groups, say… from housing companies, from management, from social health companies, from users (…) from associations… user groups, you know what I mean? Erm… and to talk with them, to be in contact, to demonstrate, to get feedback, to work with them and to use it for our new projects"

Joachim's example shows how LL4's actor-network is configured in a particular way due to LL4's need to secure funding. Contrary to other Living Labs with links to other actor-networks (e.g. local governments) LL4 does not seem to enjoy the benefit of being linked with such important actants such as 'public funding'. The consequence was for LL4's actor-network to move towards a model where the demonstration of products was a constitutive part of its business model, allowing LL4 to link with 'money' – an essential actor for LL4's actor-network nonetheless – through different means. In this case, through partnering with businesses and allowing them to showcase their products LL4 is able to establish partnerships with housing associations that may be interested in LL4's offer.

Although the idea of demonstration is accounted for across some documentation on Living Labs (e.g. Niitamo et al., 2006; Leminen, 2015b) it is usually presented as being undertaken in a product that is still in development (ibid.) and where the user is taken as a co-creator in the testing phase (Westerlund and Leminen 2011). The examples just presented, however, seem to show that not only is the testing of products a recurring theme with those who I have talked with, but also that this testing happens

after the product has been developed, after the end of the product life-cycle, as conventionally understood[46]. The conventional "script" in which the Living Lab user is configured as a co-creator is replaced by the "script" of the user as tester or consumer. In this "new" inscription, the aim (and ultimate gain) seems to be for companies to display and, hopefully, sell more of their products. This fact, however, seems to be masked by descriptions of the Living Labs as collaborative arenas in which the products are showed to assess the *needs of users*, reinforced a user-centred ethics so popular of conventional Living Lab descriptions. Project documents and websites do not seem to describe exactly how this situation unfolds in practice, just mentioning that a type of testing is, somehow, involved. For instance, in those documents in which "testing" is mentioned, Living Labs have been simply described as: spaces in which to "develop, test and evaluate" innovative products (LL3); "testing area[s]" (LL4); or "testing space[s]" (LL7). It is only after speaking with those involved in the setting up of Living Labs that one gets a better sense of how exactly testing comes about.

The idea of Living Labs as shops seems to escape conventional descriptions and literature claims whereby Living Labs are co-creation spaces where the demonstration of products (or services) happens whilst the products are still in development (e.g. Niitamo et al., 2006; Følstad, 2008; Westerlund and Leminen, 2011). From what has been discussed it seems that, at times, that is not the case and conventional descriptions of Living Labs as spaces of innovation co-creation and co-development are not followed in practice. In line with Kommonen and Botero (2013; also, Vanmeerbeek et al., 2015), one may be led to ask whether, in these type of Living Labs, the input of users is

[46] By using the term "conventionally understood" I am highlighting the fact that, as already discussed (e.g. Leonardi, 2009; Oudshoorn, 2011; Pols, 2012), a product life-cycle rarely finishes with its development and/or implementation. Implementing a product is not the end of the journey. Mutual iterations between users and the products will need to take place to guarantee the product is accepted and, in fact, used. A product is never isolated from the social, technical and spatial context in which it is delivered. Products and their surrounding contexts are, in fact, mutually configured (ibid., also, Silverstone, 2005; May and Finch, 2009; May 2013a; 2013b).

ever called for as a truly co-creation effort and not simply as a validation / feedback tool.

I would argue that the conventional "script" whereby Living Labs are characterised as co-creation initiatives, with users and producers equally and actively involved in the innovation process, presents the Living Lab as what Latour (2005a) defined as a mediator. As mediators they would radically "transform, translate, distort and modify the meaning or the elements" (Latour, 2005a: 39). Therefore, if conventional descriptions were fulfilled in practice, the Living Lab would be a mediator because the elements linked (in the cases just discussed, users and producers) would be radically transformed (Latour, 1994). Users would become co-creators and businesses would be more than just producers, needing to adapt and change their products along the development cycle based on the input from the users. However, in the examples just discussed, Living Labs seem to suit Latour's definition of "intermediary" best, in the sense of transporting "meaning or force without transformation" (Latour, 2005a: 39), being defined only by their function. As shops, we have seen, the Living Lab is more like an intermediary, bringing together users and producers without radically transforming the elements linked. In the examples just discussed, the conventional script is ignored and a new one assumed. As shops, Living Labs configure users to be "shoppers" and "testers" and businesses to be the producers of innovations.

6.4 Living Labs as closed initiatives.

Many works explore and build on the idea that Living Labs operate as open innovation spaces and networks (Leminen et al., 2012; Ståhlbröst, 2012; Leminen, 2015a; Schuurman, 2015). In this view, the innovation process benefits from the perspectives of a variety of stakeholders and is a process that happens freely. Some have argued that, as "less structured and bounded

than other forms of open innovations", Living Labs enable "more variability and freedom for innovation." (Leminen, 2015a: 17).

Notwithstanding the openness principle (Bergvall-Kåreborn et al., 2009; Ståhlbröst, 2012), I came across several examples where one may be led to challenge it, even in cases where people have directly told me that the Living Lab they worked in was an open initiative. One of the main difficulties with the concept of openness appears to be the difficulty in defining what is meant by that, and how far Living Lab managers and stakeholders are, respectively, willing to open the initiative up to the outside and to be open about their objectives.

An example from Belgium may help to shed some light on the matter. Elke manages a health Living Lab (LL6), which is part of a wider network of Living Labs across the region. Although these are independent from each other in terms of activities, they are part of a regional programme aimed at increasing social and economic innovations for elderly care. There is a regional programme office that coordinates the knowledge produced by all the Living Labs and to which the Living Labs report to. Elke told me that, on paper, the network is said to have a common objective. However, there are moments when the different Living Labs compete amongst them because they need to guarantee the sustainability of their own initiatives. As Elke puts it:

> "with some of them [Living Labs] we have a good relationship and we even work in a new European project together er… but we work on our own and sometimes we are competitors too. Because we need to attract companies to us, to have [money]- they fund us, they offer us service and we need the money to finance our staff. And every Living Lab needs to do that. So, we are competitors, in a way, but we also work together, and we try not to compete too- too hard (…)"

From this example, it seems that, at times, even when Living Labs are part of the same wider programme, delivering the same objectives, there is a need to compete. One might say that there is a need to be closed (not open!) to collaboration in specific instances. In this example, it is easy to see how the

actor-network that is LL6 is itself part of a wider actor-network (in this case the Regional Programme office). It also seems clear how, as actors in wider actor-networks, Living Labs need to break potential links with other actors if they are to survive as individual actor-networks. The conventional expectation would be for Living Labs to be open spaces where different actors freely share innovations. However, the ideal script of "collaboration", where businesses share ideas freely needs, at times, to be replaced by one of "competition", where different actors are not willing to share their ideas. In this case, the sustainability of a Living Lab's own actor-network is dependent on the successful enrolment of businesses, which should be willing to bring with them another important actor: money. To guarantee that money is successfully enrolled, Living Labs need, at times, to break (or not establish) potential links with businesses that are outside their own actor-network. In other words, if a Living Lab manages to enrol a specific business into its actor-network willing to provide the Living Lab with some money, this newly enrolled business may demand that no other links are attempted with competing businesses, limiting the number of links in the Living Lab actor-network.

Closedness also seems to show itself in the fact that the requirements of a specific project may, from the outset, limit some of its potential. For instance, when Lee (LL5, UK) told me about his project he mentioned how all the products in the demonstration were selected beforehand and that one of the requirements was for all the participants to have a tablet.

> "L: Everyone had to be given a tablet. That was part of the project. Everybody had to have a tablet. (…) There was also light switches and power points that they could control from their tablet, erm… there were motion sensors that we put on the wall that should be able to tell if they've fallen and notify a relative. We also gave them a robotic hoover- a robotic vacuum cleaner. So yeah… those were the items. There was the tablet, the camera, the light switches and power points, the motion sensors and the hoover. So, those were the things we offered.

> R: You mentioned that everyone needed to have a tablet. Was that across countries?
>
> L: That was across countries. And that was because one of the objectives of the pilot was to develop a unified gateway for everything. So, we had a separate partner (…) from France, they were developing an app- actually, it ended up being a website basically, so that you could coordinate all the control functions for all the different things with this just one app. So, it was agreed that every tenant should have a tablet so that they could control that and test that for us. So, yeah everybody (…) every tenant had a tablet."

LL5 was aimed at seeing whether products that were already available in the market could fulfil disabled and elderly people's long term living needs. Lee was a project partner in the same project as Hilde but based in the UK. Across countries, the main partners in this project were housing associations and their aim was to find the best possible set of products with which to equip their dwellings in the future. One may question whether this may have created a bias towards finding solutions that would benefit housing associations offerings more than the tenants themselves? Even bearing in mind that the needs of people were considered the crucial factor when offering a product / service, tenants were no more than providers of feedback for a specific set of products for the duration of the project. In a sense, the idea of including the user from an early stage throughout the development of a solution was not followed. The users were once again configured as testers, and the technology – e.g. the tablet – acted as an intermediary bringing together the different actors across the wider actor-network that was the international project.

As discussed in Chapter 3, previous works have drawn attention to this issue (e.g. Kommonen and Botero, 2013; Vanmeerbeek et al., 2015; Bygholm and Kanstrup, 2017). As Kommonen and Botero (2013: no paging) note: in "order to realize the ideal of a *'user driven open innovation ecosystem'*, next generation Living Lab activities should shift their focus and priorities from how to realize the interest of companies to how to realize the interest of the users".

It also seemed that openness is a process that needs to be negotiated at all times and it is not, as one may have been led to think, a given from the outset of the project. Yes, Living Lab participants may talk about collaboration among multiple stakeholders, however, this multiplicity of players seems to only work for a selected few: those willing to share information and be open about their business offering. A question worth asking is: To what extent is an over reliance on the concept of *openness* a way to *close* the door on potential participations?

The next two examples seem to illustrate such a case. Werner, a designer for a cross border project based in the Netherlands (LL3), described how his project had to deny entrance to a big technological player who was willing to invest in the initiative but not willing to allow other commercial partners to be involved. As Werner told me:

> "(…) one of the main principles of a Living Lab is that it's open. That is something you find in the literature and this is also what we said to these companies, (that) we are building a Living Lab (…) and we want to share all the insights with all the partners. (…) Before these two companies entered we had meetings with [Big Technological Company], for example, to collaborate with us on dementia as well. It's one of their, yeah, one of their goals for the upcoming years, they [Big Technological Company] want to do something for dementia, and we thought this was a very good match. But they said, 'if you worked together with us we can fund your project' – so we got extra funding – 'but you're not allowed to involve any other commercial partners in your project'. And that was, for us, something we couldn't accept. So, we said (…) one of the principles of a Living Lab is to be open, so we decided not to continue working with them."

One may be motivated to ask whether, for the sake of being open in the sense discussed above, Living Labs' managers are being realistic with their projects' aims. From Werner's quote it seems that, in his case, the project managers may have been too worried with respecting the openness principle – "something you find in the literature" – denying a seemingly advantageous collaboration because it would prevent collaborations with other stakeholders

taking place. Most of these Living Labs have an explicit goal to create a long-term sustainable solution for a specific problem (in the present case, ageing and independent living). However, what guarantees does one have that, by abandoning a collaboration with a more powerful player in favour of openness, the best long-term solution will be produced? Also, considering that most of Living Lab partners are usually SMEs who are financially challenged, is closing the door on long-term investment the right decision?

Finally, another issue that seems to impact the idea of openness is related with the fact that most of these projects will, eventually, come to an end. They will close. Whenever a Living Lab ends, so does the innovation / solution that was set to be addressed at the outset comes to an end. This causes the relationships between stakeholders, and the relationships that people established with the technology they were working with (and in some cases living with), to also come to an end. This is a clear illustration of how, at times, an actor-network may collapse. The identity of the constituting elements of an actor-network is obtained whenever they act on and are acted upon by other actors in the network. From the moment a LL actor-network ceases to exist (e.g. the project timeframe comes to an end) it is fair to assume that the actors and the links made to exist through some of its heterogeneous entities become unsteady (Mol, 2010) and may be compromised. As noted by Harman (2009: 15; emphasis in original), "actants gain in strength only through their *alliances*". If these alliances are broken the strength of the actants is compromised.

This may be especially serious whenever the services do add value to people's daily lives. Elke (LL6) told me of an example in her project where a service was created to deliver food and medications to people's homes, and the consequences of its closure.

> "[with] the home delivery of meals and medications they [the elderly] really liked the service- because they missed it [after the project ended]. They were less mobile, so it was an added value to them to join- and they really wanted to

> keep using the service but then we had to say, 'the service will close down, because the company will not run it anymore'. So, yeah… first it was good for them because they had something new (…) but then we had to say: 'now it stops because it's a test'. And this is negative… when you have to take something away from them. That's a risk in running those projects."

Here, Living Labs seem to be open for nothing more than testing, where citizens are used to simply provide feedback on a specific piece of technology or service to the companies that design / produce them, and which comes to an end whenever the testing stage is over and done with[47]. And even when citizens are said to be at the centre of the innovation, and the benefits for their daily lives are clear, they are still, at times, left without the products which they benefited from during the testing phase.

From what has been presented, Living Labs do not seem to be the open initiatives one would expect by reading the evidence of previous studies, documents and descriptions (e.g. Leminen et al., 2012; Ståhlbröst, 2012; Bódi et al., 2015; Eskelinen et al., 2015; Leminen, 2015a; Schuurman, 2015). On the one hand, there is the fear of participating businesses to share information with other stakeholders. On the other hand, some of the project requirements may restrict the type of products available for people to experiment with, which limits the opportunities available to them. The stability of the Living Lab actor-network is constantly being negotiated. As testing environments of already developed products, Living Labs will only allow users to know the technology that the project managers make available, even though there are other types of technologies around. Finally, the fact that some of the projects

[47] It should be noted that the idea of testing is acknowledged and accounted for in the Living Lab literature (e.g. Niitamo et al. 2006; Følstad, 2008; Westerlund and Leminen, 2011). The problem with that concept is that it diverts attention from the idea of co-creation *throughout* the entire innovation process in which users and producers collaborate. The idea of testing as something that occurs only at the end of the innovation cycle would turn a Living Lab into a testbed. This idea has, however, been largely contested as those are different platforms (ibid.). Living Labs are about co-creation throughout the innovation cycle *and* testing products still in development. Testbeds, in turn, are simply focused on testing already finished products (ibid.). Living Labs imply that development *and* testing occur throughout the innovation process (Westerlund and Leminen, 2011).

are temporary affects the relationships between the various actors and may contribute to the collapse of previously established actor-networks. For instance, the links established between citizens and the products / services that positively affected their lives are usually compromised once the Living Labs come to an end. People may feel betrayed when they realise that the positive impact in their lives was only provisional and a result of a temporary testing phase.

6.5 Living Labs as (un)realistic (testing) spaces.

In its definition of Living Labs, and besides the idea of user-centeredness and open innovation, ENoLL (2017b: no paging) highlights the fact that the process of innovation and the creation of solutions should take place "in real life communities and settings" (ibid.). As discussed in section 3.1., this is an idea that stems from previous literature (Bergval-Kåreborn el al., 2009; Ståhlbröst et al., 2009; Ståhlbröst, 2012). My data, however, seems to indicate that, in some instances, Living Labs would be better portrayed as *realistic testing environments* built in *unrealistic living spaces*.

The consequence of such conventional descriptions is that those people to which the products / services are supposed to be created (in this case elderly people) tend, at times, to be configured as testers and consumers. Hilde (LL5) puts it quite clearly:

> "H: (…) we were targeting elderly people, yes. Because that was- our research was aimed at cop[ing] with demographic change and see how elderly people can use it [the technology]. I mean, we had some disabled people as well, but they were sometimes younger, like one of my favourite tenants (…) she was one of our most active testers, you know?
>
> R: I like that word… and I will pick on that: Testers.
>
> J: Yeah… they were all testers, really."

The "script" of user as tester is sometimes an essential factor for the innovation process because users are considered to be in possession of valuable information that should help with developing better solutions, based on their needs. Elke (LL6), told me:

> "[we] need our citizens to be test persons… we also work with the city to- we use (…) the input from our test panel to make policy with the city. (…) the elderly at home who are very… valuable for us because they are in charge. They have the knowledge, they want- they know what they need, and so on."

Other times, the testing occurs "in the homes of the elderly" (LL2, brochure). Occasionally, the testing phase is justified by the "advantage" it provides people with: to try a product before buying it. Pieter (LL1) illustrates this point:

> "In practice, they [the people] want to see it first. They want to feel it first, they want to use it first and then they make a decision… 'ok, it's good for me, I want to buy it. (…)"

The Living Lab may also be configured as a resource for businesses to obtain the required dataset to conduct tests on specific products and services. Here, citizens are configured as a test panel available to fulfil the research needs of other actors (e.g. businesses, local authorities, etc) with which they can be linked. This is visible in the case of LL7, a Belgian project that helps companies and organisations in the health sector to implement a Living Lab approach. LL7 offers their clients access to a testing space including forty local homes of citizens and two houses purposefully built for testing. In this case, and because LL7 is managed by the local government, the city space is sometimes taken for testing purposes. The total test population consists of 1,000 people, which include the elderly, family members and care professionals. Elise, the project manager, told me:

> "[LL7] provides support to the projects [of the partners] at the time they need it. (…) Also, er… I'm providing the communication between the project and our test panel of

> elderly (…) we have er… a very detailed profile of our lab members- our test panel... so that when a project asks, 'Oh we want seven elderly with this disability and this and that' so we can [help]. (…) So, I- I also select the panel members for the different projects (…) and also, I- I give feedback to our local government er… regularly er… so they can er… also implement certain decisions".

Testing is usually described with the aim of supporting innovations that contribute to tackle the ageing challenge (LL7, Brochure) with citizens (and their needs) being the ultimate beneficiaries. However, it appears that sometimes testing is not just about the needs of citizens.

In the case of LL5, it became clear how the testing stage was used to benefit the housing association that was conducting a trial of a stove guard. This guard switches off the stove whenever a fire hazard is detected (e.g. when someone forgets about a boiling pan). Although there are clear benefits for the residents, such as their increased level of safety whilst at home (LL5, brochure) these benefits seem to be taken as means to another end: the benefits for the housing association. The housing association benefits in two ways. Firstly, testing the stove guard works as a device in which to interest the residents to the advantages of the product. In its problematization (Callon, 1986), the housing association presents the stove almost as an obligatory passage point (ibid.), without which the resident's safety will not be completed. By experiencing it first-hand, the residents and their family members are able to assess its advantages. Secondly, because the product is expensive for the housing association to pay for (€ 400 per unit) and install it in each of its dwellings, the decision is put on the residents who, after testing the product and assessing its performance, may ultimately decide whether they would be interested in buying the product and have it installed in their kitchens. The advantage for the housing association is clear: if the residents bought the product, potential fires could be prevented, and the housing association would guarantee its property is safe and protected without ever paying for its protection. Yes, the residents' wellbeing was also protected but

that seemed to be a secondary benefit. Hilde's quote, below, illustrates this point:

> "from a business perspective and the housing organisation it would hardly be worth it for us to- to buy the technology and put it in the dwellings ourselves, you know? For instance, we've got a stove guard which automatically switches off the stove, in case of a hazard… (…) this stove guard costs about four hundred euros, ok? Which is, for a housing organisation, quite a big investment erm… But, of course, it can save a whole building from burning down. And now it is (…) a question of probability, do you invest these four hundred euros per dwelling, in a house of twenty dwellings, just in case? Or do you just offer them [the guards] to your customers that you know are in danger of burning down a building? (…) we have a caretaker (…) who know[s] the people who are living there and they [the caretakers] know this person is quite vulnerable and is in the edge of dementia- or easily forgets, or (…) the smoke alarm already went off twice. So, er… it might be good to offer [meaning 'to show'] this product to their children to see whether they want to install it to save daddy, or grandma or even our building."

By focusing on the testing of already finished products / services, it may be challenging for Living Labs to convey the idea that users are testing these products in real-life situations. Testing is an artificial situation and may, in practice, prevent people from taking part in a project, as Linda (LL5) told me during our conversation. Hence, my argument that, in some instances, Living Labs are better portrayed as *realistic testing environments* built in *unrealistic living spaces*. The reason for this argument is twofold. Firstly, lets accept the idea that the testing takes place in purpose-built houses where people can live for a certain period (e.g. LL4; LL7 and LL8). The cue is in the name: "purpose-built". No matter how adaptable people may be, that house will never be their "real environment". Secondly, and accepting the cases where testing takes place in people's own homes. Plenty of evidence already shows that the introduction of new technologies in one's environment is not trouble-free (Silverstone, 2005; Oudshoorn, 2011; Oudshoorn, 2012; Pols, 2012), with sociomaterial adaptations being made locally and the acceptance of

technology by users being questioned by the very possibility of being rejected altogether. In the words of Silverstone (2005: 235): “new machines claim new spaces and new patterns of participation; new content challenges existing rules of behaviour or codes of familial practice”. In this sense, people’s own homes can barely be perceived as their “real-life environment” when new technologies or services are introduced. Also, it is difficult to think of a “real-life environment” whenever we have a group of researchers at our doorstep assessing our use of a product; or when one is asked to complete (daily!) a questionnaire or diary that reports on our experiences of use of a particular service.

Finally, and because testing is always a temporary stage of the innovation process, there is the need to question the long-term sustainability of these initiatives. For instance, if the contact with an innovative product is only for testing purposes it will be difficult to understand its benefits in the long-term and in daily life. Also, if Living Labs are used just for product testing, what happens to those products after the testing is completed? The challenge thus seems to be that of trying to build an open-ended, long-term engagement strategy with those in need of long-term solutions for their potential problems (e.g. an ageing population). This leads us on to the next section.

6.6 The (un)sustainability of Living Labs.

One of the issues that became noticeable with the majority of those with whom I talked, was the question of the sustainability of the Living Lab actor-network. Although the issue with sustainability seemed to be mostly related with lack of funding, it also appeared to manifest in other ways.

With regards to funding, most of these projects seem to be sponsored for a limited period of time. For instance, when a project is funded by INTERREG (e.g. LL5), the funding is usually given for a period between 3 to 5 years. It is thus necessary to establish new links with actors able to

transform the actor-network, guaranteeing its financial sustainability. New actors need to be enrolled such as new project partners (e.g. LL1), local, regional and national government initiatives (e.g. LL3; LL4; LL6; LL7) and universities (e.g. LL8; OLIGO and LIFT). However, even if these enrolments are successful, the stability of these actor-networks may be contested at any time (e.g. these sources of funding are still limited and do not last forever). If the links established with new allies are not able to sustain, the actor-network collapses and new actors will need to be enrolled. Challenges with funding have already been acknowledged as a key issue for the sustainability of Living Labs in previous research (e.g. Almirall et al., 2008; Mulvenna and Martin, 2012; Schuurman, 2015). Some noted that the "lack of funding is mostly the result of the ending of a project" (Schuurman, 2015: 168) which compromises the sustainability of Living Labs and creates the "need to become sustainable beyond the European project funding" (ibid.). Notwithstanding the fact that the (un)sustainability of Living Labs has been acknowledged in previous research, it is yet uncertain how exactly the actors in the Living Labs actor-networks react to this threat. In this case study, it became clear that some of the stories shared with me were about the strategies that allowed the Living Lab actor-network to sustain in temporarily stable arrangements. Moreover, I became interested in the fact that the sustainability challenge appeared to manifest itself in ways beyond the simple lack of funding.

OLIGO provides a good illustration of such endeavours. Established in the Computer Science Department of a UK University, OLIGO has been working in the field of Civic Design, an approach focused on the "mundane daily interactions of interacting with neighbors, dealing with municipal bureaucracies, and forming or working in community groups" (DiSalvo and Le Dantec, 2017: 66). OLIGO's focus is on the design, development and testing of community-based technologies able to generate civic engagement initiatives that benefit local democracy, communities and services (OLIGO's project proposal). OLIGO's case is unique because, although its director – Leonard – did not consider it to fit the Living Lab label, OLIGO is a great

case to look at due to its extensive use of multi-disciplinary and collaborative methods as well as its sustained experience and expertise in the fields of PD and HCI. Launched in 2008, it has a long-term existence when compared with the other Living Labs studied in this case. My interviews with Leonard provided interesting insights about what went on to make it sustainable over time. Yes, money is a worry. But sustainability also seems to be about enrolling and interesting (cf. Callon, 1996; Akrich et al., 2002a; 2002b) other actors in the process. Leonard told me:

> "At the top there's a real desire [to change things], obviously… I think from the Vice Chancellor and, I imagine, the executive board (…) I came to this realisation myself that, actually, there's no point asking for little bits of money to do little bits of things. You should ask for big bits of money to do ambitious things and look- ask for resources to fund the bits that aren't you. To fund the other- other disciplinary collaborators. Because, essentially, when you think about releasing strategic funds from the centre what you need is buy-in from the other three faculties. Essentially, from their pro vice-chancellors. So, that's the sort of… step change I've- I've realised"

For Leonard, the enrolment of the University's Vice-Chancellor was key. He would also tell me how inspirational the Vice-Chancellor was to their work, making them think about how their research interests could be aligned to societal challenges such as ageing. In other words, how could their actor-network interest other actors? Secondly, Leonard noted that if projects are to bid for money they should be daring in their bids. Compared with some of the projects I followed, it was clear that OLIGO's budget was quite healthy in comparison. Also, more than sustaining the project, money is an actor that allows the partnerships that make it a reality to sustain in the long-term. As Leonard told me, one needs to "fund the bits that aren't you" and, he would add, "ultimately, the financial things determine where people's loyalties are and what you can do strategically".

There was, however, another important insight for OLIGO's managers. And it was the fact that, being a research institute within a University, it was

important to explore their civic role. In this sense, sustainability would be better achieved if the project were able to develop long-term engagements with the community in which the University existed. As Leonard puts it:

> "[The] civic university is about what is the university good for, for society? But we (…) take it even further than that. So, quite influenced by [VC's] work (…) who talks about the university in the city- Thinking about 'what use are we to our- our community?' And then we sort of shifted into this thinking- well, actually let's think about users as citizens, let's think about how (…) digital technologies can scaffold citizenship and think about th- where we are as a resource, and a partnership, and not just as potential consumers that we can recruit easily (…) So, that got us thinking to what it would be like to have a long term engagement with communities where we are based, and the university is based and the- the- the representative bodies and the local authorities here (…) that's the sort of shift in our thinking to try to understand how can we configure our research in that way".

For Leonard, the sustainability of OLIGO's actor-network was about recognising that users were citizens. And, as citizens, they should be enrolled in ways that allow them to have a more active and influential role. A new script needed to be developed, one where users were more than simple devices of feedback provision in individual projects and product development initiatives.

Another example that struck me when analysing the data was the idea that, somehow, the solutions developed in a Living Lab (regardless of their technological or social focus) may lack sustainability. This is interesting, considering that one of the objectives behind the creation of most of these projects is to tackle the ageing challenge, creating solutions that will help people to live independently for longer. In this sense, it is fair to believe that any potential solutions need to be developed with their long-lasting usability in mind. However, and this is perhaps one of those "specific" and "surprising" events that an ANT approach may help to make visible (cf. Mol, 2010), there are examples that seem to show how the technologies appear to lack the

ability to evolve with the conditions that they are created to solve! This was perceived as a very important (and often forgotten) challenge by two interviewees: Henry, a nurse and Project Director of LL3 division in the UK illustrates beautifully the (un)sustainability of the technology in cases of dementia.

> "(…) you're developing a memory enabling technology to remind people, to enable memory- so people will live independently and (…) you test for all this. The challenge that you've got- and dementia is a condition where people are declining, so it's very difficult to measure (…) it's always against shifting sand. (…) By the time you evaluate in six months, a year down the line, those people are in a different stage than they were when they started. And their relation with the technology is different as well. So, technology (…) is not advanced enough to be able to change to that person's needs (…) if you develop something for early stages it won't necessarily work for mid to later stages. And it can't do that because er… I'd say in terms of what I describe as a technological scaffold.

This example seems to show that there are situations in which technologies become obsolete earlier than planned. In ANT's terms, the links established between these non-human actors (technologies) and the human actors (users) they were able to interest become weak and might break, compromising the sustainability of the actor-network as we know it. This is not necessarily because the technology is bad, but because "it's the nature of the condition" (Henry, LL5). The way certain conditions evolve does not seem to be matched by the ways in which technologies / services are built to respond to that condition. One may say that these two non-human elements (condition and technology) are unable to interest each other and, consequently, unable to establish a durable link. This is important for Living Labs working with independent living because if the links established between some of their constituting actor are compromised, the whole sustainability of the actor network is compromised. As argued by Bergvall-Kåreborn et al. (2009) and Ståhlbröst (2012), sustainability of Living Labs is also about assessing the social impact that the innovations created in the Living Lab might have once

they are implemented. If, as suggested here, the products created stop being able to respond effectively to the problem they set out to solve, it is fair to assume that their sustainability (and, consequently, that of the Living Lab) is called into question.

Other times, the sustainability of the Living Lab is guaranteed by the willingness of those in charge to put extra work in, to assure that other stakeholders understand what the projects are about and are willing to be enrolled.

LIFT is a UK Living Lab based in the Business School of the same University as OLIGO, above. David and Norman are the Project Directors. For over a decade, their aim is to help organisations in any area to work on complex problems. This is achieved through offering a space for building multi-disciplinary partnerships for sense-making in areas that range from adult social care through to climate change (LIFT, brochure). In my conversations with David and Norman I became aware of how sustaining a Living Lab was also a matter of being stubborn, trying to establish new links with other actors regardless of their financial stability. David told me that, for a long time, the Lab was living "very hand to mouth" because they had been working in projects that were more strategic and not as "higher level" (i.e. more profitable) as others they conducted before. An extract from one of our conversations illustrates this:

> "D: But this [the Living Lab] isn't viable ((laughs)) it isn't viable in economic terms. It is viable because him [Norman] and I care about it and we're prepared to legitimize it and, basically, subsidise it in various ways through the work we put into it.
>
> R: Because you have to have funding, somehow…
>
> D: Or not. You know… we basically- we did all that work for [a Local Enterprise Partnership] for ten thousand quid. And that was a lot of work, you know... And we did it because we thought it was the right thing to do. It would be a good vehicle for us to engage with. You know… I had strategic reasons (…) I wanted to push slightly more into

> that part of public sector because one of the critiques of my [Department] was that it was a more traditional entrepreneurship space and in order for me to build that [Department] up… this was an opportunity for us to do that. It's a complex story…"

No doubt that sustaining a Living Lab is not an easy enterprise. The challenges of obtaining long-term funding is an issue that most people involved in Living Labs seem to highlight, as well as previous Living Lab research (cf. e.g. Almirall et al., 2008; Mulvenna and Martin, 2012; Schuurman, 2015). But what also seems to be true is that sustainability is about acknowledging the importance of looking beyond just specific sources of money (e.g. European funding initiatives or public funds) and exploring alternative ways that may be able to challenge and transform the business models of Living Labs. Werner (LL3) noted how, in his case, they started working on expanding the network of stakeholders to reach an agreement in which they could provide private funding.

> "I think the sustainability question is actually a very big issue. How we solved it in the Netherlands was to get an engagement from the partners that were involved. So, the mental care hospital, the university, as well as the company network (…) they all said: 'We are willing to invest- to still invest (…) funding a small portion so that the structure is alive' (…) We're also trying to get big regional stakeholders to have a structural investment. So that's not a public funding but a private funding… From universities, from [Big Technological Company], from big care organisations in the region, which are trying to put together some money to get this Living Lab started to a new level".

From the evidence discussed, I would argue that sustainability seems to be about establishing long-term links between all the heterogenous actors that constitute a Living Lab actor-network, money included. In fact, from an ANT perspective, money is just one of the many actors / stakeholders in the Living Lab. It just happens that this actor seems to dominate most of the stories about sustainability. However, because there are other elements in the actor-network, money will only become an actor if many others *make it* act (Latour,

2005a). For instance, from an ANT perspective, Werner's last quote shows that when a new arrangement of stakeholders was brought to life, and an agreement was reached, the money (which was lacking) soon *reappeared*. The sustainability of the Living Lab, which was threatened by a lack of funding, seemed to have been re-established. The issue of sustainability (or lack of it) of a Living Lab is thus not the product of the influence of a single actor (e.g. money). (Un)sustainability is, in fact, dependent on various heterogenous arrangements between actors which, as shown in this section, affect sustainability differently. Lack of funding just seems to be the most talked about. Other explanations seem to be: the unsustainability of the technologies developed and the long-term engagement strategies to enrol actors other than money (e.g. citizens; industry partners). This, in itself, is a challenge. As Olga (LL2) told me: "the difficulty is to keep them [citizens] attracted. (…) To get them [citizens] once that's one thing, that's quite easy… but to get them involved and keep them interested that's, I think, point of attention. (…)".

6.7 A note on Expectations.

The findings discussed in this chapter also have strong links with the field of the sociology of expectations (Brown, 2003; Brown and Michael, 2003; Borup et al., 2006 van Lente, 2012; Michael, 2017), one of the branches of STS that seeks to "refrain[ing] entirely from attempts to predict or envisage the future of today's emerging innovations" (Brown and Michael, 2003: 5).

The sociology of expectations has been used in a wide variety of studies dealing with issues such as: the promises and hype surrounding telecare technologies (e.g. Oudshoorn, 2011; Pols, 2012); the role of expectations in entrepreneurial ventures (Garud et al., 2014); the influence of intermediary organisations (e.g. industry analysts) and their future-oriented claims in the development of new technologies and innovations (Pollock and Williams,

2010); how expectations seem to be the "cause and consequence of material scientific and technological activity" (Borup et al., 2006: 286); and how they influence foresight exercises, i.e. "formal articulations of possible futures" (van Lente, 2012: 779).

Some of the ideas explored within the sociology of expectations may, in fact, be applied in the field of Living Labs and help with understanding the mismatch between the theory and the practice of the field. Harro van Lente (2012), for instance, argues that from the moment expectations are uttered they will help to frame a particular course of action. Therefore, "accounts of the future are seen as performative (…) understood as enacting a particular future (while also marginalizing alternative futures)" (Michael, 2017). From the data discussed in this chapter, it is fair to accept that the same may be true for Living Labs. For instance, when certain accounts present Living Labs as open, collaborative, sustainable and user-centred (e.g. Bergvall-Kåreborn et al., 2009; Leminen et al., 2012; 2015; Ståhlbröst, 2012), one may easily acknowledge these as expectations that may help to enact specific Living Lab practices. In line with Brown (2003), it may be argued that both the research and documents that legitimise those views have a purpose of persuasion, and that they are "the productions of research communities" (Brown, 2003: 289) that seek "to raise the profile of their work as a means of persuading potential patrons of the benefits of investment" (ibid.).

The utterance of an expectation about Living Labs (e.g. that they promote collaboration) may "be read as an implied warrant to others that they *should* use that tool or the procedure" (Borup et al., 2006: 289) if they intend to achieve equivalent results. Expectations may, in fact, be hugely deterministic (ibid.), downplaying the specific contexts in which Living Labs develop. As pointed out in Chapter 3 (section 3.4), one may argue that all the expectations about Living Labs are nothing more than "ordering devices" (Suchman, 2007). As such, they are simple prescriptive representations and plans of what a Living Lab should (or could) be without any shaping influence on specific courses of action. In fact, as shown by the field of the sociology of

expectations (e.g. Brown, 2003; Borup et al., 2006), whatever may exist at the beginning of an innovation journey will rarely materialise in future results. In this chapter I showed how the expectations conveyed in previous literature of Living Labs as open, sustainable and real-life spaces of collaboration seem difficult to materialise in practice

6.8 Critical Reflection.

The different cases analysed in this chapter show how, in the process of setting up a Living Lab, the promised advantages of Living Labs such as collaboration; citizen involvement; co-development, co-creation and sustainability may not always be achieved. The different elements and the links established between them may end up creating an arrangement that may differ from conventional descriptions of what a Living Lab ought to achieve.

The case of LL5, for example, showed us how citizens and users may be unable to directly participate in the development of a particular solution. More powerful actors (in this case, the housing association) ended up using the input of citizens to serve the business interests more than the interest of the people to whom the service was provided. Here, users were not the co-creators of solutions (as expected in conventional descriptions of Living Labs) but simply the testers of solutions created by others. The ethics of user-centredness portrayed in the wider Living Lab literature was, in this case, bypassed and the needs of customers used as a way for the housing association to meet its objectives.

Yes, the idea that customer and user needs were the focus of the initiative was present, but it seemed just to fulfil an organizing role of what the Living Labs could achieve. In practice, however, that premise seemed to have worked as an expectation that was useful to interest other elements in the Living Lab (e.g. customers; similar businesses); it helped to perform a particular future (e.g. the future of users would be safer if they bought a stove

guard) but it was non-deterministic, in the sense that that imagined future may never materialise in practice. The same is true for expectations of Living Labs as open, sustainable, co-creation and sustainable spaces. Most of the examples analysed in this chapter also showed that the products these Living Labs were promoting were already developed, which ends up influencing the type of Living Lab to be created. Conventional scripts (e.g. users as co-creators) seem to be replaced by real life scripts (e.g. users as customers).

Initial plans change, and their accomplishment is dependent on the successful establishment of links between a variety of actors. However, the actor-network that is established during the setting up stage does not yet seem to be stable and, as such, unable to lead to promised outcomes.

6.9 Key Findings and Conclusion.

This chapter presented a set of different stories showing that the ways living labs are set up may not be the straightforward process that seemed to have been promised in previous literature. My findings provide new insights for the Living Lab research field. The insights here discussed may not be novel within the wider STS field but they are certainly new when it comes to the ways in which to look at and understand the setting up of Living Labs.

Through the theoretical frameworks used the findings show how the links between stakeholders are dependent on the different contexts in which they are established. Living Labs are thus unpredictable as it is the practices that constitute them that bring them into being. This provides a new way to interpret Living Labs and makes it easier to understand why results that do not conform to the norm in the Living Lab literature may be obtained.

Some authors already drew attention to the fact that “setting up a Living Lab with all the right components does not guarantee that it becomes a Living Lab” (Ståhlbröst, 2008: 35). In this chapter, I was able to present some examples that help to understand why this may be the case.

Depending on the links established, Living Labs do sometimes turn out to be closed, unrealistic and unsastainable spaces. The important thing to bear in mind is that taking a view of Living Labs as the product of heterogenous relationships seems a better way to account for potential differences in Living Lab practices without necessarily rejecting those practices that do not conform to traditional descriptions as Living Labs.

From previous evidence, one may be led to think that Living Labs ought to follow certain ordering principles (Bergvall-Kåreborn et al., 2009; Ståhlbröst et al., 2009; Ståhlbröst, 2012), include certain actors (Nyström et al., 2014), and be set up in specific ways if one is to benefit entirely from them (e.g. Bódi et al., 2015; Eskelinen et al., 2015). My argument is that these are nothing more than simple attempts at ordering the field around certain expectations about what Living Labs should be.

In this chapter, I tried to show that some of the theoretical principles of democratic innovation on which Living Labs are said to be built do not seem to be matched in practice. Particularly, I focused on the ideas conveyed in previous literature that portray Living Labs as sustainable and open innovation networks, existing in real-life contexts and promoting co-creation between users and producers (Bergvall-Kåreborn et al., 2009; Ståhlbröst et al., 2009; Westerlund and Leminen, 2011; Ståhlbröst, 2012).

Yes, those expectations may be taken as useful devices to interest potential stakeholders, and even help perform particular futures (e.g. when Living Labs are "expected" to help with co-creating solutions that promote people to live independently, for longer, in their homes). However, most of these expectations may never fulfil in practice because Living Labs are performed differently in different contexts. The findings discussed in this chapter show that, at times, Living Labs may be better understood as closed, unrealistic and (un)sustainable arrangements.

Drawing on ANT, I took the view that all the social and material entities linked within a Living Lab actor-network are themselves part of wider

networks of associations and it is through the links established between them that they acquire new meanings (Latour, 1994). The process of setting up a Living Lab is, thus, more than bringing different actors together and one needs to acknowledge that those different constituent actor-networks are constantly negotiating the formation of new links and the preservation of old and previously established ones.

When it comes to set up a Living Lab, and in line with the idea of "script" (cf. Akrich, 1992; see section 2.2.1), one may argue that conventional descriptions help to create assumptions about the morals, motivations, ambitions and politics of those entities that form the world in which the Living Lab will appear (Akrich, 1992) whilst, at the same time, accepting that society, "technology, science and economy will evolve in particular ways" (ibid.: 207-208). However, even though these expectations may be performative of certain futures they are non-deterministic and the futures they help to perform will, most often than not, fail to live up to the expectations that created them. They may have a purpose of persuasion, produced by research communities, public authorities, businesses to grow interest and find supporters of those descriptions, creating in them the expectation that to obtain equivalent results they should follow suit (Brown, 2003; Borup et al., 2006). However, one should be open to expect the unexpected and, like in Magritte's painting, be prepared to accept that what we are faced with may not really be the Living Lab one was led to expect.

7 Making a Living Lab possible.

> "I want all the organisations to really understand what people need (…) and how to get access to that information, and to deal with that information to implement what they want to make (…) and in the end, it can be devices which work, and people are happy with (…) but you can't do that in one year (…) Because it's changing of the mind, it's changing of the way you work together, the changing of the language you use, because the business partners use a completely different language from a care organisation, and students working on technical solutions they are so different from the ones studying to be nurses. And they all interact in our project. And I hope to make a change in that way. And, of course, I want that device but not at the end of this year (…) You have to work from a reality."
>
> Yvonne, Project Manager and Gatekeeper, Soul-NL

This chapter follows from Chapter 6 and zooms in one case from the European health cluster of Living Labs (e-Ucare, 2015) from which I drew part of the sample analysed in the previous chapter. The Living Lab analysed in this chapter is LL9, which I will name Soul-NL.

Soul-NL was a project in the Netherlands aimed at learning what were the needs of elderly people living alone, and what needed to be done to find the best ways in which elderly, carers, housing associations, local authorities and insurers could collaborate in the creation of those solutions.

When I started my research, Soul-NL was already a work in progress (one year) but had already achieved some interesting results for a project that young. Its stories and experiences provided me with understanding on how the plans and sustainability of Living Labs are constantly being negotiated and how challenging its practice appears to be. Soul-NL was about taking risks, managing conflicts, engaging funders, universities, insurers, housing associations, care associations, businesses, and municipalities. It would not have existed if it were not for the actors, the places, the funding (and lack of

it), the technologies, the conversations, the efforts and the challenges that constitute it and are constitutive of it.

"This is about the people", Yvonne would tell me countless times throughout our conversations, lunches and car journeys between project locations. She was right. It was about people in need of solutions, people collaborating to develop those solutions and people who wanted to sell and showcase their products and services. It was about people who did not always see eye to eye on some issues and project aims, but who needed to sit down together, collaborate, learn, starting and finishing collaborations. It was about the future and how to get there. It was about, sometimes, interrupting that future, changing direction and starting again.

When reading this chapter, it is important to bear one thing in mind. The idea behind this chapter is to present an in-depth analysis of Soul-NL drawing attention to some of the issues that previous literature seems to have overlooked. My aim is not to list the type of relationships, actors or methods the Living Lab seems to promote and then justify how these appear to make the Living Lab an ideal scenario for stakeholder engagement, promoting collaborations or co-creating innovations. I want, instead, to understand how the relationships established between the various heterogeneous entities contributed to the constitution of the Living Lab practice as I encountered it.

If, as suggested in Chapter 6, we accept that the process of setting up a Living Lab is not simply about bringing different actors together, but about aligning different actor-networks in a stable arrangement, it is thus important to understand how exactly these different actor-networks align. I have already suggested that this alignment may be achieved through a process of constant negotiations between the formation of new links and the preservation or breakdown with old (and previously established) alliances. Susan Leigh Star notes how, in this process of actor-network building – translation (cf. Callon,1986) – every "enrolment entails both a failure to enrol and a destruction of the world of the non-enrolled" (Star, 1991: 49).

In what follows, and throughout the analysis undertaken, I asked the following guiding question: how are the conditions of possibility of a Living Lab established – i.e. how and why the links between heterogeneous elements lead to some arrangements but not others?

There are several reasons to focus on this question. Firstly, and following from Chapter 6, it is fair to assume that conventional descriptions whereby a Living Lab is supposed to promote multi-stakeholder engagement; open innovation and co-creation are, in themselves, expectations, ways in which to interest and persuade a set of different actors to accept a specific *problematization,* to use Callon's (1986) term. Who would not want to join an initiative whose aim is to develop people-centred, timely solutions to such an important societal challenge as an ageing demographics? However, as shown in Chapter 6, these expectations will not necessarily be met in practice. Even though they may be useful into making sense of potential futures they are non-deterministic and will rarely influence the real outcomes of a specific Living Lab practice. Secondly, and considering that the "expected" ideal future of what a Living Lab may become is rarely met in practice, one may be led to accept that, in setting up a Living Lab, other factors will be at play that help explain why some outcomes turn out in a particular way. It is thus necessary to look beyond simple descriptions of *who*, does *what* and *when* in a Living Lab process, and focus on *how* exactly the conditions of possibility that make a Living Lab possible (in specific ways) develop.

The themes discussed in this chapter are those that I considered specific and surprising in terms of the story they were able to tell. Although I discuss them separately, they co-existed in practice. This analysis should contribute to understand how Living Labs are set up. More specifically, this will not be about listing and describing a set of factors that appear to be constitutive of the Living Lab. It is, instead, an attempt at understanding how some factors contribute to develop the Living Lab in a specific way. In line with Picard (2017a), I argue that before any Living Lab comes into existence it is

necessary to put it in place. As a result, my focus is on understanding what goes on (and how) during this phase.

7.1 The case

Soul-NL was based in the south of The Netherlands. It was supported by an EU funded, cross border, collaborative project aimed at developing best practice models for the procurement, development and distribution of innovative Assistive Technology solutions for health and social care markets. LAIBS was a partner in this project and I had the chance to collaborate as research assistant. Funding from the project led to the establishment of relationships among several new stakeholders allowing that, in February 2014, Soul-NL started to gain shape.

Described as both a process and a project, Soul-NL had been established with the aim of supporting people and organisations in tackling important social questions in the care, welfare and independent living fields. According to project documents, the aim was that, through the establishment of open innovation collaborations, elderly citizens and "experience experts" would make an inventory of those citizens' needs that would have to be answered in the future.

Purpose-built collaboration areas were set up in three different municipalities across the province (Locations G; R; T and Z) and named as "Rooms". In these rooms, residents and experience experts would collaborate in the creation of a catalogue of (future) elderly needs. The aim would be for companies, local authorities, welfare, care and knowledge organisations to develop innovative solutions and collaborations. The project was based on the idea that the needs of elderly citizens should be at the centre of everything that was created. Although the idea of the "Room" was central in the project, it is important to understand that these were not rooms as such. They would be better described as socio-technical spatial arrangements in which to

materialize the concept of collaboration that was so central to the project. As such, a “Room” could exit in a flat, a farm, a neighbourhood or at wider levels of collaboration, as it was the case with one entire village (e.g. Location R).

7.2 Dataset

Data for this chapter was obtained from ongoing contact with Soul-NL in the Netherlands and in the UK. Because the Soul-NL project was part of a wider European initiative in which Anglia Ruskin University was collaborating, this facilitated my contact with the project Director.

Data was collected between February 2015 and May 2016, at different points in time and in various locations, both in the Netherlands and in the UK. Data was collected in person and, on three occasions, via video calls (Skype) to conduct interviews. Table 1 (below) provides a summary of the different types of data and informants that provide the basis for the analysis in this chapter.

Data Analysed			
Documents	**Fieldwork**		
	Visits	***Interviews***	
Project website; project online leaflets; project documents; project videos.	Visits to 4 different project locations in the Netherlands; Project group-meetings as observer (4); Project conferences (2); Project networking events (2)	Project Director	1
		Project Manager	2
		Internet Provider	1
		Researcher 1	1
		Researcher 2	1
		Regional Development Agency Director	1
			7

Table 3. Dataset Soul-NL.

The previous chapter explored expectations of Living Labs that seemed to have been betrayed in their practice, with the majority of the data originating from the stories of those involved in initiatives that had already finished. In this chapter, I zoom in one case that was still in development. Through an in-depth analysis, I describe some of the stories that seem to show how some factors were key in establishing some of the alliances constitutive of Soul-NL. The aim is to illustrate how the heterogenous relationships that constitute the Living Lab actor-network develop.

7.3 Conditions of possibility.

I have already highlighted (Chapter 3) how the majority of the research on Living Labs seems to have been focused on describing the *who, what* and *when* of the phenomenon (cf. Hakkarainen and Hyysalo, 2016) by portraying it in all its glory, in an overtly positive manner (Schuurman et al., 2015) focused on highlighting the advantages of using such an approach (e.g. Ståhlbröst, 2012; Eskelinen et al., 2015; Leminen, 2015; Schuurman, 2015) and neglecting to look at the potential "drawbacks and bottlenecks" (cf. Füzi, 2014:2) of the approach (also, Vanmeerbeek et al., 2015; Bygholm and Kanstrup, 2017). This has led some to argue that research in the field lacks a "detailed empirical assessment of the merits of living labs as settings for collaboration in innovation projects" (Hyysalo and Hakkarainen, 2014: 192).

Following from the discussion on Chapter 3, it is fair to accept that Living Labs seem to be investigated as conditions of possibility for something else to happen. For instance, Living Labs are usually "scripted" as arrangements that facilitate and promote open and collaborative innovation, active user involvement, and multi-stakeholder participation in the development of new solutions.

The aim of this chapter is, however, to provide a different approach and to focus on the conditions of possibility that make a Living Lab possible. If we

accept the argument made by Picard (2017a), that before a Living Lab comes to existence it is necessary to put it in place, then one is able to question how exactly this 'putting in place' happens in practice. In short, what are the conditions of possibility for a Living Lab? The idea of conditions of possibility is a simple yet powerful concept.

In "Critique of Pure Reason", Immanuel Kant notes that "space and time are the *conditions of possibility* of things as phenomena" (Kant, 2009[1781]: 226; emphasis mine). A simplistic interpretation of this idea would be to say, for instance, that getting older (a phenomenon) is possible because of time (its condition of possibility). Without time, getting older would be an impossibility. Michel Foucault would incorporate this idea in his work, where the aim was to identify "the mobile systems of relationships and syntheses which provide the conditions of possibility for the formation of certain orders and levels of objects (…) the uncovering of what Foucault terms a 'historical a priori'" (Gordon, 1980: 236).

In line with ontological politics, we can say that "the *conditions of possibility* are not given" (Mol, 1999: 74-75; emphasis mine) and that "reality does not pre-cede the mundane practices in which we interact with it, but is rather shaped within these practices" (ibid.). Living Labs would then be impossibilities if it were not for the conditions of possibility that bring them into being. Also, it is important to acknowledge that whatever conditions of possibility we have at a certain moment, they could always be otherwise (Law, 1999; Woolgar, 2014).

Throughout the data analysis for this case it became clear how a set of circumstances seemed to have been in place that helped with the implementation of Soul-NL. From the interactions between key people, through to the way in which the project seemed to have been configured from the beginning, a set of sociomaterial arrangements aligned in ways that guided (and sometimes diverted) the project towards a certain direction. Conditions

of possibility afforded ways in which the project was initiated and how it evolved over time.

There is thus a relational and performative nature in all this, consistent with ANT and sociomateriality. It is the enactment of specific interactions between various heterogeneous elements that helps to transform and shape the setting up of a Living Lab. Moreover, it is in practice that those relations constitute, shape and give meaning to the actor-network that we call a Living Lab (in the case of this chapter, Soul-NL). Because these heterogenous arrangements are situated in practice, one cannot assume a pre-established order. In this sense, the conditions of possibility for the Living Lab are, themselves, the result of situated actions, unpredictable and open to contestation. Once again, I would like to reinforce that, in the analysis conducted in this chapter, the focus is not on the conditions of possibility *of* a Living Lab (i.e. what the Living Lab makes possible). Instead, it is focused on understanding the conditions of possibility *for* a Living Lab (i.e. those conditions that make the Living Lab possible).

The performative, relational and context dependent nature of these conditions of possibility was visible throughout the duration of my research. Also, they were not stable and changed over time. Results that seemed plausible in the beginning ended up not being realized. Promises made were not fulfilled. For instance, in some of the documents I had access to, Soul-NL was described as a project with the aim of creating a space of "open innovation" to promote the "application and implementation" of novel solutions. Also, the "demand" for solutions that presented independent living as a viable answer for an ever-growing ageing population was promoted, and Soul-NL portrayed as the "unique" opportunity to bring together a multi-stakeholder arrangement where healthcare organisations, local municipalities, citizens, patient organisations, universities and entrepreneurs were able to collaborate in the co-creation of "demand-driven" solutions that would, ultimately, contribute to develop a "more sustainable economy". This is a clear example of a problematization narrative (cf. Callon, 1986). A specific

problem – ageing population – is portrayed as being effectively solved with a specific solution – independent living. In this narrative, Soul-NL is presented as the ideal device to effectively bring to life the appropriate solution. Soul-NL thus becomes an obligatory passage point (ibid.), without which the problem will not be effectively solved. However, following from the previous chapter, these descriptions of Soul-NL may be taken as expectations that, even though useful in enrolling different actors in a potential future, will rarely influence the real outcomes of the Living Lab practice. It is thus legitimate to accept that other factors are at play to help explain how and why Soul-NL developed in a specific way. In what follows, I will focus on describing these conditions of possibility. Only by living and trying to do the Living Lab – in a "trial and error" model, as many of the interviewees have referred to it – was it possible to identify which strategies needed to change, which technology needed to be abandoned, or which partners needed to be attracted to bring the most benefit. It is, thus, the links between the heterogenous elements that constitute the Living Lab that I am interested in.

7.3.1 Enrolling actors.

From what has been argued, one may say that Soul-NL came to existence through a set of possibilities that contributed to its development. But which ones?

I would say that one of those possibilities was Fabian, the Project Director. The first interview I conducted was with him. Before the interview took place, and for a few months, Fabian was also the only point of contact between me and the project. For me, Soul-NL was Fabian. It was through him (and some project documents and pictures) that I knew the project, its rooms and its users "who were already trying stuff out". Until my first interview with Fabian and one visit where I had the chance to see the exact project location, Soul-NL

only existed through informal conversations, and the ways in which I imagined it[48].

Throughout our contacts, Fabian always seemed to have played a big part in setting up the project. In ANT terms, Fabian can be perceived as an "enrolling actor" (McNally, 1996: 104). Not only is Fabian the one translating "other actors in order to enrol them into the actor-network" (ibid.) he is also the one I started following in order to understand how the translation process occurred in Soul-NL's actor network (cf. Callon, 1986).

Fabian's long-term collaboration with the local Regional Development Agency (RDA) in care and assistive technology projects seemed to have worked as a stepping-stone for setting up Soul-NL. Also, through his participation in earlier European funded projects, Fabian was able to obtain some funding that helped him organize meetings with potential stakeholders that would then be active elements in setting Soul-NL up. Fabian would informally refer to this as his "lobby work". As Fabian explained:

> "I was doing that [lobbying] in a [Previous European Project], so I had some budget to do these things (…) I could use money for organising those meetings, for writing a plan for Soul-NL… but we needed to secure a budget for executing the project. These activities were conducted in 2013- that was the year that I was talking to many organisations about the idea and that organisations started to gain interest in joining."

Setting up these meetings was deemed essential. Not only to present the idea behind the project to potential stakeholders (e.g. healthcare, social care and home care providers, elderly homes, housing associations and SMEs), but also, more importantly, to gain an understanding of what potential partners wanted to obtain from the project, how they were willing to participate and what the best way would be for them to accept Soul-NL's problematization and, consequently, become interested and enrolled in its actor-network.

[48] To get a better understanding of this chapter, it is important to keep this information in mind.

Fabian told me that, during those meetings, it was possible to get a clear understanding of the challenges these organisations faced, whether they had a joint vision of care and the needs they could fulfil. However, what seemed key for the project to go forward was a shift in the way that partners thought about their needs and the needs of citizens. As Fabian puts it:

> "the second meeting was with SMEs, (…) fifteen, twenty SMEs whom I had been in touch with several times and whom I knew are interested in domotics, the care market, in developing technology for independent living, for example. And we had a conversation with them and it was very inspiring (…) in that meeting I presented the idea of having a kind of concept home just to inspire people. So, I envisioned the SMEs would work together and set up a kind of concept home (…) to be inspirational and make people talk about new things. (…) when we talked about those things (…) people connected and they said 'well, we would be very happy with such concept home, but (…) we would be even more happy with [a] project in which you are able to clarify the needs and demands of care organisations, because it's very interesting for us to be innovative but we really need to know what do people need to develop services that have also return on our investments in five years or ten years (…) so we do not want to get involved in too many new pilot projects but we would be very keen on the project that opens knowledge or expertise about the needs of people."

One of the interesting points in this quote is how the needs of users and the benefits for people are framed in relation to the potential benefits for the companies – i.e. businesses were happy to join the project if their return on investment was accounted for. This is a challenge that seemed to have accompanied the project throughout. The perceptions that business partners had of the project's aims seemed slightly different to those that people like Fabian wanted to achieve. However, if Soul-NL's actor-network was to sustain these two perspectives needed to align. Soul-NL's problematization needed to be accepted by the business partners. Fabian told me:

> "(…) I experienced that the story they [partner businesses] were telling was a little bit different than my story (…) they

> were really talking about technology, technological innovation. Now, we were talking about social innovation."

This fact alerted Fabian to the need of organizing the project in a way that would prevent participant partners from trying to control the project. For instance, if a partner contributed with a certain solution or even with some funding, it could be inclined to think that its contributions would guarantee more advantageous conditions (e.g. preventing other partners from joining or pushing their own solutions). In fact, Fabian told me that right at the beginning the project was struggling to obtain funding and two elderly care organisations offered to pay for the project. However, Fabian noted that if the project's aim was to really understand the needs of people, it would be necessary to be independent from the influence of specific stakeholders. It was then decided to get a project manager to guarantee the project was managed as autonomously as possible, trying to be neutral to stakeholder's private interests. Fabian noted:

> "that [getting an independent project manager] was really a great way er… of securing the neutrality of the project (…) it would not be affected by the interests of one of the participants. For example, care organisations have a different interest and when you want to give the people whom it is all about – the residents – a voice er… then you need to be sure that er- that there's no bias of an interest of, for example, a care organisation or a housing corporation".

Yvonne would become Soul-NL's project manager. I had been introduced to Yvonne during a project conference and we had the chance to briefly share some ideas about my research. That conversation was brief and only provided me with an outline of Yvonne's role in the project. It was only after I visited Soul-NL's premises, in a day where Yvonne guided me and some other project partners on a tour to different project locations, that I became aware of the influential role she seemed to have played in the project. At this moment it became clear to me that Fabian was not the only enrolling actor in Soul-NL. Yvonne's determination and approach to the theme of independent living seemed to have been key for the project. She stood out, undoubtedly,

as one of Soul-NL's conditions of possibility. Yvonne's resolve had, in fact, caught Fabian's attention long before Soul-NL started. Fabian told me how he heard about one of Yvonne's projects through a common acquaintance in one of the region's municipalities. Although Yvonne's project at the time was not directly related with care, it was her approach and enthusiasm that caught Fabian's attention. He told me:

> "I heard about one of Yvonne's projects (…) about empty houses. So, a house in which no people are living anymore… it cannot be sold (…) and for the communities those are important questions 'what do we [communities] do with those houses?' (…) 'do we [destroy] it and get rid of it?' (…) Yvonne took a quite different approach. She said: 'Well... such a house has history, has neighbours, someone is owning the house, so can we bring the stories of those [people] (…) to the forefront? Are we able (…) to listen to those stories? She did it by inviting people to live in those empty houses and to tell the story … of those houses".

Fabian told me that Yvonne's approach struck him due to its innovativeness but also for being in line with what he thought was needed in a healthcare project. Until that moment, Fabian felt that most projects and companies working with health and independent living seemed to be focused on pushing the technology they produced and tended to forget the people for whom the technologies were being developed. In his view, those projects "were always talking about involving the end user without knowing what the end user really wanted" and that whenever "they were talking about innovation, they were really talking about technological innovation (…) not about social innovation". Fabian's perception of a need to focus more on a social innovation paradigm of care, led him to meet with Yvonne and explore the possibility of using her innovative approach in a context of care and independent living. This led to Yvonne joining Soul-NL's team, once Fabian had been successful in guaranteeing funding to pay for a project manager.

When I interviewed Yvonne, she mentioned that after joining the project it was challenging to interest stakeholders in new and unusual ways of thinking and working. In line with Fabian, Yvonne's feeling was also that, for

companies, innovation seemed to be linked to the development and implementation of a given technological product. Her view, however, was that the first step for successful innovation was for companies to be open to new ways of working together and to think beyond the product development. It is easy to realise that Soul-NL's aim was thus to challenge already established and accepted translations by contesting the seemingly stabilized status of some actor-networks. In this case, the view that businesses held of innovation and collaboration. Callon noted how "in order to establish other links and new translations" (Callon, 1991: 152) one needs "to undo all those already in existence by mobilising and enrolling new alliances" (ibid.). This was Soul-NL's quest. Yvonne told me:

> "in my opinion (…) the partners in the [province] have to learn to be open to innovation. And that means that you have to be able to work together or that you have to be able to analyse the way you work, the way your organisation is structured (…) if you start only (…) from the point of view of the businesses (…) I don't think you'll have any er.. real[ly] success".

Yvonne's view was that even though services and products may be able to play a part in the provision of better care, that will only be achieved if businesses, care organisations, housing associations and citizens are able to work together to better understand each other's needs. The opening quote of this chapter reflects Yvonne's main interest: that all the organisations could understand the real needs of the people. This, however, requires bringing together various, and sometimes competing, points of view. At the same time, it would mean that businesses would need to be open to learn from people (and accept) that their technology may not be the better solution for the ageing problem. Yvonne told me:

> "when I was over some elderly people [home] last week- then you really see what it means for them to lose their partner, for instance. And that's what the life of people is about. To being able to have a life, to deal with loss, to be lonely or not, to be connected or not. And that has nothing to do with the apps we have now (…) and I think that needs

> to change. And really the big companies they don't have that information [what old people need] (…) and they now are recognising that they don't have it. So, now there's change coming from cooperating to be really a partner in it [the project] (…) I think that's the question."

For Yvonne the challenge was to try and change partner's perspectives on collaboration and to get them to look beyond business profitability (i.e. selling more units of a certain product). Interestingly, Yvonne acknowledges that when a project like Soul-NL starts, there is already a reality in which things exist and get done. In other words, different actors are already actants in other actor-networks. For instance, businesses have their way of operating, housing association and care organisations have others, project managers and directors another. The challenge is to make them all work for the same goal, understand why they are (or want to be) part of the project and clearly define their roles. They need to be translated. Only then can new options be explored. Yvonne noted:

> "You have to work from a reality. And that is: RDA and other partners started this project. (…) I have my own vision- and when I got into the project I couldn't start from scratch. I have to deal with how they look at it [Soul-NL] and why they wanted to start it (…) then I change. I tried to take them with me- (…) I tried to change them in their point of view (…) why do we enter the project? (…) what do we want to get out of it? and that has changed. (…) businesses think[ing]: 'I can get out- something out of it immediately'… and when you talk to them (…) they want to enter and they start it- but the first thing they do is (…) thinking: 'Ok, how can I sell much of this?' But it's the process. (…) there are partners (…) there is a manager with his ideas, and there's another manager with different ideas, and you have to work on that. To get them together on the central theme and the way you want to work in the process. It's really a process."

Both Fabian and Yvonne have, undoubtedly, played a key role in making Soul-NL possible. Without these enrolling actors, it may be argued, the project could have taken a completely different path. However, and within an ANT framework, Fabian and Yvonne did not exist alone and needed other

actors to make Soul-NL possible. They needed to establish links with other people, spaces, housing associations, researchers and products. For instance, from Fabian's quotes we understand how his work in previous EU funded initiatives contributed with necessary funding to start building Soul-NL. Also, Yvonne's links with previous projects made her visible to Fabian through a shared acquaintance. In the next sections, I will present some of the other elements that my analysis revealed to have also contributed to bring Soul-NL to life.

7.3.2 Intermediaries and mediators.

From the outset, it was clear how bringing the right elements together was important in creating the conditions of possibility for the project's implementation. From the previous section, one may be led to think that Fabian seemed to have been the right man, in the right place(s) at the right time(s). However, as an actor within a wider actor-network, Fabian was also surrounded by the right people and organisations. I have already introduced Yvonne and how she also played an important part as enrolling actor. It is time now to introduce the RDA and its director, Vincent. When I had the chance to interview Vincent, one of the issues he focused on was how Soul-NL was a challenging project to develop. Vincent seemed to have been the one willing to take a risk on a project that, according to him, was never easy to understand nor explain to potential stakeholders. The way Soul-NL was problematized did not seem clear, which could compromise the way in which it would interest and enrol the other actors it needed to make it successful. Vincent told me:

> "It's very difficult to describe it [Soul-NL] (…) Yesterday I had my supervisory board of RDA and they look at Soul-NL as a very interesting project but they're also trying to grasp it. And it's an ongoing struggle in a way. Soul-NL is a moving target (…) it's not a very strictly defined project (…) The project is developing. So, the ideas of what you

> can do and how you can use it are, in my opinion, changing overtime. (…) The original start was: 'Ok, here we have a Room- we put the equipment, we put the health institutions and we look [at] how can we bring them together and, in the end, we will have improved how the institutions work together, how they can make use of the technical equipment and, in the end, people can stay longer in their homes (…)' It was an easier to understand approach than what we have now, in my opinion. It has become more complicated to understand the idea. Because it started with a Room, that you could touch and then it developed into (…) a village"

As mentioned in section 7.1. above, Soul-NL is linked with the idea of "Room". The challenge that Vincent refers to is complex because, in its original Dutch name, the word "room" is part of the project's name. This creates an expectation and, whenever one hears/sees the project name, one tends to think that Soul-NL is, indeed, a physical room. In fact, this was my experience as well as the experience of other project participants with whom I had the chance to visit Soul-NL's premises. However, the name of the project works more like an umbrella term. It is like a brand. In this sense, although Soul-NL exists in different municipalities, villages and cities, each location is thought of (and performed) differently. The one thing in common across locations is the fact that all the local projects are focused in finding solutions for independent living.

Despite the difficulty in sharing Soul-NL's problematization, Vincent was a firm believer in its potentialities and was willing to take the risk by supporting the project and its team. The main reason given by Vincent was the confidence and trust that he had in Fabian's work, but also his belief that some projects "need certain people who start working with an idea and put energy in it and believe in it. If you don't have those people, it will not work". Madeleine Akrich, Michel Callon and Bruno Latour noted how a successful innovation is one which is able to master uncertainty "by choosing good speakers" (Akrich et al, 2002b: 218). These are the spokespersons that help an innovation to spread, that are willing to speak in its name and in the name of those other actors (human and non-human) that make it possible. Vincent

seemed to have become one. Vincent (and the RDA) was very open to the way in which Fabian and Yvonne worked, supporting them to achieve the RDA's aim of improving the healthcare system in the province.

> "(…) what we did was support[ing] Fabian in the beginning, and later Yvonne, to be able to operate (…) they had a kind of licence to operate which was very, very free. Saying: 'Fabian you're a nice guy… you have time that you can spend thinking creatively on how to improve the healthcare institutions (…)'. It [Soul-NL] was partly funded by a foundation that is not existing anymore, partly funded by the RDA. Sometimes, funded on a project base, funded by European money… by money from the region but, overtime, using RDA as a base (…) which Fabian used in a smart way. (…) in the end it was always a lot of stakeholders that were involved and willing to contribute and to stick together and to put funds into what is now Soul-NL."

Even though Vincent trusted the work of Fabian and Yvonne, he also acknowledges how it was his own belief in the potentialities of the project for society in general that made him take such a risk. Especially, considering that the project did not bring immediate profit and its benefits were not easy to measure and quantify. Vincent told me:

> "… this is one of the most difficult projects for me actually to defend (…) it's way out of scope of what we [RDA] do normally. And the reason I let this exist and support [it], also financially, is that I had the feeling that it will benefit our society without knowing exactly how it's going to benefit here or there. I simply don't know."

Regardless of the support given by the RDA to Fabian and Yvonne, it was also clear, from Vincent's interview, that the project needed support from other stakeholders (e.g. housing associations, universities, care institutions, etc). Although the support Vincent refers to is of a monetary kind it became clear, during my research, that support for the project could also materialise in other ways. More importantly, the RDA did not seem to have been the only actor in Soul-NL's actor-network willing to take a gamble in the project.

“Room G”, for instance, illustrates how other partners were also willing to take a risk and collaborate with Soul-NL’s aims. In ANT’s terms, they accepted its problematization and became interested. Based on “Location G”, Room G is one of three Rooms that the project managed to develop in three municipalities in the province. Room G was located in a flat, belonging to a local housing association. The flat had been redeveloped to allow for elderly people to live in for limited periods of time (e.g. two weeks) and to report on their experiences of daily living. Room G was the product of a collaboration between the RDA, a local healthcare company and the housing association that owned the block of flats. Figure 4, below, provides an overview of the exterior of the building in which the flat was located.

Figure 4. Soul-NL, Room G – Location G, Exterior.

The main purpose of the flat was to allow Soul-NL and its partners in Location G to understand more about the needs of elderly people to allow them to live independently. According to Yvonne, Room G had been “completely redone” and it was created with the following objective:

> "a housing company and a healthcare company, wanting to know how the houses need to look, what do we need to get in it (or not) to be able to- to let people stay here for a longer period".

Room G, however, was not only about the housing company and the healthcare company. Figure 5, below, shows how the living area in the flat was completely furnished. The same had been done in the other areas of the house. The interesting thing about the furnishing in this flat, across all its rooms, was that each piece of furniture (e.g. kettle; sofas; shower rail; chairs; beds, mattress, carpets, etc.) belongs to local companies that provide the equipment free of charge. Soul-NL seemed to have been able to also interest and enrol some non-human actors.

Figure 5. Soul-NL, Room G – Location G, Interior.

During a guided tour to the flat, Yvonne explained:

> "the floor is of a SME, the rail [in the bathroom] is of a SME, the bed is of a SME, everybody joins in and no one has to pay for that. There's a kitchen being placed by someone who delivers kitchens. So, many partners are joining in. (…) they're showcasing [their products] and learning from it."

One may ask what the return on investment is for these partners. Yvonne admitted that it was not easy to explain the model and that, at the start, it had been challenging to get businesses to accept Soul-NL's problematization with fear of sharing their solutions freely with potential competitors[49]. What would their benefits be? But the goal, for Yvonne, is beyond profit. The learning that each and every partner can gain from taking part in the project is what matters. An example was the way in which the housing association seems to have learned from its participation in Soul-NL. Yvonne admitted that the housing association had, indeed, made a huge investment in improving the flat. She noted:

> "They [the housing association] invested a lot in it, I must admit. And yesterday we had an evaluation and they got out of it [the project]. Because by learning from this apartment they now know how to adjust their other apartments. And if you- this apartment- you can live in this for another fifty years, and the other apartments, which are not done, they're old, they're- they are out of date. So, they really learned enough from this apartment (…) because the other apartments in the same building, they haven't been redone like this, but they are doing them now. And they're going to do it in other blocks as well. Learning from 'Ok, how wide (points to a door frame) should this be?' all those kinds of things"

The learning process is what matters to Yvonne and Soul-NL (project website). For her, learning and cooperation between partners are the "products" of the project but also its added values. Project partners have the chance of "learning from the questions of real people" (Yvonne, Interview). She told me:

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[49] This is similar to the findings on the previous chapter in which some partners refused participating in some Living Labs with fear of sharing their ideas with potential competitors (see section 6.4).

> "I'm interested in what the local shop [business] and [Partner Name] together learn- what should be in it [the room] and how should I think about it, how should I cooperate in it [the project]"

Most importantly, from Yvonne's quotes, it seems that learning is important to help the partners improve their products and services. In ANT's terms this also required these actors to accept a new "script". From a model based on "sales and profit", where businesses are focused on selling directly to their customers, by joining Soul-NL's actor-network businesses would need to buy into a model of "collaboration", accepting a new role as co-creators in a new innovation model where Room G would act as a mediator between their products, other businesses and potential users. The housing association, seemed to have been able to learn from their experience with Room G. According to Yvonne, one of the reasons the housing association was willing to invest in the project was the fact that its managers were aware of how the flats in their buildings were old-fashioned and not able to satisfy long-term care needs. For instance, one of the early issues with the flat was the fact that most door frames did not allow for someone in a wheelchair to move freely in the flat. Also, the height of the existing kitchen work surfaces was too high for someone in a wheelchair to prepare a meal and the carpets also made it difficult for a wheelchair to move easily. Room G was then a space to experiment and learn with different solutions, such as having lowered kitchen surfaces, wider door frames or carpets that allow wheelchairs to move easily.

Regardless of the amount of learning that takes place among partners and the opportunities created, it is also easy to imagine that those people who have the chance to live in the flat may also learn about potential solutions for independent living. However, and this is my argument, any learning that took place in Room G, be it for the housing association, care organisation, businesses or elderly people, was made possible because the flat (a non-human actor) was available, with no tenants. Thus, the flat was also a condition of possibility for the way in which the project, in Location G, ended

up being organized. Also, the housing association, the healthcare organisation, all the companies that showcased their products, and all the citizens taking part for free are all part of Room G's actor-network and were willing to take a risk in the project, redefining their identities along the way. They were all, in their own ways, part of the conditions of possibility that shaped Soul-NL in a specific way. Without their enrolment, Yvonne, Fabian and the EU funding would have not made Soul-NL.

Two other actors willing to take a risk and establish an alliance with Soul-NL, were Karin and Gustaf. They managed Room Z, another project room situated 40 kilometres north from Location G. Whereas Location G was a small city, Location Z is a rural village. Figure 6, below, shows the house in which Room Z was built.

Figure 6. Soul-NL, Room Z – Location Z, Exterior.

Room Z is a house in private land – a farm in the countryside. Like Room G the house is furnished with products from local businesses. The land and buildings thereon (there is also a converted barn and warehouse) belong to Gustaf and Karin. They are a couple who became interested in the issue of independent living, influenced by the fact that the population in the province is growing older and that healthcare provision does not seem able to respond to elderly people's long-term needs. They had, in a way, already accepted part of Soul-NL's problematization – i.e. independent living as an effective solution to an ageing population. Gustaf notes:

> "we [the province] have a lot of elderly people and nobody is looking after them (…) people are getting older, older, older, older. So, somebody has to look after them."

Gustaf and Karin self-invested in the farm as a form of diversification. They started by building a caravan and camping site but, after a few years, realised that some of the people who stayed with them would not return. The reason being that for some elderly people it was not easy to move easily around the site, due to disabilities and/or long-term conditions. Also, the site was not correctly adapted to cater for the needs of those people. Up until that moment Karin and Gustaf's offer did not seem able to enrol the exact people to whom it had been built. Their actor-network needed new alliances if it was to sustain. This made Karin and Gustaf want to develop a place for holidays that focused on people with disabilities. At the time of my visit to Room Z, they had been able to set up partnerships with local government, care organisations and one housing association that would build houses where people could live for set periods of time (e.g. holidays) and spend time with continuous access to care. These houses would be prepared to provide accommodation and care to people with special needs. Karin notes:

> "We are going to build special houses (…) we want sixty houses, to make it possible to give care (…) twenty-four hours a day, seven days a week (…) and now we started in- at the end of this year [2015] with the first seventeen houses".

Due to its privileged location in the countryside, Room Z provides care services for people in need of physical rehabilitation. This is a way to help the business side of Room Z. As Gustaf noted:

> "It's really costs us… at the moment, more than eight hundred thousand Euros and we have still nothing".

The need for money made Gustaf and Karin set up a collaboration with a local care organisation that was already a partner of Soul-NL. The contract is advantageous not only financially but also to show to the local government that the service they are providing is worth supporting:

> "We do have a contract at the moment. And that is also very important to have a contract. They [the care company] (…) give us more than one hundred patients a year. So, we have a certain base to- to give this government the idea that we are doing something." (Gustaf)

Gustaf firmly beliefs in the role of the government to support such initiatives, noting that "if you don't have the government with you, don't even start (…) the government is very crucial in this (…) in this whole idea of developing a new thing". The government is thus a key actor that needs to be enrolled.

Karin and Gustaf's aims seemed to align well with the approach offered by Soul-NL. Firstly, in Location Z, Karin notes that "a lot of people live in these buildings [old houses] and they want to stay there as long as possible". This made them think of the importance to have an experimental space and how their own premises could be used for that purpose. According to Karin and Gustaf, having an experiment room, like Room Z, is a way to learn and understand how to improve the new houses being built.

> "Karin: So, we have a building and then we said: 'We need [an] experimental room to make sure (…) we are later [able] to (…) build the houses very well'.
>
> Gustaf: Like a mock-up (…)

> Karin: Yes (…) this is for us very important to see 'Do we do the things right? Do people need what we think they need?'"

This learning, Karin later noted, does not come only from Room Z but is also provided by the experiences in the other Soul-NL's rooms: "they [the other rooms] bring us some other information so we er... can make the concept (…) better".

The example of Room Z, similar to what happened in Room G and with the RDA, seems to show how different stakeholders were willing to risk taking part in a project such as Soul-NL, where benefits are not easily assessed. The reasons to take this gamble seemed to be varied. Housing Associations seem to benefit by learning how to improve their residential dwellings to make them better adapted to the long-term needs of an ageing population, even if their initial investment is substantial. Local companies developing solutions and services for independent living take advantage of obtaining feedback on their usability and adaptability, even if that means providing services/products for free. In the case of the RDA and its director the gamble seemed to have been based on the belief that one particular individual – Vincent – had in the work of Fabian and Yvonne and in the potentialities of a project that was not easy to understand nor evaluate in terms of profitability. Taking together, all of these have been conditions of possibility to the ways in which Soul-NL ended up being performed in all its different locations.

7.3.3 Enabling actor.

Finally, I would like to focus on what, throughout my analysis, became one of the most important conditions of possibility for Soul-NL. The reason I present it last is because this was also one of the last interviews I conducted with the project stakeholders. Up until this moment, my knowledge of the project was based on my visits to project locations and conversations with the

project manager and director (Yvonne and Fabian). From what has been discussed, Soul-NL seemed to have been possible due to the work of Yvonne and Fabian (enrolling actors), the support of the RDA and its director (spokesperson), as well as all the actors in the different Rooms willing to take a risk and contribute to a project whose benefits were not easily assessed. Until I met Ernst.

Ernst was the sales manager of "Internet Z", an Internet Service Provider (ISP) in the province in which Soul-NL was developed. Although Internet Z had previously been mentioned in interviews with other elements, it was always as if Internet Z was just another intermediary in the project, like the housing associations, the care organisations or the SMEs which provided the different products and services to be showcased in the Rooms. However, from my conversation with Ernst, Internet Z seemed to have been more than that.

Ernst explained how Internet Z provides multimedia services (television, telephone, and internet) to 120,000 households in the province. Also, 85 to 90% of regional business and care institutions, including hospitals, care homes and care organisations are clients of Internet Z. For Internet Z, there was a business opportunity to be seized with Soul-NL. As Ernst puts it

> "our [Internet Z] idea was… if we already have all those companies, institutions and customers connected with each other, how easy would be to build a platform on top of that which makes it easy for both sides to communicate with each other? And that's when we started to talk to all the healthcare [managers] and asked them what they would need to- to come in contact with their clients- with their patients and stay in contact with them".

This interest led the management of Internet Z to approach Fabian, whom they knew from previous projects, to help them understand how to develop a new proposition.

> "that's when we er… asked Fabian to help us… [to] talk to all those institutions [healthcare] on how to help them. Based on the connectivity that we already have and er… the

> need for the elderly to live as long, as self-sufficient [as possible] in their own homes"

What was interesting for me was to realise that, according to Ernst, Internet Z seemed to have been a key player from the beginning of Soul-NL and was also behind the idea to start developing experimental rooms. Rather than being interested and enrolled, Internet Z seemed to have been, in fact, a very important "enrolling actor". Ernst told me:

> "we tried to er… start a location where companies, people and healthcare organisations could meet each other and try out the solutions (…) the first place we started was in Location T, where we arranged a room in an elderly [people] home and tried to build a basic apartment with basic connectivity and basic solutions where people could live for a couple of weeks and experience those solutions. But specially, to tell us what they would need (…), the problems they experienced using that room (…) they were sleeping there, using the apartment. And their experiences… they were shared and based on their experiences the idea was to use new techniques as much as possible to optimize (…) their lives"

It also became clear that, for Internet Z, the main appeal of a project such as Soul-NL was to increase their customer base. On the one hand, their customer base was constituted by the care and business organisations, on the other they also had household consumers. Ernst told me how Internet Z's long-term aim was to provide a connection service that would allow care organisations to be in touch with household customers and deliver some type of telecare service.

> (…) 99% [of patients in the region] are already our consumers. They already have a cable connection which they use to watch television (…) it's quite easy to deliver internet via the same cable connection. Only 60% of the elderly (…) use internet, so there's a huge opportunity for us to fill that gap of 40% elderly with internet (…) sales wise there's a huge opportunity for Internet Z (…) there's much money to be made. That's the commercial side of the story. On the other side, all those healthcare organisations (…) need to get in contact with their clients- or their patients.

> (…) instead of living in an elderly home (…) their [healthcare organisations] mind is now on how to get in contact with those patients (…) there's an opportunity for them [healthcare organisations] because a lot of those elderly aren't patients yet but will be in the near future. So, they're also looking for ways to get in contact with them [patients] (…) in the long term they will need those healthcare services. (…) So, we can help them with the use of the standard connectivity we already have".

One can see how Internet Z planned to take advantage of the existing connectivity infrastructure that was already provided to people and care organisations in the province. The logic seemed to be: if people and hospitals already have access to internet connectivity, why not make it so that a new service is created to allow care organisations to also increase their offer and deliver new types of care for those people living longer at home. Ernst had a justification for that:

> "(…) what we need is a substitute for real life care. People need to be in contact with the healthcare. And instead of sending someone 6 or 7 times a week to have a social talk or drink a cup of coffee- you can reduce that to 2 or 3 times and substitute that with video conferencing"

Ernst's quote shows a clear push for a type of care reliant on telecare technology, with its advantages being described in terms of the time saved in care visits. His assertion that "what we need is a substitute for real life care" is interesting, as it does not reveal much about who the "we" is. Who needs such a substitute for real life care? Internet Z's business focus, may lead us to think that they would actually be the main beneficiaries of such a change in the care provision model. Interestingly, in this new proposed model, Internet Z seems to be configuring its existing customer base into two new categories: household customers become "patients"; and hospitals / care organizations (previously considered business customers) become "care providers". There was, however, acknowledgement of the difficulties of getting household customers to buy the technology. Firstly, because "most of the elderly do not want technology", as Ernst told me. Secondly, because even if Internet Z can

provide an off-the-shelf solution that includes connectivity, TV and telephone, tablet and training for 50 Euros per month, Ernst noted that "when you are on welfare, 50 Euros a month… that's a lot of money". There is, however, a great business appeal in Soul-NL, from Internet Z's perspective, as Ernst made clear:

> "because we [in the province] have about well… five or six thousand elderly that are not connected. And that's a huge opportunity. 5000 customers… 50 euros a month well… you do the maths"

It turns out that this business focus made Internet Z's management aware that their participation in Soul-NL needed to be kept on the background. Yes, they were happy being a partner, but did not want to be known as the partner behind the initiative. The "enrolling actor" did not want to be known as one. It was as if they needed the involvement and participation of other organisations to legitimize Internet Z's participation in the project.

> "We [Internet Z] needed the rest of the market [healthcare businesses and housing associations] to start that initiative [Soul-NL] (…) that's what I told Fabian two or three years ago (…) if [we] started this from Internet Z- the market would probably not accept the push from Internet Z. So, I needed the rest of the market- I needed partners to realise- to build such a solution, which was built by the market and not only by Internet Z. (…) We [Internet Z] are a partner in the living lab and it's not our initiative- (…) we are a founding partner but we're also a commercial organisation"

This was, perhaps, my most surprising finding regarding Soul-NL. I was aware that Internet Z was an actor and partner in the project and was aware of their offer. What surprised me was to realise the involvement they seemed to have had from an early stage and the enabling role in setting up Soul-NL. With Fabian and Yvonne, I did understand that since its inception Soul-NL's aims had shifted towards a social innovation approach to care provision. However, after speaking to Ernst, it became clear how varied the ways in which different stakeholders see the project can be, as well as what they intend to obtain from their participation. Moreover, the example of Internet Z

and its influence, may lead us to question the idea of independence and autonomy, supported by Fabian (see section 7.3.1), whereby no partners should play a dominant role and the project should remain independent from the influence of specific stakeholders.

7.4 Critical Reflection.

This chapter showed how the conditions of possibility for setting up a Living Labs are context dependent and not one-size fits all. Consequently, the idea that Living Labs are conditions of possibility for open innovation, for instance, as much as it is interesting is still nothing more than a simple expectation. This means that whenever one comes across a Living Lab that does not fulfil a specific expectation (e.g. Living Labs as co-creation spaces) there may have existed conditions that made a specific outcome possible.

In this chapter I explored the case of Soul-NL and found how the conditions of possibility for its specific outcomes were the product of relations between enrolling actors, intermediaries and enabling actors that (although not clearly visible) had more power than initially thought.

I started by describing two enrolling actors - Fabian and Yvonne – who seemed to play a key role in the development of the project, particularly with bringing other elements to join the project. They came across as actors without whom the project would have not happened. However, throughout the chapter we see how they needed to be supported by other elements (intermediaries, mediators and enabling actors) in order to create the conditions that made Soul-NL possible.

The way in which they presented the project (its problematization) needed to be accepted by other elements. As described, these elements were: the RDA Director who firmly believed in them and the project they were developing; housing associations, that provided flats to experiment with; local SMEs willing to showcase their products for free; local citizens and an internet

service provider – Internet Z – whose role was way more influential for the existence of the project than initially thought. In fact, had not been for the Internet Z's own business interest the project may have not been supported in the way it ended up being supported.

The findings of this chapter show how one should never expect a specific Living Lab outcome (e.g. Living Lab as participatory context) based on the simple establishment of connections between heterogeneous elements. It is, instead, the local and context dependent nature of those links that create the conditions of possibility for particular outcomes. These conditions of possibility may, sometimes, be hidden from official project descriptions and accounts. However, they are needed and end up being more important than initially thought for the outcome of the project (e.g. role of Internet Z).

7.5 Key Findings and Conclusion.

By looking at and questioning the conditions of possibility that make a Living Lab possible, one is able to understand that, when it comes to setting up a Living Lab, some of the actors that one may be led to think play a key role in bringing it to life may not be as powerful as initially thought. This chapter showed that there are other actors that, even though not directly involved in organising the formal Living Lab structure, are still key players in enabling the project to develop and grow. Internet Z appeared, in this chapter, as such an actor. Internet Z was part of the project from the beginning, looking after its own business interests and making itself known as another stakeholder. Its role, however, was revealed to be more important that initially thought.

This chapter was an original attempt to explore how exactly the conditions of possibility that make a Living Lab evolve and are put in place. It questioned the seeming evidence one may be led to accept as determinant for Living Lab development and explored alternative routes for these projects to grow. It also

showed that the conditions of possibility for a Living Lab to develop are not stable and may, in fact, vary and change across time. In line with previous findings (Hakkareinen and Hyysalo, 2016) we also saw how those actors involved in setting up a Living Lab do not have fixed roles, and how their roles change across the innovation process.

Also, in this chapter, I was able to explore the key role that intermediaries and mediators play in bringing a Living Lab to life. It became clear that, regardless of their seeming powerful role, enrolling actors are not enough when it comes to set up a Living Lab successfully. Their success is always dependent on the alignment of multiple actor-networks and the adoption and translation by other mediators and intermediaries of the project's objectives and its potential challenges.

The aim of this chapter was to provide some illustration of the conditions of possibility that bring a Living Lab to life – in this case, Soul-NL. Instead of listing and describing a set of factors that appear to be constitutive of Soul-NL, my aim was to understand how some factors contributed to develop the project in a specific way. In line with Picard (2017a), I took the idea that before Soul-NL came to existence it was necessary to put it in place. My focus was on understanding what went on (and how) during that phase.

Soul-NL was officially described as a “unique” way of bringing together a multi-stakeholder arrangement of healthcare organisations, local municipalities, citizens, patient organisations, universities and entrepreneurs, where “open innovation” was promoted. Its aim was the co-creation of “demand-driven” solutions that could, ultimately, help to address the challenges posed by an ever-growing ageing population and contribute to develop a “more sustainable economy”. These descriptions may, however, be simply taken as expectations – ways in which to interest and persuade a set of different actors to make sense of and accept a specific future problematization - that will rarely influence or determine the real outcomes

of the Living Lab practice. It is thus legitimate to accept that other factors are at play to help explain how and why Soul-NL developed in a specific way.

From the analysis conducted, it seems that the existence of Soul-NL was facilitated by some conditions of possibility that, even though hidden from its official accounts and descriptions, were necessary in bringing it to life. These appeared to take different forms and I started by analysing the ways in which the project manager and director worked together. I argued that, regardless of these two "enrolling actors" working together, they would have not built Soul-NL if it were not for the support that the RDA and its director provided. Also, because Soul-NL was a project where the benefits for partners and stakeholders were not easily quantifiable I argued that another one of Soul-NL's conditions of possibility were those actors willing to risk and "take a gamble" in a project that was far from a straightforward commercial proposition. These risk-takers included housing associations, care organisations, and local businesses developing independent living solutions. Also, because Soul-NL is a heterogenous arrangement of humans and non-humans, I showed how the existence of some available flats and houses also contributed to develop the project in a specific way. Finally, I discussed the example of Internet Z, a local ISP and stakeholder whose participation, business focused agenda, and its strategy to be left on the background, revealed itself more influential to the existence of Soul-NL than I initially thought.

From what has been discussed in this chapter, it is easy to understand that a Living Lab needs to be made possible. It also appears that these conditions of possibility are varied and go beyond the simple existence of funding or government supported initiatives. They require the alignment of multiple actor-networks in a process of continuous negotiations between the creation of new links and the preservation or collapse of old (and previously established) alliances. The conditions of possibility for a Living Lab are thus performative and dependent on specific contexts and sociomaterial practices. They may manifest through people, flats, houses, business interests, local

government support or care organisations. However, due to their situated nature, they could have been otherwise (Law, 1999; Woolgar, 2014). It is thus difficult to believe that the conditions of possibility for Soul-NL (or any Living Lab, for that matter) would have been replicated if different relationships had been established between all those heterogenous elements.

8 Bringing a Living Lab to life.

> Since innovation moves, via the reactions which it provokes, from negotiation to negotiation and from redefinition to redefinition, everything depends on the identity of the protagonists who are mobilised: tell me with who and what you are innovating, and I will tell you what your innovations are made of and how far they will spread. (Akrich et al., 2002b: 217)

One of the aims of this PhD is to provide an account of how, in practice, a Living Lab is brought to life. As discussed in Chapter 4, this responds to previous calls to get away from a research trend that simply describes *who* does *what, where* and *when* in the process of Living Labs, and focuses on providing a better understanding of *how* exactly the concept has been set up (e.g. Bannon and Ehn, 2013; Hakkarainen and Hyysalo, 2013; 2016). Some note how, regardless of the seeming popularity of Living Labs as an innovation model, it is still difficult to find "detailed evaluation studies that examine *how the Living Labs concept has actually played out in practice*" (Bannon and Ehn, 2013: 54; emphasis mine).

In the case of Lake-EU, discussed in Chapter 6, one sees that there are instances where those taking part in different Living Labs try to get away from a model simply focused on the provision of technology. However, due to some project requirements, they end up falling into that trap with the Living Lab acting simply as a testing space for technology. Also, Living Labs may, at times, be perceived as amenable spaces for social innovations instead of technological ones. Technology is then presented as a mean to an end, where more socially focused goals are pursued. The words that Ehn, Nilsson and Topgaard (2014) write in the cover of their book appear to resonate well with some of the Living Labs studied in the present work, whereby "innovation and design need not be about the search for a killer app" (Ehn et al., 2014: cover) and "can start in people's everyday activities. They can encompass local services, cultural production, arenas for public discourse, or

technological platforms. The approach is participatory, collaborative, and engaging, with users and consumers acting as producers and creators (…) concerned less with making new things than with making a socially sustainable future" (ibid.). Yet, it is important to keep in mind that the argument of this thesis is that Living Labs may not be the stable and predictable structures one is led to believe by some of the extant literature. They are, in fact, dependent on the situated links established between different elements in their various social and material contexts.

As discussed in Chapter 2 (section 2.2.1), to build a relatively stable actor-network of heterogenous elements (Living Labs included) is not an easy enterprise, and one of the ways to understand this process of network building is to perceive it as the result of a successful translation process (Callon, 1986), a process characterized by "all the negotiations, intrigues, calculations, acts of persuasion and violence, thanks to which an actor or force takes, or causes to be conferred on itself, authority to speak or act on behalf of another actor or force" (Callon and Latour, 1981: 279). It was also argued, above, that any translation process is not about shifting between vocabularies or languages, but about creating links – links that did not exist before and, once established, modify the elements linked (Latour, 1994).

In this chapter, I draw on the idea of translation (cf Callon, 1986), with a particular focus on the moment of *interessement* (ibid.; also, Ackrich et al., 2002a; 2002b) to show how the development of a Living Lab actor-network – Link-UK – required some of its actants to gain support from the other elements of the heterogeneous network of which they were part. I shall describe some of the negotiations, acts of persuasion and intrigues that took place. *Interessement* (cf. Callon, 1986) is the moment whereby a set of actors tries to bring other elements of the actor-network to accept that a specific problem will only be successfully solved if those same actors are an active part of the problem-solving strategy. This is an attempt to disrupt "potential competing associations and to construct a system of alliances" where "social

structures comprising both social and natural entities are shaped and consolidated" (Callon, 1986: 211).

This chapter will give an account of how Link-UK was brought to life. I will describe some of the acts that helped building Link-UK from scratch, adapting the Dutch model in use by Soul-NL to try and implement it in the UK. In Chapter 3, it became clear that very few research efforts have described the setting up of Living Labs (for some exceptions, see Ehn et al., 2014). Most works seem to analyse, in retrospect, whether the Living Lab model seemed to have been fit-for-purpose when developing a particular technical innovation or used as a collaborative methodology.

Drawing on the idea of *interessement* (Akrich et al., 2002a; 2002b), this chapter should help with understanding some of the events that were key for the setup of Link-UK – from an attempt to start building a network of *interested* stakeholders, through to keeping the project on its feet until the moment I stopped following it. In introducing the concept of *interessement*, Akrich et al. (2002a) draw attention to the fact that innovations in the making are a "completely different ball game altogether" (ibid.: 201), particularly when one is to understand which factors facilitate or hinder the viability of a technological innovation. They consider it easier to describe such factors in retrospect than when the innovation is in the making. Although their work is focused on the innovation of technological objects (photovoltaic kits), the concept of *interessement*, used as a framework also seems suitable to understand how a Living Lab is brought to life. This is because, in order "to understand success or failure (…) the idea that an object is only taken up if it manages to interest more and more actors must be accepted" (Akrich et al., 2002a: 203-204). The socio-economic context, as previously argued, cannot be "known once and for all, as if it were possible to define the product outside of all interaction with it" (ibid.). Innovation is thus a process that requires a "perpetual search of allies. It must integrate itself into a network of actors who take it up, support it, diffuse it" (ibid.).

The idea of *interessement* thus seems suitable to shed some light on processes such as those of setting up Living Labs and should be used beyond the simple understanding of innovations of technical objects. Similar to a technical object that is perceived as an "interessement device" highlighting the "bundle of links which unite the object to all of those which handle it" (ibid.: 205), so can Living Labs be looked at through the same lens, as it allows one to understand "all of the actors who seize the object or turn away from it" emphasizing "the points of articulation between the object and the more or less organised interests which it gives rise to" (ibid.). The process of setting up Living Labs can thus be compared to the idea of innovations in the making as described by Akrich et al. (2002a; 2002b). Their ultimate success is dependent on their ability to interest as many allies as possible as well as being accepted, supported and diffused by the different elements of the actor-network that constitutes them as Living Labs.

In their attempt to interest different elements, Living Labs are in fact being translated, "passed from hand to hand", as Law (2006: 48-49) would put it. However, in this process of being transferred from one context to another, and in line with technological innovation, one cannot assume that they [Living Labs] "originate at a point and spread out" (ibid.) Instead, every time they are passed they change and "become less and less recognizable" (ibid.). As some have noted "to adopt is to adapt" (Akrich et al., 2002b: 208; also, Callon, 2004). There are no pre-set ingredients nor predetermined conditions that deliver a specific, programmed and planned outcome. In a sense, there are no best practices of "Living Labbing" (Mulder, 2012) that can be swiftly imported or adapted across contexts. This idea is important for a chapter that deals with how the Living Lab concept travelled across countries, and how it was differently appropriated by different networks of heterogeneous elements.

The example of Link-UK shows that some changes and adaptations need to be made locally. There is no "one size fits all" model when talking about importing a model from one country (The Netherlands) to another (UK). From the moment the first development meeting took place it was clear that

the Dutch model would be contested. In the UK, the model would be different and would require building a new actor-network of interests. Also, and most importantly, I want to illustrate that setting up a Living Lab is not simply about bringing different actors together. It requires acknowledging that each and every actor (whether human or non-human) has its own interests and that these interests are being constantly negotiated.

It is thus important to illustrate how some of these processes of *interessement* occur in practice. For this I draw on three examples that help with understanding how different actors interact in practice to try and persuade other elements to accept a particular outcome for the project. Firstly, I describe a development meeting where one sees how different stakeholders try to interest and become interested in each other's propositions. Secondly, I zoom in two cases that show how non-human actors also play a key role in the *interessement* process. One case is that of how a telecare technology stopped engaging the interest of one of the actors and how this led to new interests being developed. The other case, is that of a design company and how its offer – a bathroom – attracted the interests of a considerable number of actants to the extent that the project path could have been compromised.

8.1 The case

Link-UK was established as a way for introducing a new model of social care within a Local Authority in the South of England (LASE) and to understand what it meant to be an older person living independently in that region. Link-UK was a partnership between LASE's Social Care team and an EU funded project in which Soul-NL (Chapter 7) was a partner. The idea was to replicate the Dutch model in the UK in which, through collaboration between elderly citizens and project experts, LASE hoped to learn what was needed to support independent living and healthy ageing in their region involving housing associations, local businesses, care institutions and local government.

Up until then, LASE had been looking at social care and the way its population benefited from the offer as a continuation of healthcare provision. Social care was, in this view, nothing more than a step-down service in the normal healthcare pathway. For example, someone discharged from hospital is usually placed in social care until restored to health. However, two elements of LASE – Georgina, Director for Older People and Physical Disability, and Harvey, GP and manager of an integrated care initiative – told me how the team considered that placing people in social care had always been looked at as an inevitable step-down service in the healthcare pathway. According to Georgina and Harvey, this led elderly citizens to see social care as a natural occurring sequence in healthcare provision, especially because very few initiatives seemed to exist in the region that promoted independent living. LASE had already been concerned with independent living, but awareness of, and collaboration with Soul-NL made it possible to start thinking about changing the classical way in which healthy ageing and independent living was being looked at.

8.2 Dataset

Data for this chapter was obtained from Link-UK – a project that was developed during the second phase of a European project in which both Soul-NL (described in Chapter 7), and Anglia Ruskin University were partners. The adaptation of a relatively successful model from the Netherlands to the UK presented itself as a great opportunity for me to study what happens in the design of a Living Lab. Data was collected between April 2015 and April 2016 at different points in time, and in different locations, both in the Netherlands and in the UK. Most data were collected in person and, on two occasions, via video call (Skype) to conduct interviews. Table 4 (below) provides a summary of the different types of data and informants that provide the basis for the analysis in this chapter.

The previous chapter explored some of the contingencies that contributed to the design of a particular Living Lab – Soul-NL – taking into account the experiences of those who were active members of the ongoing initiative. In this chapter, via an in-depth analysis of the Link-UK case, I will describe the development journey of the Living Lab, through from the first development meeting with potential stakeholders and partners, shadowing initial project meetings, project launch and presentation events, and conversations with participants / stakeholders of the Living Lab. As mentioned above, the focus is on using an ANT approach to understand how exactly a Living Lab is brought to life, when the objective is set out to answer a social challenge – Healthy Ageing and Independent Living – and not to create a technological innovation.

Considering that several actors are associated in the Living Lab actor-network, I was interested in understanding how are their interests managed and negotiated (e.g. how is the enrolment of actors performed and sustained in practice)?

Data Analysed			
Documents	**Fieldwork**		
	Visits	***Interviews***	
Project leaflets; project documents; project videos.	Development meeting with twelve (12) stakeholders; One (1) week shadowing of project manager with preliminary meetings with eight stakeholders; Project launch event; Project conferences (2); Project networking events (2)	Project Director	1
		Project Manager	2
		General Practitioner	1
		Healthcare Commissioner	1
		Personalisation Development Officer	1
		Librarian	1
		Community Support Commissioner	1
			8

Table 4. Dataset Link-UK.

8.3 Growing interests.

From the moment I was invited to take part in the first project meeting it became clear that if Link-UK was to succeed it needed to build a strong network of stakeholders able to look at social care in a new and challenging way. More than building the network there was an effort to grow the interest of those that were to be involved in the project. As Akrich, Callon and Latour (2002a) would put it, the "art of interessement" needed to be at play.

This was, however, a two-way exercise, as interests had to be grown on both sides. Those promoting the project had to attract the interests of potential partners. These, in turn, would need to guarantee that their interests for taking part in the project would also be attended to.

I was able to take part, as an observer, in two initial events that were key to grow those interests. On the one hand, the first project development meeting with many potential partners and, on the other, one week I was able to shadow both Link-UK and Soul-NL project managers who had organized and were attending a variety of bilateral meetings with individual potential project partners.

In what follows I analyse these moments in more depth, to provide a detailed analysis of the issues encountered during the initial stages of the project to help making sense of how this Living Lab was brought to life and, more importantly, how the different actors in its actor-network were being interested and how they were able to enrol other elements. The choice of a more in-depth description of these events is deliberate as it can provide an account of what was happening *in situ* whilst the Living Lab was being developed. Silverman (2010: no paging), referring to how a researcher can capture what people do, notes that "there is no unitary phenomenon to be understood. There are only sets of phenomena to be understood *in situ*. So (…) if one's studying organisations say, there isn't the organisation as a whole (…) there is only the organisation as conducted say in a job interview or the

organisation as produced in the way in which the firm sets out its accounts". In a similar fashion, and in line with what has been argued regarding performativity in the previous chapter, one may consider that there is no Living Lab to be understood as a whole. There is only the Living Lab as performed in its actor-network, for example, in project meetings, launch events, local government initiatives, documents, websites and leaflets.

8.3.1 The *problematization(s)* in Link-UK.

Similar to what was discussed in Chapters 6 and 7, it became clear that the basis for stakeholder participation had to be negotiated in the new care model proposed by Link-UK, requiring people who might be willing to be open and participate without demanding anything in return.

A meeting had already happened in February 2015 between Soul-NL and Link-UK managers. However, the development meeting that took place in April 2015 was a first attempt to explore how to interest additional new partners in the project and how these could contribute to the initiative, as well as exploring how and in what best ways to make Link-UK a reality. This was a one-day meeting guided by the project manager and director of Soul-NL (Yvonne and Fabian). The meeting took place in a Care Home that belonged to LASE. This Care Home was the chosen place for two experimental flats to be installed. These two self-contained apartments would constitute the first "Room" of Link-UK.[50]

In this section, excerpts of the field notes taken during that meeting are presented. I present them either *verbatim* or construct them as a narrative to help with describing who the potential partners were and how these started to build a Living Lab by presenting and negotiating interests. The presentation

[50] Similar to Soul-NL, and due to importing this model to the UK, the idea of Room is also central in Link-UK. In this sense, a "Room" is not a traditional room (like a bedroom). A "Room" is a socio-technical spatial arrangement in which the concept of collaboration, so central to the project, materializes in practice. In Link-UK a "Room" could also exist in a flat, a neighborhood, or an entire county.

of findings is structured in a way that follows the timeframe in which the interventions of different stakeholders in the meeting took place.

More than describing the meeting, the aim is to illustrate how the actor-network of Link-UK's first Room started to be built. This is a way to understand how exactly, in practice, some of the enrolling actors in Link-UK attempted to interest and enrol other actors in accepting, supporting and diffusing (Akrich et al., 2002a) a new model of social care. In Chapter 2 (section 2.2.1) we have seen that in order to interest it is necessary, first, to persuade other actors into accepting a specific problematization. In this case, one key problematization could be described as follows: the local authority (LASE) has a problem (ageing population) to which Link-UK and its Room seem to be the perfect solution. If Link-UK is to succeed, it is necessary that enough heterogenous elements accept that same problematization and its solution. Link-UK's development meeting may thus be taken as way in which to share this problematization with potential new partners.

A clarification. As already noted, I want to illustrate that setting up a Living Lab is not simply about bringing different actors together. It requires acknowledging that each and every actor in the actor-network (whether human or non-human) has its own interests and that these need to be constantly negotiated. It is thus fair to accept that several problematizations are simultaneously being negotiated and different *interessements* are also at play. This, in fact, has been noted by Star and Griesemer (1989), who criticized the classic translation model (e.g. Callon, 1986) for being too focused in analysing the process of *interessement* from a single viewpoint (e.g. the professional's perspective). In the analysis undertook in this chapter I take Star and Griesemer's (1989) advise and acknowledge that "an indeterminate number of coherent sets of translations" (ibid.: 390) are taking place.

At the start of Link-UK's development meeting, it became clear to me that a various set of interests was present. In what follows, I present some of the

actors taking part in the meeting and the several attempts at interesting and becoming interested in each other's problematizations.

The meeting started with Georgina (LASE's Director for Older People and Physical Disability, Social Care Health and Wellbeing) highlighting how it had been set up as an exploratory exercise, trying to collect a varied set of opinions from the participants but also a way to introduce a new and challenging model of thinking about independent living. This would be materialised with Link-UK.

Harvey, who manages an integrated care program with LASE, noted how his experience as a GP seemed to show a paradox – if Link-UK were to succeed "one cannot do more of the same", and although "the needs of the community seem to ask for creative solutions, experts seemed to continue to prefer more of the same". To find innovative solutions, he notes the importance of bringing together people from diverse backgrounds in a meeting designed to think about independent living. Harvey wanted to understand how to bring the community into developing a new independent living initiative. As he put it "How to translate experiences in practice?". Harvey admires and was very impressed with Soul-NL's model. One might say the he had already been interested.

Due to Link-UK's model being based on Soul-NL's Dutch experience it is fair to accept that Soul-NL would, itself, act as an *interessement* device throughout the meeting. Soul-NL, it could be said, seemed to have been acting as *interessement* device long before this development meeting, for example by enrolling Harvey and Georgina. As Georgina pointed out during her interview with me:

> "through our [LASE] European work we came in contact with the Netherlands and heard of the programme [Soul-NL] that was happening there (…) And immediately it clicked, and it very much fitted into what we wanted to do, building community capacity. So that's where it started".

The following section describes how Soul-NL was mobilised as an *interessement* device during Link-UK's development meeting. Whereas in the previous chapter Soul-NL was approached as an actor-network that was put in practice, in this chapter, and as an actor in Link-UK's actor-network, Soul-NL adopts a new role: that of an interessement device.

Soul-NL as an* interessement *device.

Yvonne started her presentation at the meeting by noting that, like the situation with Link-UK, when Soul-NL started they had very little money. This meant that "from the beginning, we [Soul-NL] needed partner organisations to be involved and interested". For Yvonne, "although there are a lot of rooms of the future, the rooms built with Soul-NL are the rooms of today". This was the way the project wanted to learn: the needs are in the present and one needs to work from this present towards the future. Soul-NL brought together partner organisations from various backgrounds because it was noticed how, sometimes, SMEs tend to provide technology that no one really knows how to use, nor wants. Like the situation with Link-UK, the questions Soul-NL asked in the Netherlands were: (a) How do people live in that region; and (b) where were the people and organisations that could join the project and were willing to invest?

Yvonne's account of the Dutch experience resembles a sales pitch trying to get as much people as possible to buy-in to the concept. One can see why. Link-UK would replicate the Dutch model and it would be a fantastic way to convince potential Link-UK partners that the model being implemented had already been tested and delivered as promised! It was important to buy into Yvonne's problematization.

Yvonne describes what could be perceived as an almost perfect situation. Soul-NL allowed them, in the Netherlands, to collect data that could help care providers, companies, housing associations and local governments to improve their health services. People in the regions would also benefit

directly from the project as the model was also a way to connect with them. Interviews and observations with elderly citizens would allow the project to learn from their experiences of what it is like to be old and living alone – "understanding what people need and how people live" (Yvonne). People who test the rooms keep a diary of their experience and sometimes it happens that, when they leave the rooms, they end up taking some of the learning to their own homes as the experience seemed to "make them think how they can improve their own place".

In her 'pitch' Yvonne focuses on the benefits of a collaborative method, which is able to simultaneously give voice to the citizens and allow partner organisations to understand the real needs of people and adapt accordingly. Yvonne noted: "When we built one of the houses, one partner thought it would be better to install electric curtains, but because they had learnt that people needed to physically move, they decided to install manual ones instead, as it required people to get up and walk to the window and back". Another successful example follows. That of "a couple who lived in a house with a garden and the husband did not want to move into a flat". However, after living in and testing "one of the [Soul-NL's] Rooms they decided to move for a smaller flat, as they realised it was more adapted to their needs". At this moment, Harvey reinforces the idea of how important it is "to listen to what people say but also to give the community the opportunity to co-design new services".

Also, Georgina reinforced one of the building blocks and objectives of Link-UK: to show how "people who live in care have a life outside the care institution. They are part of a wider society and they are community members". This seemed to be a big concern in this meeting, and one that would shape the project throughout its development: the fact that people in care are, first and foremost, citizens. As citizens, they exist within a community of social networks, institutions and services. Link-UK would be a starting point to see how elderly citizens, and those in care, can be supported in (and by!) the community and how they [the citizens] may live

independently for longer without relying on the formal social and healthcare systems[51].

Attracting Businesses.

Darren is the CEO of a company that builds adaptable independent living concepts. Their focus is on the design, supply and installation of adaptable bathrooms able to fulfil the needs of elderly / disabled people without being "ugly". Darren presented a case study where his company had been asked, by a housing association, to provide a solution for sheltered accommodation with some space restrictions: a very small bathroom needed to be designed for someone with care needs. (The fit to Link-UK seems clear to the other participants). Darren stresses how important it is to plan a house not only for "now" but also to "how the condition develops"[52]. In his business, every adaptation is created to contribute with improving the value of a property in case someone without care needs moves into the property. It usually happens that someone who buys a house with an adapted bathroom will probably renovate the bathroom, so the value of the house changes. New buyers may not be willing to pay the asking price, as they will need to spend money to change the bathroom. Darren's company helped to adapt flats with designs that were friendly to people living with disability but that would also be visually appealing – "this is beautiful design" Darren noted.

Darren's offer seems to go down well with the other participants in the meeting. Someone mentions how storage space appears to be an issue when old people move to assisted living accommodation, with people complaining that they are not able to fit their belongings in the new flats. The idea of a

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[51] This may be taken as a political issue that was already discussed in previous chapters. Community-centred initiatives are usually linked with a rhetoric of empowering the citizens to help build the solutions to their problems. However, this empowerment is rarely democratic, and citizens may simply end up replacing the role of an ever-impoverished government with no budget to finance healthcare initiatives (see Seddon, 2008).

[52] This is a clear diversion from the case discussed in Chapter 6 (section 6.6) where technologies were created that did not evolve with the conditions they had been developed to help.

design that evolves with the condition seems appealing and well-tailored for Link-UK. In a way, the concept Link-UK intends to develop is that of a space suited for the entire life of a person and not just as a space fitted for a particular condition or a specific stage in life. After all, healthcare is about caring for a variety of conditions and independent living seems no different.

The other business representative was Jodie, project manager of a local business support network aimed at improving healthcare and healthy ageing. She drew attention to the challenges of implementing Soul-NL model in the UK. On the one hand, although the project can have long-term benefits those involved would need to agree on a business plan. The fact that financing structures / rules are different in the two countries (NL and UK) is a worry. In the UK, Jodie noted, there are NHS annual budgets where it is necessary to make the money work – "it is necessary to make the most of the money that exists in the budget". Jodie acknowledges that solutions are based on people, and people will be the ones able to make the initiative work. Using Soul-NL and Yvonne's introduction as an example, Jodie stresses how Soul-NL may have been a successful case because they could persuade people to see past short-term budget lines, "an example is the fact that they openly share their products". For Jodie, the main issue for Link-UK is the need for catalyst funding that allows the project to bring on the right people as stakeholders. Her company possesses a database of SMEs that may be willing to bring technology to be tested in the flats.

Missing links.

This was a moment in the meeting where it was clear that, for some people, it was important to communicate the project to the outside world. Only then people in the outside would know the project existed. Peter, who used to be a nurse working with Dementia within LASE noted: "we need to find a better way to innovate but other people need to know we are innovating, it is important to make ourselves known out there". This could also be perceived

as way to interest the elements in the community. After all, they are also part of the actor-network in which Link-UK exists. If Link-UK is to be successful, the community needs to be enrolled.

Although the importance of understanding the needs and wants of the community was highlighted, financial issues were also brought forward as a worry for the project, as shrinking budgets influenced negatively what one could achieve. Peter continued: "I had experiences of sitting down in meetings when architects had an amazing plan, but by the time the project was finished we had a box because the budget shrunk as the project developed".

Others supported the idea that the important thing was to start the project somewhere, even if just with those at the meeting, which would then allow them to build upon it. For Fabian, Soul-NL's project director, this would allow the project to start learning and, sometimes, it seems that to try and get the perfect scenario would delay things. During Soul-NL there was a moment where they "had an apartment that had all the technology possible until someone asked: 'will there ever be a person living here that will need all this technology?'". Only by starting somewhere would it be possible to understand these things and the perfect starting point may never happen. As Fabian noted "everyone has a picture in their mind of what the project will look like in the end, and that picture is different from people to people". Trying to align all those "mental pictures" may delay things. "Innovation is about trying", Georgina would say.

There was a sense that that day was the starting point of a longer journey in innovating LASE's care offering. However, as Harvey acknowledged, "for an initiative that is focused on the community, the fact is that today the community is not present". This is one of the most interesting observations I came across. As previously pointed out (Chapter 3 and 4) although initiatives like Living Labs claim to be open and a way to involve citizens as co-creators

in the development of product / service innovations it seems that their involvement only occurs quite later in the process (e.g. Kommonen and Botero, 2013 Vanmeerbeek et al., 2015) and citizens may end up being nothing more than simple testers of previously developed solutions.

The appeal of Link-UK's model was, according to Georgina, an attempt to divert from healthcare solutions simply focused on individual conditions (e.g. dementia friendly technology) and bring the focus to a broader, community-focused level and start asking: how can innovation opportunities in the area be created?

The last moments of the meeting were about setting up the stage on how to take the initiative forward. What would the next steps be? What needed to be in place to create the room where people could start living? When would that be? It was interesting to see that there seemed to be an over reliance on Yvonne's opinion regarding some issues of substance. Most of the actors in the meeting seemed, by now, to regard Yvonne as the expert in this new care model. They seemed to have accepted her problematization and she seemed to have turned into this obligatory passage point (cf. Callon, 1986), without whom Link-UK's success would be compromised. As such, Yvonne was the one to turn to, to ask questions such as: How are the patients to be sampled? Did she have a vision on who those patients could be? Would patients be from hospital discharges? How long would people be staying / living in the room?

In line with Fabian's opinion, above, Yvonne noted that the important thing would be for the flat to be ready, just so experiments could start: "this means that something needs to exist where people are able to live". As for the type of people that would occupy the room, it was agreed that it would be better to have a mix of people, both in terms of age but also in terms of physical ability / diseases. Also, Peter suggested that these participants could be recruited via organisations such as Age UK, as this would guarantee voluntary participation of potential users and avoid regulatory issues that could apply if a patient was recruited directly from the NHS.

Another type of concern for Link-UK was to make sure that those potentially trying out the flats are not under the impression that they will be looked after, since the flat was part of a Care Home belonging to a local authority. The objective at this stage was for people to be aware of the learning process needed, and that their participation was voluntary. Harvey stressed that participation in the initiative should not be perceived as a step-down in care, as people could be under the impression that they would simply be moving from one category of care to another.

As presented in this section, the development meeting may be seen as a way to help develop the moment of *interessement* – to know which elements Link-UK would be able to recruit and enrol as allies in its innovation effort. In this case, those responsible for Link-UK needed to know on whom and what they could "rely to bring a project to a good end, but also to predict the way in which alliances will be redistributed" (Akrich et al., 2002b: 222) if the project were to be transformed. Link-UK's problematization needed to be accepted. It goes something like this. Local authorities, businesses, housing associations, older people, healthcare providers are all, in one way or another, faced with the challenges posed by an ageing population. To successfully help solve these challenges the ideal solution is to create a new model of health and social care provision that can only be delivered by Link-UK's proposal. Or, at least, Link-UK is perceived as the best, if not the only, way to solve these challenges. The relevance of the development meeting for the analysis is that it gives a detailed idea of how different stakeholders try and play their part in this translation process. One sees that it is not only up to Link-UK to interest stakeholders but that these participants should, themselves, try to negotiate their own interests in the process. The meeting resembled a market, where different elements tried to pitch their product hoping that enough buyers would accept the offer.

8.4 Interests in practice.

Due to the complexity of the actor-network in which Link-UK was developed, the development meeting was not the only moment in which the "art of interessement" (cf. Akrich et al., 2002a) took place. In fact, and as presented in section 2.2.1, is it important to recall that *interessement* is a process happening to (and across) all the elements of an actor-network, in what Star and Griesemer (1989: 389; emphasis in original) called the "*n*-way nature of *interessement*", where no point of view is favoured over another. In this sense, no actor's viewpoint is better or worse than that of other actors, with the focus being on the entire actor-network of interests and not only on one particular interest. For instance, A is able to interest B only if C and / or D do not catch B's interest first and, consequently, redefine A's position in the actor-network (cf. Callon, 1986). Also, even if some *interessements* are achieved, they can always be transformed and contested. They are only temporary.

Another important moment in which the interests of stakeholders were being negotiated was the week I shadowed project managers Nicole (Link-UK) and Yvonne (Soul-NL). Throughout this week Nicole and Yvonne conducted ten individual meetings / interviews with potential stakeholders. All these potential stakeholders were either part of LASE's existing network or businesses and care associations in the region that were being approached for the first time. The week was crucial to help Yvonne and Nicole to understand the agendas of specific elements and how exactly their participation was being negotiated. It allowed those being interviewed to, on the one hand, clarify and understand what the project could be about and, on the other hand, make Link-UK representatives aware of some of the initiatives that were already taking place across the region. For instance, during this week there was a chance for Yvonne and Nicole to understand that some of

the potential stakeholders being interviewed were already providing similar services in the region that Link-UK managers were not aware of.

An example was the fact that the local library already had an initiative for elderly people – a Home Library Service – and was offering training packages to help older people use the internet and get online. Interestingly, this service came out of a perceived need caused by the fact that more and more library services (e.g. reserving a book) were being done online. The library also has interest groups that elderly people can join, where they can regularly meet and get together, which helps prevent social isolation.

The week was also a way for me to understand the type of different stakeholders being approached (e.g. Communication Managers, Product Designers; Health and Social Care Commissioners; Public Health Programme Managers). However, throughout my analysis, it became clear that it was also necessary for non-human elements to interest other elements in the actor-network of the project. Non-humans needed to interest as many allies as possible as well as being accepted, supported and diffused by the other different elements of Link-UK's actor-network. Sometimes these non-human elements would be able to recruit allies. Other times less so.

8.4.1 Mixed interests.

The first example comes from a meeting with Ian, Commissioning Officer for Social Care, Health and Wellbeing in LASE, who specialised in telecare technology that helped LASE to develop its strategy of care provision in the region. Ian tells us that limitations of the existing procurement system for telecare solutions within LASE had been an incentive to start to think differently about care provision and that Link-UK could, indirectly, contribute to help materialise that change. At the time this meeting took place (May 2015), Ian noted that LASE was in the process of replacing the company that provided LASE's telecare solution – Brand X. For those in Ian's team, it

was necessary that the new provider was technologically agnostic. This meant that the commissioning team would like to have access to a telecare monitoring platform that was open to diverse types of technologies being connected to the central monitoring hub.

Ian explained how, at the time (May 2015), the client base of LASE's telecare offering was made up of 3,500 people. All these people would need to change providers (i.e. from Brand X to another) when a new telecare platform provider was in place. Why? From what Ian told us, there seemed to exist a monopoly at that moment, which meant that those 3,500 people used the technology that the system provider – Brand X – pushed them to use. Simply put: "Brand X" only provides "Brand X equipment". The reason "Brand X equipment" is distributed is because it is the only technology that can be safely connected with the central monitoring hub, which "coincidently" is also from "Brand X". This means that if someone in the region wanted to buy a piece of telecare equipment from another brand (e.g. Brand M) it would be impossible to connect this equipment to Brand X's hub. In a way, and from a user point of view, his/her telecare service would stop at that moment. For a user, it would seem safer to stick to Brand X.

However, LASE's commissioning team seemed keen to change the paradigm for their telecare offer. This interest started when Ian and other members of his team started to attend international technological fairs and showcase events. At that moment, they realised that "there is a lot of new technology out there" but regardless of its potential benefits, LASE would never be able to realise them because its system of telecare provision would not allow other technology to be connected (Brand X's hub would only accept Brand X's equipment). Ian's team's experience in those events made them realise that it was necessary to start thinking about the real needs of the citizens and understand what type of technology people may really need (if any!). The idea was to give them a choice. This meant that the technology would have to adapt to the individuals and not the other way around. With the monopoly of Brand X, Ian notes, what happens is that people are left to use a

technology that may not be the most appropriate for their condition. Instead, the technology they use is the one compatible with the service offered by the telecare provider. This led LASE's team to start looking for a more open platform, one which would allow the central monitoring hub of Brand M, for instance, to be linked with products of Brand A, B, C, X, Y or Z.

In this example one sees how many different "*interessements*" seem to be at play and how there is not only one interest at play, nor a specific element trying to persuade other elements – there are multiple elements and interests being negotiated at once. Also, the "art of interessement" does not seem to be a process taking place exclusively in a particular project. In line with what has been discussed above (e.g. Chapters 3 and 4), Link-UK is not created out of the blue. There were moments before Link-UK that are still part of its actor-network of heterogeneous elements. The same may be said for interests. In this example, one identifies the interest that LASE, and its commissioning team, seemed to have lost in Brand X's telecare service. In a sense, Brand X's telecare offer acted as a *desinteressement* device and Brand X could no longer be an ally in LASE's new enterprise (Link-UK). The exclusion of Brand X thus allowed other actants (e.g. telecare equipment from other brands) to be enrolled in Link-UK's actor-network. For instance, there is the interest that the commissioning team gained in a more open platform of telecare and how this led to new ways of thinking about telecare provision. Finally, and in terms of Link-UK, the proposal of building two experimental flats – independent of Brand X – seemed to have interested Ian and his team, who noted how these experimental rooms would allow for different and new types of technology to be on show, so people could assess which ones were better adapted to their needs.

8.4.2 Don't throw the Living Lab out with the bathroom.

Darren is the CEO of a company that builds adaptable independent living concepts (section 8.3.1). His company focuses on the design, supply and

installation of adaptable bathrooms and kitchens able to fulfil the needs of elderly / disabled people without being "ugly". His willingness to get involved with Link-UK was due to the innovative approach that LASE seemed to have on elderly care. In his interview Darren noted:

> "it [Link-UK] is a project that is very much close to our hearts in terms of our resources…. and we're always keen on partnering with organisations who look at this area [elderly care] differently and pioneer new models of thinking".

Darren's proposal seemed to link well with a project such as Link-UK. The bathrooms his company creates "could flexibly adapt to the changing needs of different residents" (Darren, interview). This was perceived by Darren as an opportunity, since the idea of an experimental room would allow the company to showcase different products, as the bathroom could easily be changed (e.g. handrails could be easily replaced, as well as toilets and sinks). Contrary to most offers in adaptable bathrooms, who are fixed and have a "clinical feel", Darren highlights how his company is able to combine design with affordability and "demonstrating that good design can be possible on a local authority budget". Darren notes:

> "the perception with local authorities is that anything that looks good has to cost money (…) our goal is to prove that the equipment we install yes, it's a bit more expensive than the (kit) they [Local Authorities] normally install themselves, but actually the longevity of that equipment over the life of the bathroom is such that they'll save money in the long run. And this ability of flexibly adapting bathrooms saves them significant money because they're not having to adapt en-suites, or bathrooms, or shower rooms that they would have to rip out two or three years later [when a new resident with different needs moves in]".

Having a bathroom installed in one of Link-UK's experimental rooms would be an opportunity for Darren to showcase the potentialities of his business offers. In fact, the showcase of products is one of the appeals that

Link-UK's proposition seems to have. Nicole, Link-UK's project manager, told me in her interview:

> "we have said to [business] people, you know… this [Link-UK] is a really good data source for people testing and trialling your products your equipment and then providing you with feedback."

When Darren presented his case study in the development meeting (see section 8.3.1, above), it was clear that his offer attracted a lot of interest from the other stakeholders. Undoubtedly, the design was a unique selling proposition but there was also the fact that the adaptations being proposed could be done relatively quickly. Due to the initial stage of Link-UK and the fact that LASE had two flats available in its Care Home to use for experimental purposes, it was clear that there was an opportunity for both parties: Darren's business and LASE.

From the point of view of Link-UK, Darren may be perceived as a "powerful stranger" (Westley et al., 2007; Emilson and Hillgren, 2014) someone who has the resources (in this case an extremely innovative and appealing product) needed by Link-UK and with whom connections need to be established if the "innovation is to transform from an idea to reality" (Westley et al., 2007: 95). Darren also seemed to know that his resources were needed, and Link-UK representatives were quick to establish a connection with his company (Nicole, interview). The agreement was for Darren's company to equip the bathroom in one of the available flats because Link-UK "wanted to have a comparison offer – a very nicely adapted bathroom [Darren's] to a more standard adapted bathroom [what LASE already provides]" (Georgina, Interview).

What became interesting in this collaboration was that it seemed to have reached a point where the bathroom seemed to have taken a crucial role, as if the Living Lab would not be possible if the bathroom was not there. The bathroom was becoming an obligatory passage point! I guess one of the justifications for this may have been the fact that, due to the very early stages

at which the collaboration was established, a lot of expectations were created with regards to the fact that one of the bathrooms would be built by Darren's company. For instance, in my interviews with Georgina, Harvey and Nicole, Darren's offer was always mentioned. Also, Darren had been invited to speak at a Link-UK workshop opened to the public where other companies and care associations were also present. Similarly, when Link-UK officially launched Darren was present to showcase his offer.

Most importantly, Darren was able to make himself interesting to and interested in what Link-UK could offer. Sometimes this *interessement* was even made on Darren's behalf. Nicole, for instance, noted:

> "So, I mentioned Darren's bathroom to [Local S] District Council the other day and a couple of other people and they said: 'oh, we'd be interested in come to see that'.

This would later materialise in an actual meeting between one of Local S District Council representatives and Darren. He told me:

> "to give you an example… following Link-UK's launch presentation, I met one of the senior people at [Local S] District Council and since then I've been to a meeting with them to discuss a similar type of refurbishment of seventy bathrooms for a new build development for them".

This was however, part of Darren's strategy from the beginning. In the meeting I attended between Darren, Nicole and Yvonne it was clear that Darren was willing "to go into the house to take measurements and prepare everything" but the important thing "is to have a conversation [with Link-UK representatives] that is clear with regards to what are the costs". Darren acknowledged that he and his company were not looking at Link-UK as a commercial project, "it is a marketing tool for us", and stressed that they "would not be able to pay for the [installation] costs themselves". They needed an open conversation with regards to ensuring costs could be covered by LASE, for instance.

I later found out through Georgina that the strategy was for LASE to guarantee and cover the costs of building the bathroom as LASE had access to their own team of builders. However, there were some delays in the process because this innovative product was being installed in a care home that belonged to the Local Authority. For that reason, Georgina told me, "we [LASE] had to have it completely signed off by our property people". But his was not the only reason for delays. One of the flats was flooded due to heavy rain and the initial planned date to start the works had to be postponed for a few months[53]. One might say that the flat has not been, at this stage, fully enrolled in Link-UK's actor-network. These issues seemed to have influenced Darren's perspective. One may even say that his interest in the project may have changed. Darren told me in the interview:

> "I think the biggest frustration from my side has been the quality of the installation of the bathroom. So, whilst we designed and provided all the kit the quality of the installation by LASE's recognised contractor has been very poor. And we are still trying to sign off some issues with the bathroom to make sure we're happy with it (…) until I'm happy with this issue… with the bathroom I think it's just gonna be… for me Link-UK hasn't really started yet."

As Darren acknowledged, above, his participation in the project was more of a marketing strategy and Link-UK a stage where his company could showcase its products to a larger audience. Also, the fact that he was able to start conversations with people in other councils (and potentially get more business) gave him the assurance that his strategy paid off. In a sense, his interests seemed to be protected. What is interesting, however, is the fact that, from the beginning, Darren's company seemed to have been *presented* and *accepted* by other stakeholders as an obligatory passage point (cf. Callon, 1986) for Link-UK to be in place. This allowed Darren to interest other

[53] This is a fascinating illustration of some of the theoretical principles I adopt in this work: these heterogeneous arrangements are only temporary, they are always in making and they can always be otherwise! In this case, a non-human actor, external to the project – rain – ends up influencing its timeline. Rain was, in fact, part of the whole actor-network. It just had not been recognised as an actor until it made its presence felt!

elements in his offer. What did not seem to have been planned were, however, some of the external constraints that appear to have affected not only the planned timeline of the project but also Darren's own interest in Link-UK.

8.5 Critical Reflection.

In this chapter I explored how a Living Lab was being set up in the UK (Link-UK) by importing the Dutch model discussed in Chapter 7. The findings illustrate the local and context dependent nature of Living Labs, showing that the same model / best-practice of Living Lab may never be successfully replicated. Local adaptations need to be made if the project is to succeed.

Also, this chapter reiterated the idea that the outcome of a Living Lab cannot be known in advance, once and for all. It is through the interaction of different elements that the outcome will be known / achieved. As Akrich et al. (2002) tell us: innovations in the making are "a completely different ball game altogether". The same seems to be true when setting up a Living Lab.

This chapter shows some of the different attempts made at attracting different elements to the new Living Lab actor-network.

I described a development meeting and how this helped the project managers with interesting new elements with Link-UK (from local businesses to GPs and care professionals). I also had the chance to shadow project managers in meetings with potential stakeholders (e.g. local libraries; designers). Both these opportunities showed how Link-UK was presented as a structure without which the challenges of the region with regards to ageing could not be properly solved. It was also possible to witness how all these elements are constantly negotiating between competing interests. Setting up a Living Labs, it seems, is all about being interested and becoming interesting to others.

These findings also show how interests can be lost and new interests developed and how non-human elements are themselves used as *interessement* devices. One example is that of a bathroom, which ends up gaining such relevance for the project that it becomes synonym with its success. It was as if without the bathroom the project would not be the same. Once again, more than bringing different elements together, these findings show how making a Living Lab is about creating and managing challenges, resistance and disagreements between the elements of its actor-network.

8.6 Key Findings and Conclusion.

This chapter provided and in-depth account of how a Living Lab – Link UK – is set up. More that describing the actors and their roles within the Living Lab I questioned how the relationships between those different elements are established and how they may change throughout the duration of setting up a Living Lab project.

Through the analysing of a project development meeting and of initial meetings between various project stakeholders I was able to show some of the challenges, resistances and disagreements between the connected elements in the Living Lab and how those unfold throughout the project's timeframe. Such analysis provides a new way in which to identify and question how the heterogenous elements linked in the Living Lab may gain or lose relevance along the way. This allows us to better understand how these different elements are (un)able to (des)interest one another and how the Living Lab ends up following a particular path. As with Chapters 6 and 7 this provides a new way to look at and understand how Living Labs are set up in practice.

This chapter also shows that when it comes to understand the process of setting up a Living Lab it may be beneficial to understand it as constituted by multiple moments of *interessement* (Callon, 1986; Akrich et al., 2002a). More

than bringing different actors together, it is necessary to acknowledge that each and every actor (whether human or non-human) in the Living Lab actor-network has its own interests and that these interests are dynamic and constantly being negotiated. Therefore, if a Living Labs is to succeed it needs to interest as many allies as possible and it needs to be accepted, supported and diffused by all its constituting heterogeneous elements. The challenge is that, in practice, the "art of *interessement*" seems to be shaped and performed differently, with different actors trying to play their own part in the process at once. Moreover, it is important to note that the process of *interessement* is not simply a matter of interesting other elements but also trying to ensure that those already interested remain so. Only then will a Living Lab be able to sustain in a relatively stable arrangement, even if temporary.

Part IV — Closure

9 Discussion(s) and Conclusion(s)

One question guided this research throughout: How are Living Labs set up? This question was influenced by my participation in two European cross border research projects focused on understanding how demographic challenges (an increasing ageing population coupled with a shrinking work force) could promote the creation of new services, products and businesses opportunities focused on the real needs of people living independently. Their aim was to guarantee better provision of health and social care, with the needs of citizens and their dignity at the centre of any technological and social change / solution, which should be developed with a co-creation strategy in mind. A Living Lab (Soul-NL; Chapter 7) was being developed by a Dutch partner in one of the projects and this model would later be used as a best-practice to be imported to the UK (Link-UK; Chapter 8). These Living Labs were focused on understanding the needs of elderly people living alone and exploring best ways in which elderly, carers, housing associations, local authorities and insurers could collaborate in the creation of suitable solutions to fulfil those needs.

In asking how Living Labs were set up I was also influenced by the seeming mismatch that seemed to exist between the theoretical and publicly available descriptions of collaborative and user-centred projects (like the Living Labs in the projects I joined) and their real-life practice.

The projects I was involved in were focused on developing independent living solutions, and this focus seemed highly influenced by a political push across Europe where structural funds supported initiatives aimed at creating "more opportunities to implement new technologies in the health care sector, to create job opportunities and to provide better services for elderly" (Interreg Europe, 2017: no paging). At the same time, some policy documents portrayed ageing as a problematic issue in need of urgent, effective solutions – what I opted to call the "ageing threat". However, some ways of ageing seemed to be considered more appropriate than others (cf. Aceros, et al.,

2015), with some discourses hinting at the idea that people are supposed to age "actively" (Age Platform Europe, 2013), "healthily" (European Policy Centre, 2012) or "well" (Harkness et al, 2012).

To tackle the challenges posed by an ageing demographics, two strategies seemed to have gained momentum. On the one hand, a strategy that sees technology as an essential solution to the demographic challenge (see Chapter 1, section 1.2). In this view, without technological innovation, successful healthcare provision for an ageing population will fail. On the other hand, I discussed a set of evidence that suggests the "ageing threat" would be better solved with a participatory approach (see Chapter 1, section 1.3). Here, the solution is believed to rest with those (in)directly affected by ageing (i.e. citizens, their families and population in general), calling for an active participation of these elements in the development of potential solutions. However, each strategy has its own limitations. Technology, *per se*, does not equal successful healthcare provision, and such an approach ignores how issues of implementation, and the meanings people attribute to technology, may influence its (non-)adoption (e.g. Pols and Willems, 2011; Oudshoorn, 2012; Greenhalgh et al., 2013). Participation, on the other hand, is not as democratic as one would expect, and people involvement may sometimes be nothing more than a bureaucratic design requirement that has nothing to do with listening to people's real needs (e.g. McCarthy and Wright, 2015).

It was within these different contexts, that Living Labs revealed themselves as interesting objects of research, particularly those developing independent living solutions. My argument for studying Living Labs was based on the fact that these innovation arrangements appeared as one possible (but by no means exclusive) way in which to bring together the technological and participatory approaches advocated to tackle the ageing challenge. Also, my focus on Living Labs developing independent living solutions was a way to understand how straightforward the creation of initiatives aimed at responding to the urgent calls for participatory solutions for an ageing society may be (e.g. Interreg, 2017). Even though Living Labs for independent living

have recently received attention of some researchers (e.g. Vanmeerbeek et al., 2015; Bygholm and Kanstrup, 2017; Picard, 2017a; 2017b) these research efforts are still very much focused on describing the projects and processes of co-designing healthcare and independent living solutions.

My analysis of the literature (Chapter 3), showed that Living Labs have been regarded as ways in which to combine the creation of innovative solutions (technologies; products; methods; services or processes) with the active participation of various stakeholders (e.g. users; producers; local governments; universities) in the innovation process (Westerlund and Leminen, 2011; Ståhlbröst, 2012; EnoLL, 2014; Schuurman, 2015; Baccarne et al., 2016). Existing literature portrays Living Labs as methodological approaches to innovation (Mulder, 2012; Dell'Era and Landoni, 2014) that promote multi-stakeholder collaboration, open and distributed innovation (Leminen et al, 2012; Leminen, 2015a; 2015b) in real-life contexts (Bergval-Kåreborn el al., 2009); and where the innovation developed may be a product or service that is not necessarily technological. Also, the research field seemed to have been highly influenced by some paradigms, such as Open and User Innovation (von Hippel, 1988; 2005; Chesbrough and Appleyard, 2007), without a clear understanding of their theoretical underpinnings (Leminen, 2015; Schuurman et al., 2015).

Based on my critical analysis of the literature, I argued that most research on Living Labs has been focused on describing *who* does *what* and *when* in the process, reinforcing their seeming potential for societal value creation (e.g. Ståhlbröst and Holst, 2012; Eskelinen et al., 2015) but forgetting about their potential "*drawbacks* and *bottlenecks*" (Füzi, 2014: 2, italics in original). However, some authors started to draw attention to the fact that although users seem to be involved in the Living Lab process, they are not able to *actively* influence or drive the innovation outcomes (Kommonen and Botero, 2013). Others suggest that, in practice, user involvement only means feedback provision for specific innovations at later stages in the innovation process, and not at the beginning and throughout the entire process (Vanmeerbeek et

al., 2015). Also, the involvement of real users does not seem to guarantee their needs are met nor will it ensure real cooperation among stakeholders (Bygholm and Kanstrup, 2017).

Joining these recent efforts (e.g Kommonen and Bottero, 2013; Sauer, 2012; 2013; Hakkareinen and Hyysalo; 2013; 2016; Bygholm and Kanstrup, 2017) this thesis aimed at extending the understanding of Living Labs beyond simple description of *who* does *what* and *when* in the process and to offer a much needed in-depth account of *how exactly* that process is enacted in practice (Hakkarainen and Hyysalo, 2016).

9.1 How is a Living Lab? That is the question.

Throughout my analysis of the extant literature it became clear that, by simply focusing on describing Living Labs and creating typologies of different actors and organizing principles (Bergval-Kåreborn el al., 2009; Leminen et al., 2012; Ståhlbröst, 2012; Nyström et al., 2014; Leminen, 2015), the research field was still lacking an understanding of how exactly the process of setting up Living Labs happened in practice. It seemed that most research was lacking a "critical attitude towards Living Labs as a concept" (Schuurman et al., 2015: 19), describing them in "neutral or overtly positive" ways (ibid.) and simply contributing to define *what* a Living Lab is.

The purpose of this thesis was to understand *how* exactly the different elements that make a Living Lab are linked as relatively stable sociomaterial assemblages (Latour, 2005a; Suchman, 2007). This is important because, as acknowledged by some (e.g. Picard, 2017a), before any Living Lab comes to existence systematic work from different actors is needed, a point that seemed to have been overlooked by academic authors (ibid.). In Chapter 2, I argued that Living Labs may be better understood as actor-networks – the product of associations between heterogenous elements (documents, people, money, governments, technologies, etc). Although previous research seemed to show

that Living Labs required the coming together of different elements (e.g. producers; local authorites; users; citizens; businesses) it was not clear how exactly these associations happened in practice, and the active role that non-human actants could have in the process seemed to have been largely ignored.

Based on the notions of ANT (e.g. Law, 1987; 1999; Latour, 2005a) and sociomateriality (e.g. Orlowski, 2007; Orlikowski and Scott, 2008), whereby a phenomenon cannot be understood in isolation but is, instead, in constant relation with a variety of other human and non-human elements, I argued for a view of Living Labs as the products of heterogeneous connections. Therefore, instead of looking at Living Labs as entities that, for instance, facilitate collaboration among several stakeholders, where innovations are developed and openly shared (i.e. the Living Lab as cause), I approached Living Labs as the product of associations and links between heterogenous elements (i.e. the Living Lab as effect). It is through the links established between the multitude of social, political and economic elements (e.g. demographic challenges; funding providers; local authorities; businesses and citizens) that Living Labs are made. These new links, which did not exist before, transform all the elements that are linked (Latour, 1994; Callon and Law, 1997). Living Labs are thus not something that exists in and for itself, but something made to exist through the different links established between the variety of heterogenous elements that constitute them. Their status is never definite and, due to their situated nature (Suchman, 2007), they are "potentially on the verge of turning into something different for new experiences to be accommodated" (Tsoukas and Chia, 2002: 576). Also, drawing on the work of Björgvinsson et al. (2010; 2012a) and Ehn (2008; 2012), I took the view that Living Labs should not be exclusively taken as places to design projects (or specific objects) but also as spaces to design "Things" – assemblies of heterogeneous elements and relationships (Latour, 2004; 2005b).

Influenced by my theoretical choices, my findings showed that in understanding how exactly a Living Lab is set up it is important to account for three factors: expectations; possibilities; and interests.

9.1.1 Expectations

The data analysed and discussed in Chapter 6 shows that ideas conveyed in previous literature of Living Labs as open, sustainable and real-life spaces of collaboration between users and producers (Bergvall-Kåreborn et al., 2009; Ståhlbröst et al., 2009; Westerlund and Leminen, 2011; Ståhlbröst, 2012) are not easily matched in practice. My argument is that these conventional descriptions work as expectations that are produced and shared by research communities, businesses, citizens, healthcare organisations and local governments in order to persuade and interest other actors by creating in them the expectation that equivalent results will be obtained whenever Living Labs are adopted (Brown, 2003; Borup et al., 2006).

It also became clear that these expectations are, nevertheless, important devices in which to make sense of the research field, and even help perform particular futures. For instance, one of the expectations of Living Labs working in independent living is that they could help solve some of the challenges of an ageing population, through co-creation of solutions that help older people to live independently. However, it is important to highlight that even though these expectations may be performative of certain futures, they are non-deterministic in the sense that those futures often do not live up to the expectations that created them.

My findings, for instance, show that, at times, Living Labs may be better understood as closed, unrealistic and (un)sustainable arrangements. This is because they are situated in different practices and, consequently, dependent on their local social and material contexts (Suchman, 2007). As I have showed, Living Labs are not a simple matter of bringing different actors together. An

ANT approach reminds us that all the heterogenous elements (human and non-human) linked within a Living Lab actor-network are, themselves, actor-networks belonging to wider networks of association and that the new links established between them provides each one of these social and material entities with new meanings (Latour, 1994). At the same time, one needs to acknowledge that those different actor-networks are constantly negotiating between the formation of new links and the preservation or collapse of old and previously established ones.

Living Labs are, by their very nature, unstructured arrangements dependent on how they are (per)formed in their everyday activity (Feldman and Orlikowski, 2011) and one needs to accept that they will rarely materialise in the ways that we may have been led to expect.

9.1.2 Possibilities

In Chapter 7, contrary to previous literature that portrays Living Labs as conditions of possibility for particular outcomes (e.g. facilitating and promoting open and collaborative innovation, active user involvement, and multi-stakeholder participation in the development of innovative solutions), I argued that before any Living Lab comes to existence it is always necessary to put it in place (cf. Picard, 2017a) and it is essential to understand the conditions of possibility that make such existence possible.

Through an in-depth analysis of a single Living Lab case – Soul-NL – Chapter 7 focused on understanding how the conditions of possibility that made Soul-NL possible came to life. Building on the idea that conventional descriptions of Living Labs are simple expectations that will not always be achieved in practice (cf. Chapter 6) I suggested that other factors might play a role in understanding how and why some Living Lab outcomes turn out in specific ways.

The analysis and discussion in Chapter 7 showed that the conditions of possibility for Living Labs should not be understood as something that is given in advance (cf. Mol, 1999) but are, instead, the product of their own practices. They are performative and dependent on the specific contexts and sociomaterial practices in which a Living Lab is developed. The case of Soul-NL shows that it is necessary to look beyond simple descriptions of *who* does *what* and *when* in a Living Lab and focus on understanding *how* exactly the conditions of possibility that make a Living Lab possible assemble in practice. My analysis shows the importance of accounting for specific possibilities that may be hidden from official accounts and descriptions (e.g. official project documents) but without which Living Labs would never exist.

As found in Chapter 7, these conditions of possibility seem to manifest themselves through people, flats, houses, business interests, local government support initiatives and care organisations. However, due to their own situated nature, they could have been otherwise (Law, 1999; Woolgar, 2014) and it should not be assumed that those conditions that made Soul-NL possible (or any Living Lab, for that matter) would have been replicated if different links had been established between the same heterogenous elements. Chapter 7 also shows how, in the process of building an actor-network of heterogeneous associations, those that we may think are the most important actors in building those associations – the enrolling actors – needed to have been previously enrolled by other most powerful (even if not immediately visible) actors.

9.1.3 Interests

Finally, in Chapter 8, I drew upon ANT's notion of translation (cf Callon, 1986), with a focus on the moment of *interessement* (see also, Akrich et al., 2002a) to describe some of the negotiations, acts of persuasion and intrigues that took place in developing a Living Lab – Link-UK. The aim was to show how some of its actors needed to gain support from the other elements of the

heterogeneous network of which they were part to guide the project towards a desired path.

In this framework, establishing and sustaining an actor-network requires its enrolling actors to bring other actors to accept a particular problematization. In the case of Link-UK, it was necessary to convince a variety of actors (businesses, housing associations, local governments, telecare providers, technologies and buildings) to accept the idea that, in order to successfully deliver a new model of health and social care provision to address the challenge of independent living, Link-UK would be the right way in which to do so. This process, it was shown, requires a "perpetual search of allies" (Akrich et al., 2002a; 203-204) and Link-UK needed to "integrate itself into a network of actors" (ibid.) willing to accept, support and diffuse it.

Considering that several elements were associated in Link-UK's actor-network, I was concerned with understanding how their interests were managed, negotiated, and sustained in practice. Once again, the findings showed how, in this process of setting up a Living Lab, one needs more than bringing different actors together. In practice, one needs to acknowledge that each and every actor (whether human or non-human) in the Living Lab actor-network has its own interests and that these are being negotiated at all times within and across multiple actor-networks. As already argued, all those actors are constantly negotiating between whether to establish new alliances or maintaining or breaking with old and previously established ones.

The temporary success and sustainability of a Living Labs is thus dependent on its ability to interest as many allies as possible. However, the "art of interessement" (cf. Akrich et al., 2002a) is also situated in practice and, consequently, shaped and performed differently in its different sociomaterial contexts. Most importantly, *interessement* is not just about interesting other elements. It is, above all, trying to ensure that those elements already interested remain so.

9.2 “Oh user, where art thou?”

The quest for understanding who the user is and what its role is in the innovation process has been widespread (e.g. von Hippel, 1988; Woolgar, 1991; Oudshoorn and Pinch, 2003; Oudshoorn et al., 2004). The same is true in the Living Lab realm (e.g. Sauer, 2013; Vanmeerbeek et al., 2015; Bygholm and Kanstrup, 2017). Research has shown that when it comes to innovation the user seems to have been “configured” (Woolgar, 1991); “inscribed” into technologies (Akrisch, 1992); “imagined” (Ivory and Alderman, 2009; Ivory, 2013); taken as a “customer” (Silverstone, 2005); as “everybody” (Oudshoorn et al., 2004) and, most recently, seen as a “relational entity, expended across time, between moments of technology design and use as well as across space, from the sites of design to sites of use” (Hyysalo and Johnson, 2016: 89). Because users are active rather than passive elements when it comes to their relationship with a product or technology (Oudshoorn and Pinch, 2003; 2008) some have argued that it would be worth focusing on understanding how non-users (and non-use) are important to fully understand how the innovation process unfolds (e.g. Wyatt, 2003; Melby and Toussaint, 2016).

These efforts to try and clarify who the user (or non-user) is, how it is imagined, how it is differently represented in practices of design and use and its role as constitutive part of the innovation process seem far from being over. I would argue that these efforts are much needed if one is to truly understand innovation initiatives and processes such as those enacted in Living Labs. However, based on my experiences with Living Labs, I found that regardless of the long-lasting quest to shed light on how users and non-users may be involved in innovation processes, it was still difficult to come across users during my research. Hence, the choice of an archaic English phrase to name this section – i.e. even though the quest for the user has been long-lasting, it was still difficult to find one in practice. Also, and based on previous findings (Kommonen and Botero, 2013; Vanmeerbeek et al., 2015; Bygholm and

Kanstrup, 2017), it seems that even when users are considered to be involved in the Living Lab process they do not seem to influence much of the innovation outcome. This is interesting, particularly if one takes into account how the conventional Living Lab mantra seems to be focused in an open and user innovation paradigm (von Hippel, 1998; 2005; Chesbrough and Appleyard, 2007).

My cases seem, somehow, to have forgotten about the user. By user I mean those to whom the solutions developed in the Living Lab were aimed at (in my case, elderly citizens). I heard about them, saw pictures of them in websites, brochures and in projects workshops but I never met one. In a way, I had to imagine them. The absence of users was also noted by other elements. In Link-UK, for instance, Harvey (GP) noted that "for an initiative that is focused on the community, the fact is that today [development meeting] the community is not present". This quote is interesting as it shows the involvement of users does not happen across the entire innovation process, as one would expect from extant literature. Also, in my findings, it became clear that, in the Living Labs studied, users were simply used as testers of already developed technologies, which seemed to contradict the human-centred and needs-based approach advocated in the Living Lab literature. If Living Labs shall, in theory, be human-centred, it was interesting to realise that, in practice, it was the technology (the non-human) that ended up taking centre stage. Based on the ideas of expectations, possibilities and interests, as discussed in this thesis, I would argue that the concept of "user involvement" may, in the case of Living Labs, be better understood as a rhetorical tool with which to interest potential stakeholders and help perform a certain future, for instance, the idea that users will be actively involved in the creation of independent living solutions. However, such "expected" future may not always be possible.

A curiosity. It is usual, in the Living Lab literature, to come across the idea of "user forum" – a space designed with the aim of collecting feedback and a variety of opinions about a technology or service being tested (e.g. Ståhlbröst, 2012; Schuurman 2015). Throughout my research, some interviewees would

refer to the fact that one of the ways in which they listened to user needs was through the organisation of a "user forum". Accidentally, there is a fascinating meaning behind the use of the word "forum". In its etymology, the word "forum" means something that is outside, like a space outside a house. In the context of Living Labs, however, the word "forum" is used in the sense of an assembly, a space where users are invited to discuss a set of matters that imply them. The irony is that, from the moment some findings suggest that users have no active involvement in innovation outcomes (and when they are *de facto* absent) one may be led to believe that, in practice, users are left "out" of active participation and decision processes with their opinions and suggestions being left (and kept) "outside".

9.3 Whose voice?

In this thesis, my ambition was to understand the process of setting up Living Labs. It was the stories of their development that interested me. My aim was to voice and tell alternative stories of the process of Living Lab development and not to focus exclusively on giving voice to the silent actors in the process (as discussed in section 5.7, above, some of these actors were not yet present, making it impossible to listen to them).

It may be argued that those actors I spoke with were powerful and that, due to their executive positions, they were telling me stories of a particular version of the Living Lab. Those actors, however, were not powerful in the sense of determining the fate of the Living Lab. Yes, their position enabled them to achieve goals that other actors were not able to achieve. However, throughout my conversations and data analysis I maintained a healthy scepticism.

It was clear that I could not take the stories I was being told at face value. Honesty was probably not the first aim whenever those actors engaged in conversations with me. Their situated roles and positions in the Living Lab

(and elsewhere) would make their version of events partial and political. However, even if those perspectives were political, they were also more informed. Consequently, I could not ignore them.

The actors I spoke with were key witnesses of the development of each Living Lab from the very beginning. Because of that, they were able to witness more than other actors. For instance, it is fair to assume that the manager of a project that lasts five years and who is there from the very beginning has more knowledge of the nitty gritty of developing that project than a citizen who only engages twice a month to test / use a product or service. However, they do not articulate all the perspectives in the project.

Due to their roles in the projects, those actors would always speak about the project and other actors in particular ways. Previous Living Lab studies showed exactly that and focused simply on reporting the development of these projects in an uncritical manner (see, for example, Schuurman et al., 2015 for a criticism). In this thesis, however, I did not limit myself to accept and report their views. I critically reflected and interpreted those accounts in order to voice new and alternative stories: stories showing that, at times, the process of setting up a Living Lab does not follow a straightforward path leading to open innovation, collaborative innovation efforts or participatory arrangements. Even though the actors I spoke with could not, on their own, determine the fate of a Living Lab they were still a very important part of its sociomaterial fabric. As such, they were part of the heterogeneous links that constitute and help to make the Living Lab.

Finally, as already pointed out, the Living Lab is never a thing in itself. It needs to be made up. And all the stories I listened to were also a way to make up a Living Lab. As constitutive elements of the Living Lab those actors (and their stories) would not destroy what they were trying to make.

9.4 Contributions.

In the last chapter of her book, Jeannette Pols notes that her results should be taken "as suggestions and possibilities for discussion rather than directives of probabilities. They are local rather than universal facts, food for thought rather than final conclusions" (Pols, 2012: 147). I would like to make a similar argument with regards to my findings. From the beginning, and in line with ANT, sociomateriality and their performative idiom, it was clear that this research would not be about "refutation – proving that the other social theories are wrong – but (…) proposition" (Latour, 2005a: 12). More than catching reality as it was (cf. Mol, 2010) my aim was to make "specific, surprising (…) events and situations visible" (ibid.: 255). To use Flyvbjerg's (2001; 2006) insight, I was in pursuit of "black swans" in the field of Living Labs. I hope my research effort paid off and would like to highlight three contributions that appear to stand out.

9.4.1 Theoretical.

The first contribution of this thesis is theoretical. The use of ANT and sociomateriality as theoretical lenses to the study of Living Labs is an opportunity to look at Living Labs beyond the seeming influential open and user-centred design paradigms in which most research has been framed. I called for a theoretical perspective that acknowledges the importance of using different frameworks in the study of social science phenomena, where one may be encouraged to learn from them (cf. Baert, 2005; 2013).

The performative and relational idioms of ANT and sociomateriality did offer a much-needed way of interpreting Living Labs not as something that exists in and for itself, but as something situated in practice, made to exist through the different links established between a set of heterogeneous elements in their different sociomaterial contexts. Because of this, the stability of Living Labs is never assumed and they could always be otherwise.

Consequently, some of ideas whereby Living Labs are presented as best practices for innovation are flawed because, as my findings suggest, Living Labs will inevitably be (per)formed differently by different actors in different contexts.

The idea of Living Labs as actor-networks and sociomaterial assemblages is appealing as it allows one to shift our research focus towards an understanding of how the heterogenous elements that constitute them are brought together in practice. The sociomaterial approach is not better or worse than other approaches but it seemed better suited to shed light on the enactment of specific and situated Living Lab practices. Throughout this research, such an approach allowed me to view Living Labs as dependent on the establishment of heterogeneous relationships between social (human) and material (non-human) elements. This constitutes a new way of looking at a phenomenon, which has been extensively studied with a focus on simple descriptions of *who* does *what* and *when* in the process.

9.4.2 Methodological

The second contribution is methodological and follows from the previous one. Taking the view that Living Labs have a situated and context specific nature, it is thus necessary to contest the seeming accepted research tendency that focuses on describing what they are, which actors play a role in the innovation process or which guiding principles appear to organise them (cf. Hakkarainen and Hyysalo, 2016). That type of research, although important, seems to lack both the theoretical complexity and thick descriptions that allows one to gain an in-depth understanding of the phenomenon by answering questions aimed at explaining "*how*, *why*, and when things happened" (Gregor, 2006: 619; emphasis mine).

Influenced by an "ontological politics" (cf. Mol, 1999) view of method, I attempted at breaking the methodological mould of the extant Living Lab

research and took the view that Living Labs do not have "reality or form outside the enactment" (Law, 2009: 141) of the heterogenous sociomaterial relationships that make them. This led me to a choice of qualitative methods that could provide me with an in-depth account of how Living Labs are set up. This was also a way in which to contest what for me seemed to be a methodological bias in the existing Living Lab research (e.g. Leminen et al., 2012; Ståhlbröst, 2012; Nyström et al., 2014). Regardless of that type of research claiming to adopt a qualitative research strategy, and independently of their use of interviews and case-studies as their respective methods and designs, their results are usually presented in ways more compatible with a quantitative approach (e.g. by creating typologies of Living Labs users, their actors and guiding principles).

9.4.3 Practical

Lastly, a contribution for practice, which should help to inform all those involved in the creation of Living Lab initiatives (e.g. local governments; businesses; universities; health and social care providers) and help them reframe some of the accepted and uncontested ideas surrounding the phenomena (e.g. Living Labs as promoting collaboration and active involvement of users in innovation processes).

It starts with recognising that, in the process of setting up a Living Lab, one cannot simply be focused on replicating successful models as best-practices. The adoption of a Living Lab model will not, on its own, produce a specific set of outcomes (e.g. multi-stakeholder collaboration, open innovation or active user participation). Also, it is important to acknowledge that both human and non-human actors play important roles when it comes to designing a Living Lab. In this thesis, we have seen how some of these actors can take the form of local authorities, housing associations, policy documents, expectations, flats, technology and even rain.

The findings of this research also show that Living Labs are not made in a unified way. Instead, they are performed differently by their constitutive elements in different contexts and, as a research phenomenon and enacted reality, they are messy, multiple and made in multiple ways (Law, 1999; Law and Singleton, 2000; Mol, 2002). They are not an "ordered ground separate from practices and their relations" (Law and Lien, 2013: 366). Their order is provisional and a result of specific "practices and their ordering relations" (ibid.). Due to their situated nature, their outcomes are unpredictable, and their seeming stability is dependent on a set of temporary links, established between a set of heterogeneous elements, that can be contested at any time and could always be otherwise (Law, 1999; Woolgar, 2014).

Living Labs may, in fact, be considered as an "effect of materially, socially and conceptually hybrid performances" (Law and Singleton, 2000: 774), where heterogenous actors assemble and act in specific ways to produce specific consequences (ibid.: 774). In line with Law and Singleton (2000), Living Labs are thus performances which take place in the context of other performances, interacting "with enactments of older performances – to mimic and reaffirm them, or perhaps to interfere with them and suggest alternatives" (ibid.: 774). Their failure to perform, one may argue, is due to an inability to enrol the right actors.

It is thus important to acknowledge that setting up a Living Lab is not only about bringing different actors together. It is about bringing together different actors, where each actor has its own interests, and where these interests are negotiated, at all times, within and across multiple actor-networks.

9.5 Relevance of Findings.

It is important to highlight that this thesis goal was not to simply offer a criticism of the popular discourses surrounding Living Labs and the wider research field. It was important, however, to critically analyse these narratives and contest some of its underlying premises to understand that Living Lab practices end up evolving in various ways.

The important thing to acknowledge is that regardless of some potential mismatch between the theory and practice of Living Labs (as discussed throughout this thesis) they are still important and play an important role when it comes to bringing different actors together to try and develop innovative solutions to issues such as improving society and healthy ageing.

The findings of this thesis may help to inform Living Lab initiatives and the research field in the following ways:

(1) In research terms, these findings show that to look at Living Labs as initiatives that are situated in practice and dependent on the contexts in which they are developed helps to better account for differences in these practices. Instead of expecting Living Labs to always guarantee open innovation, collaboration and citizen participation, one should take these potential outcomes as useful rhetorical tools and expectations that even though may not materialise in practice are important in helping to perform a certain future (e.g. good ageing).

(2) For policy makers, these results may be useful in contesting the seeming idea that Living Labs are best practices of innovation. By challenging the current view, this thesis showed how Living Labs may be better understood as useful practices. As useful practices, the nature of Living Labs is contextual and provisional, and they are generated by people's activities in their own particular situations. As such, they cannot be successfully applied across diverse contexts.

(3) In terms of funding, these results may help to shed some light on the need to find alternative ways of funding these projects. As already pointed out, Living Labs are important initiatives. However, when it comes to funding, it seems that this is one of the most important factors to guarantee both the existence and sustainability of Living Labs. Also, some actors (e.g. businesses) feel compelled to join a Living Lab project if they sense that funding may be available to improve their businesses. This, however, goes against the idea of Living Labs as places of cooperation where a common societal goal is to be reached more than attending to individual interests of specific stakeholders. My findings showed how important it is for these projects to be open from the beginning and how the innovation landscape is changing. So should the funding structure. Perhaps the funding may appear later in the process, once the projects are already up and running. It also seems necessary to create an awareness in those participating actors of the importance to be open in such projects from the very beginning as well as to create a network of stakeholders willing to take risks and help contribute to solve a wider societal problem more than an individual need.

(4) To those assigned with the task of setting up a Living Lab project, the findings of this thesis should help with acknowledging that diversions from the norm are to be expected and that does not necessarily mean that the project is a failure.

(5) Finally, when it comes to the involvement of users this should be a requirement made clear from the very beginning in the project's life cycle. By making sure citizens and potential users are present from the very beginning in thinking and developing potential solutions to a problem that affects them directly, one is closer to guarantee that the

nature of the Living Las is truly collaborative. Otherwise, the risk remains that one will be left with yet another project where users are simply testers of previous devised solutions.

9.6 Limitations and further research.

The most important limitation may relate to the way in which data was collected. If it seemed appropriate to investigate those Living Labs where the phenomenon of study was most likely to take place, it was also true that this study may have been limited by the fact that only those cases available to be studied were followed. This created a situation in which only "snapshots" of reality were observed. Some may even argue that only the voices of powerful actors were listened to (cf. Star, 1991; Verhaegh et al, 2016). In fact, as already discussed in this section, the user seemed to have been absent in all the cases. However, even if my data is partial, my use of it is thorough and I hope I can persuade you. My suggestion is thus that future research could extend the understanding of setting up Living Labs in both longitudinal and ethnographic terms. Even though some of my cases were investigated across time, I am aware that this was not done in classic ethnographic terms, which may have influenced the true understanding on how the phenomenon could develop and transform across time. I am aware of the potential challenges in terms of access to the field, but it would be important to gain an in-depth insight of how the phenomenon evolves as well as allowing for the researcher to be part of the reality in a more continuous manner. I would, however, suggest that the Living Lab field continues to be explored using a performative and relational approach such as the one used in this thesis (ANT / Sociomateriality), as it allows to account for different practices of Living Lab based on their situated practice. It would then be interesting to focus in a detailed analysis of some of the factors just hinted at in this research, namely the idea of expectations, conditions of possibility and interests.

9.7 Summary

If it is true that artifacts have politics (Winner, 1980), I would argue that the same holds true for Living Labs. They are portrayed as real-life, open, collaborative and user-centred innovation arrangements. This, however, may be simply seen as a 'political' effort to enact particular forms of ordering the Living Lab field (Law and Urry, 2004). In practice, they do not seem to be so.

The prescriptive ways in which earlier research promotes Living Labs as guarantors of predetermined results (e.g. more user involvement, open innovation and collaboration; see Bergval-Kåreborn el al., 2009; Westerlund and Leminen, 2011; Ståhlbröst, 2012; EnoLL, 2014; Leminen, 2015a; Schuurman, 2015; Baccarne et al., 2016) were not replicated in this thesis.

Those descriptions and expectations may travel from hand to hand (Law, 2006) or, as seen in this thesis, from land to land. Eventually, they may end up being accepted as the underlying ethics of Living Labs. However, it may be argued that those conventional views are nothing more than persuasion tools, produced by "research communities" (Brown, 2003: 289) seeking "to raise the profile of their work" (ibid.) to convince potential stakeholders of the benefits of the approach. However, and this was my argument, their seeming performativity is non-deterministic since the futures they help to perform often fail to live up to the expectations that created them.

If Magritte were to paint a Living Lab, I risk the caption would read: "Ceci n'est pas une Living Lab" (This is not a Living Lab). I do believe that the quest for a common definition, typology or orderly ground of Living Lab is a way to constrain the Living Lab concept within a certain version, forgetting its local and situated nature. For that reason, I looked at Living Labs through an ANT and sociomaterial lens, asking *how exactly* they were set up. The findings of this research suggest that the extent to which Living Labs are open, participatory and democratic arrangements can never be taken as definite

outcomes. Instead, they are the product of the heterogenous relationships established between different elements, in different contexts and at different moments in time. Also, as actor-networks, Living Labs do not exist in a vacuum. They are part of wider contexts of influences and actor-networks that need to be brought together, and that may include heterogenous elements such as: existing research literature; political initiatives; documents promoting public participation; structural funds supporting the development of solutions for an ageing population; buildings; local authorities; businesses; care technologies; or citizens.

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Appendix 1

The Living Lab.

- Describe the Living Labs activities.
- What are its objectives?
- Why was it formed? (e.g. Social need? Funding available? Government? Private?)
- Who is involved in making it a reality? Examples (Type of organisations, SMEs)
- How are the participants selected and how is the network built? EXAMPLES
- How are the relationships between the Living Lab and other similar initiatives?
- What are the challenges for the future?
- Is the Living Lab a sustainable initiative?
- What are the follow up plans stemming from this experiment?

User-Producer / Participation.

- How would you describe your role in the system?
- Who are the users? How were they selected? Examples.
- What solutions are being produced / worked on? (Services / Products?)
- How do you assess user needs?
- What happens to the information you collect from users?
- Who participates? Who started? Who comes in? Who goes away?
- Challenges for learning.
- Who learns? (SMEs, Gov, users)

Decision Making

- Who decides which solutions go forward?
- Who is responsible for making them a reality?
- How would you describe the process of selecting a “good” solution? Examples
- What would you say your role is in this process?
- Do users decide?

Community

- What are/is the people / Living Lab developing?
- Are these players aware of their role in the Living Lab?
- Was it agreed beforehand?
- Do they know why they are involved in this?
- What is the interaction between your work and the community? Examples
- Who would you say is served by / takes advantages of the Living Lab / initiative and its products? (SMEs / Users / local governments / Community)
- How are the relationships managed? (By whom? By no one?)

Appendix 2

According to Braun and Clarke (2006: 87) the six phases of thematic analysis are as follows:

"1. Familiarizing yourself with your data: Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.

2. Generating initial codes: Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.

3. Searching for themes: Collating codes into potential themes, gathering all data relevant to each potential theme.

4. Reviewing themes: Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.

5. Defining and naming themes: Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.

6. Producing the report: The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis." (Braun and Clarke, 2006: 87).

Appendix 3

Approval letter from Faculty Research Ethics Panel.

Anglia Ruskin University

Cambridge Chelmsford Peterborough

19 February 2015

Dear Ricardo

Project Title: **User involvement in the development of independent living solutions: decision-making and the making of publics. The case of living labs.**

Principal Investigator: Ricardo Jose Dias Carolas

I am pleased to inform you that your ethics application has been approved by the Faculty Research Ethics Panel (FREP) under the terms of Anglia Ruskin University's Research Ethics Policy (Dated 23/6/14, Version 1).

Ethical approval is given for a period of three years from the date above.

It is your responsibility to ensure that you comply with Anglia Ruskin University's Research Ethics Policy and the Code of Practice for Applying for Ethical Approval at Anglia Ruskin University, including the following.

- The procedure for submitting substantial amendments to the committee, should there be any changes to your research. You cannot implement these amendments until you have received approval from FREP for them
- The procedure for reporting adverse events and incidents.
- The Data Protection Act (1998) and any other legislation relevant to your research. You must also ensure that you are aware of any emerging legislation relating to your research and make any changes to your study (which you will need to obtain ethical approval for) to comply with this.
- Obtaining any further ethical approval required from the organisation or country (if not carrying out research in the UK) where you will be carrying the research out. Please ensure that you send the FREP copies of this documentation if required, prior to starting your research.
- Any laws of the country where you are carrying the research and obtaining any other approvals or permissions that are required.
- Any professional codes of conduct relating to research or requirements from your funding body (please note that for externally funded research, a Project Risk Assessment must have been carried out prior to starting the research).
- Completing a Risk Assessment (Health and Safety) if required and updating this annually or if any aspects of your study change which affect this.
- Notifying the FREP Secretary when your study has ended.

Please also note that your research may be subject to random monitoring.

Should you have any queries, please do not hesitate to contact me. May I wish you the best of luck with your research.

Yours sincerely,

Appendix 4

Participant Consent Form

PARTICIPANT CONSENT FORM

NAME OF PARTICIPANT:

Title of the project:
User involvement in the development of independent living solutions: decision-making and the making of publics. The case of living labs.

Main investigator and contact details:
Ricardo Jose Dias Carolas

Supervisory Team and contact details:
Professor Chris Ivory
Professor Ruth McNally

1. I agree to take part in the above research. I have read the Participant Information Sheet which is attached to this form. I understand what my role will be in this research, and all my questions have been answered to my satisfaction.

2. I understand that I am free to withdraw from the research at any time, for any reason and without prejudice.

3. I have been informed that the confidentiality of the information I provide will be safeguarded.

4. I am free to ask any questions at any time before and during the study.

5. I have been provided with a copy of this form and the Participant Information Sheet.

Data Protection: I agree to the University[1] processing personal data which I have supplied. I agree to the processing of such data for any purposes connected with the Research Project as outlined to me*

Name of participant (print)……Signed……Date…07/12/2015…

YOU WILL BE GIVEN A COPY OF THIS FORM TO KEEP

If you wish to withdraw from the research, please complete the form below and return to the main investigator named above.

Title of Project:

I WISH TO WITHDRAW FROM THIS STUDY

Signed _____ Date: _____

[1] "The University" includes Anglia Ruskin University and its partner colleges

Appendix 5

Dear **Ricardo Jose Dias Carolas,**

This is to confirm that I give permission for you to collect data about our organisation as part of the fieldwork of your PhD in Business at Anglia Ruskin University.

Working title of research:
User involvement in the development of independent living solutions: decision-making and the making of publics. The case of living labs.
SID: 1234568
Institute: Institute for International Management Practice
Department: Lord Ashcroft International Business School
University: Anglia Ruskin University
Location: Cambridge, UK.

- I understand the scope of the study as well as the methods used for data collection (e.g. interviews, analysis of websites / available documents, etc)
- I understand that, by giving this permission, I am granting you the use and ownership of data collected.
- I understand that you will write up the results for your degree and you may disseminate findings at Anglia Ruskin University and elsewhere, including for publication.
- I give permission for our organisation to be named in dissemination.

Yours sincerely,

Name: [redacted]

Title: president of the board

Date: 20th October 2015

Letter of permission to conduct research