The role of soft skills to leverage co-creation in living labs: insights from Spain

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ABSTRACT

Living laboratories (labs) have emerged as increasingly relevant open innovation frameworks, first in the private sector and, more recently, in the public sector. The role of a living lab is to spur service co-creation based on the rather interactive nature of labs, but traditionally service co-creation has been addressed from a user-centric perspective. Nevertheless, the contribution of front-end living labs employees in leveraging co-creation has not been properly addressed, especially in terms of the required skills and the role played by public leadership. In this context, the aim of this paper is to explore the role of a set of particular skills (i.e. soft skills) that front-end employees should be equipped with in order to spur co-creation in living lab activities. The analysis is performed against the backdrop of relational leadership, which is able to gather together concepts traditionally dispersed and isolated such as co-creation and skills. Results point out that the types of soft skills (i.e., personal, social, content/methodological) seem to be associated with the type of users targeted at the living lab; e.g., personal skills, such as self-control or conflict management could be especially relevant in those living labs where end-users are mentally impaired individuals. Notwithstanding, the final balance between different soft skills needs to be elucidated on a project basis. To do so, evidence based on interviews and ethnographic observation was obtained in three different Spanish public-oriented living labs. Although the results are exploratory, there may be implications for the delivery of public value and public services.

Key words: living labs, co-creation, soft skills, front-end employees, relational leadership

Living labs as co-creation activities

No specific definitions are used in the literature for living but the definitions in use appear to have similarities with other experimental innovation frameworks (Fuglsang and Hansen, 2019a). An ever-growing stream of research contributions with a focus on living labs have emerged recently (Gascó, 2017; Schuurman and Tõnurist, 2017), emphasizing their role as tools for service co-creation and co-production (Nesti, 2017) across varied norms and practices (Gascó, 2017). Thus, "living labs can be described as a methodology of innovation that enables collaborative learning by users, producers and researchers in a real-life environment, in which user-needs are central" (van Geenhuizen, 2018). Living labs first flourished in the private sector services (Sundbo and Sørensen, 2014), but have also started to emerge in the public sector (Burstein and Black, 2014; Carstensen and Bason, 2012; Gascó, 2017; Tõnurist, Kattel and Lember, 2015) where their importance as levers of value creation is gaining momentum.

In accordance with this co-creative role, the literature distinguishes at least three types of living lab environments (Fuglsang and Hansen, 2019a): 1) living labs as "semi-realistic environments," where new technologies or new services can be explored by involving end users (Følstad, 2008); 2) living labs as real-life environments, where "sense making" processes take place through experiential learning leading to a better understanding of the (…) service adoption behaviors by users (Lehman, Frangioni and Dubé, 2015), and 3) living labs as networks or linking/interaction spaces. Under this latter interpretation, stakeholders form public–private–people partnerships (4Ps) of companies, public agencies, universities, users, and other stakeholders that are "all collaborating for creation, prototyping, validating, and testing of new technologies services, products, and systems (…)" (Leminen, 2013).

Although the above definitions focus on different aspects of living lab environments, the role of users as key players in the co-creative relationship is considered an underlying element. In reality, the user-centric character of living labs is emphasized in many definitions of living labs. Major examples are Eriksson, Niitamo and Kulkki (2005), Gascó (2017) and Eskelinen et al, (2015), who emphasize their role as user-centric innovation environments where creators, managers, and users can participate in co-creating innovations enabling social and economic impact.

In this context, one may wonder what makes these interactions more or less fruitful. In other words, what are the optimal conditions spurring expected outcomes and impacts derived from co-creation practices? In this regard, the majority of research in the field of value co-creation has focused in the voice and the role of customers (Schuurman et al, 2015; Amin, Ghazali and Hassan, 2020) to optimize co-creation, but to our knowledge scant evidence has been obtained regarding the rest of the stakeholders involved, especially service producers (Heinola, 2012). Some research has been undertaken with respect to the main responsibilities of service providers, concluding with the importance of building trust and striving for a high value outcome by being a committed partner and accumulating expertise (see Toivonen, 2004; Bettencourt et al, 2002; Ballantyne and Varey, 2006).

Besides, the continuing exiguous contributions on the role of service providers are focused on private services, whereas public services have not been addressed in the same vein. This is quite striking, as co-production is currently one of the cornerstones of public reform across the globe, articulated as a valuable route to the planning and delivery of effective public services (Osborne, Radnor and Strokosch, 2016). In fact, co-production in public services is an essential component of service delivery that does not need to be built-in on an *ad hoc* basis, as it occurs whether or not it is chosen, whether or not actors are aware of it, and/or whether or not the public service encounter is coerced (Osborne, Radnor and Strokosch, 2016).

After this introductory review on the concepts of living labs and co-creation, the next section is focused on the concept of relational leadership as the anchor allowing a linkage between co-creation in living labs and the skills issue. Following the framework, the methodology and short descriptions of the case studies, stressing selection criteria, basic information on each case is provided. The next section is devoted to explaining the roles of living lab employees in co-creation, fundamentally in terms of the most relevant skills and capabilities required. The fifth section contains the main discussion on soft skills as the most needed skills, irrespective of the major differences existing among the three case studies. The paper ends with some conclusions and perspectives.

Relational leadership, co-creation and soft skills in the public service domain

The role of public service providers as co-creation drivers draws upon the concept of leadership, even though it has received little attention. This lack of interest may respond to different reasons, such as the infancy of the co-production concept, or the challenges explaining the process of leadership in the co-production of public services using mainstream models of public leadership (Schlappa and Imani, 2015).

Co-creation is interpreted as a relational and interdependent process, and accordingly, it seems to be at odds with the existence of *leaders*. Yet, where co-production takes place and is a declared aim, answering the question of "who is in the lead" becomes essential to surface collaborative practices, evaluate them and develop guidance on effective practices that boost co-production (Schlappa and Imani, 2018).

Traditional transactional perspectives on leadership are concerned with efficiency and effectiveness and are rooted in the realms of linear and mechanistic manufacturing processes (Osborne, 2010) and rational/instrumental approaches. Embraced by the paradigm of the New Public Management (NPM), transactional leadership has very limited application to the concept of co-creation. Co-creation is best understood from the perspective of other leadership approaches, transformational leadership being one of the most important. Transformational leaders have the ability to inspire followers to envision the future (Kark and Shamir, 2002), involving public service consumers into co-productive trajectories. Yet, transformational leadership is primarily concerned with the management of organizations and not with the interactions that occur between regular and citizen co-producers (Schlappa and Imani, 2018). In this sense, distributed leadership is a more appropriate and precise setting, as it advocates a model of less formalized leadership where citizens and service providers share responsibilities, thus stressing concepts of transparency, responsiveness or interdependence (Bolden, Petrov and Gosling, 2008).

Nevertheless, the concept of distributed leadership is not totally suited to the practice of co-production in public services either, and some conceptual and practical challenges arise. In particular, the consideration of two different actors (i.e., service provider and service user), who have different motivations and expectations and are bound by organizational controls in different ways. Accordingly, the relational perspective on leadership, which is based on the distributed approach, provides conceptual tools to examine aspects, such as motivation, that are crucial to understanding collaboration among actors who aim to accomplish something together (Hosking et al, 2012). This type of leadership is better equipped to appreciate the critical role played by stakeholders of all kinds in delivering the common good (Hart, 2014), and accordingly, in developing the necessary capacity to address complex problems and to achieve collective goals in the public domain (Goldsmith and Eggers, 2004).

Relational leadership can be an anchoring concept in understanding the skills necessary for the provision of co-created services in living labs. Leadership is associated with the main skills required by front end living lab employees to produce successful and fruitful co-productive interactions leveraging optimal public service delivery and innovation. The traditionally elusive concept of *skill* is referred to here as competency and is therefore identified with the essential attributes of employees (knowledge, skill, behavior, mindset) required to spur co-creation dynamics. Living labs facilitate co-creation requiring a certain level of leadership and competences that go beyond traditional hard skills, such as language

skills, technical or programming/computer skills. In fact, value co-creation opportunities that rely on existing skill sets of employees may help to manage the resource burden of value co-creation (Loades, 2018). This result is particularly true in the case of living labs. It is noteworthy that living labs are but one particular setting where co-creation takes place. As an example, the focus is not on *service providers* but rather on *employees* (i.e. living lab employees), and more specifically, on *front-end employees* (i.e. employees that are in contact with living lab users) to produce co-creation dynamics.

Relational leadership blends particularly well with a particular type of skill, namely soft skills. Soft skills are often defined against hard skills, that comprise capacities that workers acquire through education, work experience, education, or training. These kinds of skills are very specific, varying from job to job. Hard skills are essential to performing the technical specifications of a particular job. On the other hand, soft skills comprise other kind of capacities related to essential human qualities such as intuition, creativity, passion, responsibility and kindness, courage, and self-awareness. Soft skills are determinant in all businesses and the public world and they apply to all disciplines; they are occasionally identified as *interpersonal* or *people* skills, which allow an individual to relate to others successfully (Cimatti, 2016; Andreas, 2018). Employee hard and soft skills are both essential in the co-creation process (Tsey et al, 2018; Morris, Vanino and Corradini, 2019).

Soft skills have been labelled with a wide array of names and different frameworks have been put forward to tackle them (Cinque, 2016). In fact, some taxonomies, such as the one advocated by Haselberger et al, (2012), distinguishing among personal, social and content-reliant/methodological skills have been suggested. A fairly general agreement has arisen about the crucial role that these skills are (currently) playing and will be playing in the future. In fact, they should be acquired by all citizens, in order to ensure their active participation in society and the economy, taking into account their role as major drivers of change (see, for example, Author, 2015; Bartel, 2007; Deming, 2017). Both soft skills and co-creation are particularly important in relational leadership in living labs (Fuglsang and Hansen, 2019b) and relational leadership, in turn**,** may help orchestrate the role of soft skills in spurring co-creation dynamics.

Methodology

This section describes the methodological underpinnings of the study. The case selection criteria are described, as well as basic information about the living labs making up the case studies and the analytical approach followed.

To explore the relationship between living-labs, co-creation, leadership and soft skills, three case studies based in Spain and representing rather different public service living labs were undertaken, namely:

- Intras Foundation-Ides Living Lab. This is a private NGO primarily based in Castile-Leon in north-western Spain that was founded in 1994 and is aimed at helping people suffering from mental illness and cognitive impairment to restore their life project through the delivery of an integral circuit of care resources and services and the deployment of different research and development and innovation (R&D&I) activities;

- Guadalinfo-Fernando de los Ríos Living Lab. This is a massive network based in Andalusia in southern Spain since 2003 that has greatly evolved from a digital literacy-based network focused on small municipalities and urban disadvantaged areas to a powerful tool spurring social innovation and the empowerment of citizens;

- Library Living Lab. This is an open participatory experimentation and co-creation space situated in the Miquel Batllori public library, in the municipality of Sant Cugat del Vallés, Barcelona in north-east Spain.

Case selection criteria

Four main criteria were agreed upon by the Co-VAL partners[1] in the selection of cases, informed by both a review of the literature and especially the literature on public value. As Fuglsang and Hansen (2019a) point out, their literature review on living labs reveals that the concept and usage of living labs is diverse and to some extent blurred. Nevertheless, living labs are usually described along several dimensions and accordingly some continuums may be identified. As such, living labs could be grouped as: contextuality (small-large scale services), institutional boundaries (inspired by the distinctions made by Leminen et al (2012) among utilizer-driven, enabler-driven, provider-driven, and user-driven living labs), organization (formalized-less formalized and single-networked organization), and time frame (short-term or long-term change agents facing societal challenges).

The criteria were built to embrace cases that illustrate the ends of each the outlined continuums:

1. Selected by public service characteristics: Large-scale services (e.g. street lighting, water and sewerage, supporting citizen welfare broadly) or "small-batch" services (e.g. childcare, elderly care).
2. Selected by sector/actors: Public organized (municipality/municipal department), Civil society (citizens/NGO.) or privately organized (company/entrepreneurs).
3. Selected by organizing: Formalized/less formalized and/or networked/single organization.
4. Selected by temporal aspects: Initiatives targeting short-term challenges or initiatives targeting long-term challenges/next generation.

Based on the above, the cases have been selected to ensure that they address public value and work with citizens in different ways. Table 1 summarizes the case selection criteria logic for the three case studies undertaken in Spain.

[1] 21 in-depth case studies across nine EU countries were undertaken under Task 2 - WP5 (*In depth case studies of how living lab approaches are used for co-creation and co-innovation*) from H2020 Co-VAL Project. The aim of Task 2 was to explore what innovation and living lab approaches tell about introducing new open institutional structures of innovation in real-life settings for co-creation and co-innovation of public services.

Table 1: Case selection criteria

Case	Intras Foundation- Ides	Guadalinfo Consorcio Fernández de los Ríos	Library Living Lab
Service characteristic	Small batch: elderly and mentally impaired individuals	Small batch: rural areas and marginalized neighborhoods from urban areas.	Small batch: library users, but likely to be scaled up (the initiative is to be implemented in the Library Network of Barcelona Provincial Council).
Sector/actors	Civil Society (NGO—Intras Foundation)	Public Sector	Public Sector
Organization type	Formalized and single organization. But strong links with different stakeholders (care providers, technology-based companies, technology research centers). Regional government also plays a relevant role	Public-law entity monitored both by the Ministry of Economy, Innovation and Science of the Andalusian Regional Government, as well as the eight Andalusian Provincial Councils. Citizen participation mainly revolves around Guadalinfo users. Networked organization (i.e. Guadalinfo is a network) and not quite formal.	A citizen-initiated grassroots project that has become a rather networked/joint collaboration project. An example of a quadruple helix: Public Administration (City of Sant Cugat, Provincial Council of Barcelona, University/research institutions (Autonomous University of Barcelona-Computer Vision Center), citizens (Neighbors' Association of Vollpelleres and (increasingly) the business sector.
Time perspective	Long term: mental health and aging at the crossroads of the profound and long-term socio-economic changes taking place in modern and developed economies	Both short and long term as many issues are tackled; e.g. e-Administration, Digital Administration and (social) innovation/entrepreneurship may apply to both timeframes	Long term: the library as a space to explore new methods and tools to enjoy culture both individually and collectively, in that the technology is an enabling factor.

Source: Authors, based on information provided by the case studies

Basic information on living labs selected

Intras Foundation-Ides (Castile-Leon). Intras Foundation is a private NGO that was established in 1994 thanks to the efforts of professionals strongly involved with individuals suffering from mental illness and cognitive impairment. The main goal of Intras Foundation is thus helping those individuals restore their life project through the delivery of an integral circuit of care resources and services and the deployment of different R&D&I activities. This integral circuit of care resources involves a) prevention/intervention/rehabilitation; b) monitoring and evaluation; c) education and training; d) self-management and self-empowerment; e) fight against stigma; f) labor integration; g) management and coordination.

Ides is the *spin-off* of the Intras Foundation and was born with the basic aim of promoting knowledge transfer through different activities, such as training, the development of care-based technologies, the promotion of the usability lab and the Ides Living Lab, whose activity is the core of the present analysis.

Guadalinfo-Consorcio Fernández de los Ríos (Andalusia). Guadalinfo was set up in 2003 with the basic aim of providing public broadband Internet access and Information and Communication Technologies (ICT) uptake to the whole region of Andalusia including the most remote areas. The initiative was implemented by the Service for Access to the Information Society within Andalusia's Ministry of Innovation, Science and Enterprise and targeted, in particular, towns of less than 20,000 inhabitants (initially less than 10,000 inhabitants) and neighborhoods located in the most under-populated and disadvantaged areas of Andalusia. Further, Guadalinfo was born to foster social cohesion and regional development by minimizing both the urban-rural divide and the emergence of exclusion in processes of innovation. The project is organized as a massive network with a strong degree of capillarity and around 770 centers are operating throughout Andalusia.

Guadalinfo network is mostly funded by the Andalusia Regional Government (Junta de Andalucía), which provides 66.7% of total funds, whereas the eight Provincial Councils provide the remaining 33.3%. As a conclusion, the network is 100% public owned, and it is managed by the Fernando de los Ríos Consortium, which in turn is owned by the Andalusia Regional Government (50%) and the eight Provincial Councils (the remaining 50%). The Consortium provides strategic support and guidance, network capabilities, technical equipment, training, projects and innovation.

Guadalinfo has greatly evolved from a digital literacy-based network to a powerful tool spurring social innovation and the empowerment of citizens, thus unleashing fruitful processes of co-creation. This shift reinforces the pioneering role of Guadalinfo, the strong value as a network and the profound embeddedness in the Andalusian society. The 770 centers making up the network may be strictly considered living labs.

Library Living Lab (Catalonia). Library Living Lab (L3, hereinafter) is an open, participatory, experimentation and co-creation space situated in the public library Miquel Batllori, Sant Cugat del Vallés, Barcelona, Spain. Sant Cugat del Vallés is a privileged and well-connected municipality surrounded by a beautiful landscapes, innovative companies and strong academic institutions.

Case study design and field work

Living labs are typically researched as either single or multiple case studies (Dekker, Franco-Contreras and Meijer, 2017), and mixed methods prevail, including qualitative interviewing, focus groups and observations coupled with data logging and surveys (Liedtke et al. 2012). Building on their evidence and on the need to both illustrate cases among the selection criteria and keep comparability with living lab cases being explored within the Co-VAL project (public-oriented living labs), the three Spanish case studies were selected to generate knowledge about how innovation and living labs bring actors together and carry out citizen-based. innovation in real-life settings while also contributing to public value generation in terms of service quality and efficiency, public trust and social inclusion.

The case studies were based on a shared Co-VAL protocol to ensure consistency in conducting and analyzing the cases by each partner (see Fuglsang and Hansen, 2019b, for

details). The case studies were subjected to a cross-case analysis, focusing on how each case adds to and reveals insights regarding the overall unit of analysis: living labs in the context of public sector innovation.

In keeping with the Co-VAL protocol, the three Spanish case studies were conducted using a qualitative research methodology applying semi-structured interviews (see template in Appendix I) and participant/ethnographic observations to complement the evidence obtained during the interviews. In the three cases, a comprehensive review of internal and external documents relevant for the analysis was also conducted.

Before the interviews, potential participants, represented by the director/general manager of the living lab or the organization hosting the living lab, were contacted and informed about the scope of the project and their role in the interviews. Thus, sufficient details were provided for the participants to make an informed decision about whether to take part in the research and positive answers were obtained from the three living labs contacted. Field visits were made between the end of February 2019 and early June 2019 and were recorded with participants 'permission. Recordings allowed the inclusion of some informant quotes throughout the paper.

The interviews addressed a wide array of topics centered around living labs and only a fraction of the evidence, i.e. that related to the role of living lab employees in co-creation, was considered for this paper, in question number five as shown in the appendix. Nonetheless, the relevance of front-end skills and capabilities arose as a relevant topic during the interviews. Although they were not a question in the Co-VAL protocol, they were specifically introduced in the field work for the Spanish cases in order to produce this research. Interviews were undertaken and recorded in Spanish and quotations in the next section were selected from the full set of quotes, after translation into English.

The Intras Foundation-Ides interview took place the 26th of February 2019 at Ides' premises. Semi-structured interviews were undertaken with two living lab managers (e.g. Ides General Manager and R&D&i Manager) with proven experience as front-end employees. Two additional persons involved in an exchange program partnership with Ides acknowledging vast front-end experience joined during the last part of the interview and nurtured the results. Field visit to Fernando de los Ríos premises occurred the 20th of May 2019. Semi-structured interviews with two managerial profiles were undertaken and evidence was also enriched with more informal and on-site talks with two front-line employees working at the Albolote living lab, which is one of the nearly 8,000 living labs making up the Guadalinfo network. In the case of the Library Living Lab, a semi-structured interview was delivered to the co-founder, who has been heavily involved as a front-end actor, and, until very recently, played an informal managerial role.

The role of living labs employees in co-creation: need for appropriate skills

Front-end employees may play a crucial role as facilitators of co-creation processes when they are not engaged as users. In order to do so, some skills are especially important, even though they might not be exactly the same for different living labs and, besides, the employees are usually building up their own competences in a type of learning-by-doing process.

Intras Foundation -Ides

Co-creation plays a major role in Ides activities. Co-creation is embedded in the very philosophy and inception of Ides. Ides provides help and guidelines in the living lab sessions, but final decisions are ultimately taken by end users so as to ensure that they live the life they wish to live, taking into account that users' capabilities are rather different according to the degree of impairment, which obviously determines the degree of their involvement.

Community support is provided through an integral circuit of services and resources (training, employment, healthcare, lodging, leisure, etc.). The Ides vision advocates that the best ideas come from involving people (i.e. nothing about us without us; Latin: Nihil de nobis, sine nobis) so that without the insights gained through the lived experiences, policy makers and professionals run the risk of developing costly services that do not meet the needs of those who will be using them.

Clustering partner relationships between end users and staff is crucial to develop effective co-creation processes. Hence, staff relational skills are deemed key to unleash co-creation potential, create an appropriate atmosphere of trust and complicity and facilitate relationship-building. Along with social skills, front-end staff need to master different co-creation tools as there is no one size fits-all solution, but tools are to be implemented on a tailored basis. This specially applies to co-design, where tools are somewhat difficult to be anticipated, whereby modularity and flexibility are also relevant skills that the staff should possess. As co-design is a very uncertain process so are the tools needed. For example, in some cases, group sessions may in principle be the most suitable tool, but when the process evolves some other tailored/individual-based instruments seem necessary to elicit qualitative data from the users. Furthermore, sometimes feedback from users is not easily obtained and specific methodologies need to be put in practice to "break the ice" as in the Project *MinD* (*Designing for People with Dementia*)[2]. In this project, the *MinD* Diaries were created by users after co-designed sessions to reflect upon their main wishes and motivations.

Front-end staff indirectly drive co-creation when they select lead users out of end user groups. Lead users contribute to make co-creation processes more effective as they are not coming from the "outside world", but instead they naturally flourish along with the sessions. Other skills mentioned during fieldwork have to do with the ability to be "prepared to challenge and disagree with partners where necessary" (assertiveness). It is also important to consider "that engaging with someone as a collaborator in the living lab is different to engaging with them as a client." The approach here must be "give as well as take, and only when the front-end employee lived experience has been delivered in the mutual pool, lived experiences from others may be elicited".

Going back to the aforementioned importance of creating an appropriate atmosphere, the institutional openness of Ides was also noted as a relevant driving factor for Ides success. Ides boasts a multi-cultural and multi-lingual atmosphere, and it seems that this may help develop more trustful and long-standing co-creation experiences. According to users, dealing with foreign people fosters empathy since they consider themselves to be engaged in true relationships with peers. In fact, both users and foreign staff are somehow "looking for a place in this world" and they seem to share motivations. It is noteworthy that users struggle to

[2] Project MinD is a H2020 project (2016-2020) aimed to help people with dementia engage in social contexts to improve psycho-social wellbeing.

recover their life projects and foreign staff are aiming at settling down in a new place, far away from their home countries, hence there is a commonality.

Guadalinfo-Consorcio Fernández de los Ríos

Co-creation is a multi-faceted phenomenon in Guadalinfo, but it definitely gained momentum when the social innovation approach was channeled through the implementation of Innycia. This new approach was put in place in 2011 and the first steps were focused on setting up an appropriate framework to spur and exchange creative and innovative ideas, as a result of which Guadalinfo aimed at becoming a laboratory of experimentation so as to provide effective solutions to the myriad of challenges brought about by the digital world.

Innycia caught on and the centers became collaborative and vibrant spaces where different initiatives and projects are deployed, with the citizen at the core of different processes of transformation. Innycia was also equipped with a virtual "stage" thus giving rise to the concept of community. This virtual stage provides a space where the community can work, build and grow without resorting to face-to-face meetings at the centers.

In fact, it is difficult to consider co-creation as a one-size-fits-all process since the types of services and activities carried out/provided are huge. At least three degrees of co-creation can be distinguished in correlation with the services provided:

- Low co-creative content. Activities of this kind have to do with eAdministration procedures. Thus, at this level the basic aim of citizens when accessing a Guadalinfo center is to be purely *eAdministration users* and being provided guidance on how to proceed with eAdministration. Co-creation in this case is almost negligible as the activity (and the outcome) is known and pre-defined, even though the users may be remarkably empowered.
- Medium co-creative content. Most training actions provided by Guadalinfo center may fall into this category, but this will ultimately depend on the specific features of the action. Good examples are those training actions of a highly technological and hands-on nature (e.g. robotics, 3D printing) where users co-create and co-innovate along with the local innovation agents and the other users. A good example is the Erasmus+ project *Pathways4employ*, where Guadalinfo is involved. The project, which is specifically focused on entrepreneurs and tele-workers, has developed a self-assessment and certification tool to gage digital competences for entrepreneurs and tele-workers in seven different countries. The tool (that was still in the pilot phase when the fieldwork for the present study was carried out) and takes the form of an Online platform where everybody willing to become an entrepreneur or a tele-worker (irrespective of the sector of activity) can check to what extent these digital competences are mastered. If not, the user is given guidance on how to acquire the competences. On the contrary, if the assessment is positive, the user is certified with open badges. User testing to optimize the platform was also performed by Guadalinfo users along with local innovation agents and the business sector.
- High co-creative content. In this case, co-creation goes a step further, with arising long-standing projects that were born or incubated in the living lab environment thanks to social innovation and collective intelligence, and as a result of a heavy involvement by the local innovation agent and the users. It is noteworthy that some of these projects have the power of co-creation and they are quite different in nature and scope. Examples of such projects are: *Virtrael* (virtual platform for evaluation and cognitive intervention in older adults in order to support a strategy aimed at

preventing and addressing cognitive impairment), *JamToday Andalusia* (a project to spread innovative thinking across the population through technology and game-based methodologies) or *Just one hour from…* (a project to promote rural environments in Andalusia that are usually overshadowed by the most popular and known tourist destinations).

Local innovation agents play a crucial role in the effective and successful implementation of Guadalinfo activities and vision. In fact, the most relevant infrastructure of Guadalinfo is considered to be of human nature, and very much related to the excellent community of local innovation actors that have built up. Local innovation actors are also the main drivers of co-creation, whereby the acquisition of appropriate skills is a determinant for them. In this regard, three specific skills have been identified as being especially relevant to unleash co-creation potential, namely:

- Versatility: as the local innovation agent is trained in whatever digital competence is considered necessary (having the European competence framework as a backdrop), versatility seems paramount.
- Pedagogic skills: these are especially necessary to create the *Made in Guadalinfo* atmosphere of trust and reliability.
- Other skills (e.g. self-confidence, active listening, problem-solving, etc.). These are also considered crucial to set up a relationship of mutual confidence and also to align living lab priorities with the priorities the users. As aforementioned, Guadalinfo is a massive network and priorities are customized for each project. The local innovation actor receives inputs from various sources (e.g. the Town Hall or the business sector), and feedback coming from users appears to be paramount to articulate attractive value propositions that are able to drive processes of co-creation.

Additionally, co-creation is not restricted to the user (citizen)-front end employees locus, but other important interactions may arise amongst front-end employees (e.g. local innovation agents) of different living labs. In fact, the agents have been able to build up a strong community of practice that interacts both digitally and physically. At the digital level, an electronic platform called Agora has been created with the main goal of becoming a meeting space between the agents. The platform includes a relevant amount of useful resources, guidelines, question-and-answer sites, etc., to foster interaction and shared learning and cooperation on numerous topics. This digital layer is also enriched with physical interactions. The centers (living labs) are organized in 25 different geographical sectors, each comprising around 30-40 living labs. At least once every month, local innovation agents of each sector meet physically, monitored by an area coordinator, who also spurs interaction and community building.

The importance of this internal engagement is enlarged when considering the difficulties to be confronted, as the reality of each living lab is still somewhat dispersed. For example, the Town Halls or the NGO in charge of monitoring Guadalinfo centers based in disadvantaged areas are the institutions hiring and paying the local innovation actors, whereby remarkable differences in terms of wages or front-end profiles may arise.

Library Living Lab

In the case of the Library Living Lab (L3), library users are multi-profile individuals such as scientists, artists, entrepreneurs, and others who enhance co-creation. Knowledge and potential opportunities for multidisciplinary exchange experiences among all participants are

leveraged, starting with the library users and finishing with the professionals providing the services. Thus, the concept of *community of interest* or *community of knowledge* is realized, and the library becomes a creative space where something new or not previously planned can happen as a result of ~~a~~ collaborative work (Vilariño, Karatzas and Valcarce, 2018).

One major contribution of the L3, according to the informant, is that "decision making processes are fully open", and library users (along with other stakeholders) are fully engaged. This is a distinctive and differential aspect of the L3 when succeeding in building up and consolidating communities. In fact, "user co-creation practices started at very early stages, when they were required to identify communities of practice in order to build and scale projects around those communities."

When addressing the role of the L3 employees in spurring co-creation, a distinction between two types/levels of employees needs to be made. On the one hand, the managerial level, which has been absent at the Library until recently when a living lab manager has been hired (even though it was considered an imperative need from the beginning) is key to "connect different things" and therefore may be deemed as a co-creation catalyzer. Project managers of the Library Living Lab are in close contact with users, and thus fully committed to the living lab logic and the ensuing co-creative activities. In order to do so, skills such as versatility, analytical skills, ability to engage users in projects of different nature and kind (social skills) or active listening seem to be paramount. Further, users participate in decision processes associated to the activities and projects implemented in the lab, which is not the same as *open consultation processes*. As an example, the *3D Scan of the Cloister Capitals of the Monastery* project that involved developing a process of scanning the capitals of the Sant Cugat Monastery so as to create the first digital catalogue of the capitals and a series of 3D reproductions was carried out, not as a result of a survey among library users (or neighbors in Vollpelleres), but as a decision taken internally in the lab. The decision was taken on the grounds of the intrinsic interest of the project and the important role as co-creators that users who are involved could display.

Finally, the converse of this pertains to the library assistants, who are also front-end employees. Library assistants are not trained to know what a library living lab is and means, let alone being engaged to the project. Potentially, this may create tension and conflict because the library assistant, once in the library, is required to perform tasks that are either new or insufficiently known/understood. In order to circumvent this, Design Thinking (DT) workshops were put in place to identify major skills gaps. Notwithstanding, the highest barriers are not of a technical, but rather of a cultural or even a personal nature. A high degree of motivation is crucial here and when it exists the library has been providing a training framework to empower the library assistants with new tools, but the results have been a little patchy. This calls for a major responsibility of public institutions in providing training, along with flexible and ever-changing tools to catch up with the most-needed digital transformation-based skills. Otherwise, public servants would become demotivated and their expectations would appear to be deceived.

Discussion

Even though the analysis has addressed three rather different types of living labs, it is noteworthy to inquire whether there is a common ground for the most required skills from front-end living lab employees.

Table 2: Skills relevant to co-creation for front-end employees of living labs

	Intras Foundation- Ides	**Guadalinfo Consorcio Fernández de los Ríos**	**Library Living Lab**
Common soft skills	- Analytical/content skills	- Analytical/content skills	- Analytical/content skills *(applied to project managers)*
	- Flexibility, modularity	-Versatility, flexibility	- Versatility, flexibility *(both for project managers and library assistants)*
	- Trust and reliability	- Trust and reliability	
		- Creativity	- Creativity *(applied to project managers)*
		- Active listening	- Active listening *(applied to project managers)*
	-Teamwork building (with users)	-Teamwork building (especially with other local innovators)	
		- Social and cross-cultural skills	- Social and cross-cultural skills: Ability to engage users in projects of different kind (*project managers*)
Specific soft skills	- Transparency - Conflict management/ assertiveness (willingness to challenge and disagree with partners when necessary)		*Library assistants:* - Self-motivation - Cultural awareness - Open mindedness

Source: Authors, based on information provided by the case studies

Table 2 summarizes the main results in this regard. The evidence has been obtained from the interviews performed during the fieldwork, as emphasized in the methodological section. Many of the skills were not expressed with nearly a single word during the interviews, but it required some kind of abstraction or elaboration based on the ideas of the informants, which have been put forward in the previous section. Aside from the interviews, internal and external information provided by the informants was also useful to identify the skills in some particular cases. When inspecting the table, it is evident that the bulk of the skills described are related to what can be considered as soft skills.

Unlike hard skills, soft skills are blurry and difficult to define, even though some interesting attempts have been made to identify them. In this regard, Haselberger et al, (2012), proposed a taxonomy where 22 skills are divided into three main groups:

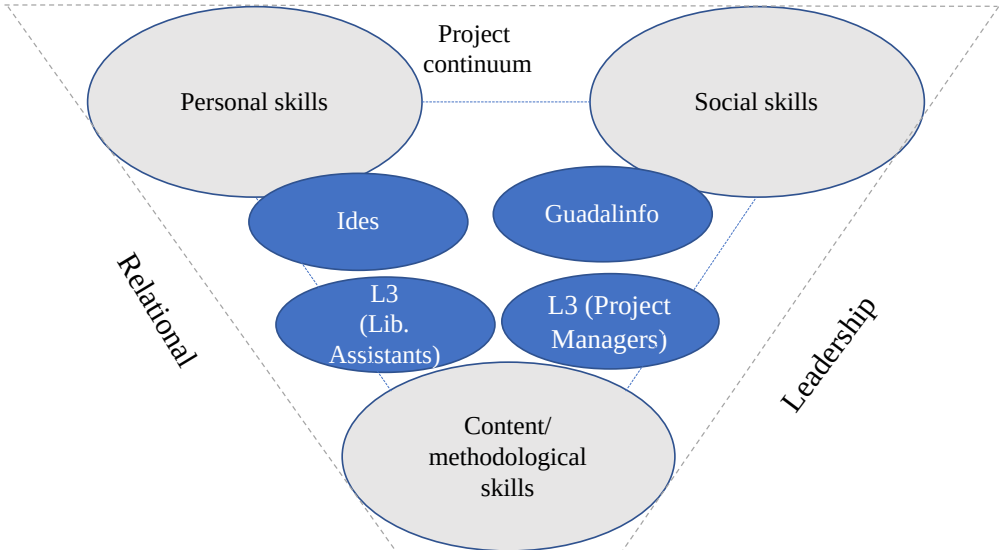
- *Personal skills:* Learning skills, Tolerance to stress, Professional ethics, Self-awareness, Commitment, Life balance, Creativity/Innovation.

- *Social skills*: Communication, Teamwork, Contact network, Negotiation, Conflict Management, Leadership, Culture Adaptability.

- *Content-reliant/Methodological skills*: Customer/User orientation, Continuous improvement, Adaptability to change, Results orientation, Analytical skills, Decision making, Management skills, Research and information management. These are soft skills related to ways of thinking, as opposed to ways of working (Binkley et al, 2012).

Thus, it is possible to classify the evidence on soft skills for the three case studies illustrated in Table 2 using the Haselberger et al, (2012), taxonomy, as is shown in Figure 1.

Figure 1: Framework for analyzing soft skills in living labs



Source: Building on the three types of soft skills provided by Haselberger et al, (2012)

As stressed in Figure 1, some minor but interesting differences may be detected across the three case studies. In the case of Intras-Ides, soft skills are much related to the existence of personal skills (as well as content/methodological skills) that are conducive to co-production. Further, dealing with individuals suffering from mental disabilities requires strong personal skills, as emphasized by Angelova-Mladenova (2016).

In the case of Guadalinfo, the balance leans slightly towards social skills (along with content/methodological skills), given that front-end employees (called *local innovation agents*) need to deal with very different service users, not only in terms of age or social and cultural status and background, but also in terms of expectations or willingness to be involved in co-creative processes. Furthermore, mutual interactions amongst these local innovation agents reinforce soft skills building, such as active listening, teamworking and/or flexibility, major shared capabilities. Distributed leadership works across this network of local innovation agents, since responsibility for leadership is dissociated from the organizational hierarchy and local innovators may exert influence over their colleagues and influence the overall direction of the network.

As for the Library Living Lab (L3), content/methodological skills seem to be rather relevant, even though a line may be traced between library project managers and library assistants. In the first case, social skills seem to be a little more important to engage users,

while in the case of library assistants, personal skills related to open mindedness, self-motivation or adaptation to change seem to be more important.

Nonetheless, the balance of personal/social/content and methodological skills ultimately relies on the character of the project undertaken (that would require customized or ad hoc methodologies, technologies and/or specific service users). Therefore, a space of heterogeneity and uncertainty does exist in this regard.

The framework of relational leadership provides a conceptual underpinning to encapsulate the importance of soft skills. Front-end living labs employees become actors who ensure relationship building and maintenance, and relational leadership is paramount to engage co-creation processes. What is more, relational leadership might be facilitated when soft relational skills are present (Woods, 2004; Schlappa and Imani, 2018) and, at the same time, soft skills help shift power balance between front-end employees and citizen co-producers according to their expertise, prior knowledge, resources and other contextual factors (Tuurnas, 2016). As a conclusion, co-creation becomes fully operational and public value obtained might be optimized.

Conclusion

This paper has tried to connect rather dispersed but related concepts, such as public-oriented living labs, co-creation dynamics, relational leadership and skills that may spur such dynamics. As such, it is a humble attempt to approach public sector innovation literature on co-creation with human resources literature on skills and leadership in the public sector.

Some interesting conclusions arise from this study. First, living labs, as open organizational frameworks for co-innovation, may contribute to transformation of public administration in significant ways by providing appropriate institutional arrangements for co-innovation.

Second, relational leadership provides a useful bridge, connecting *a priori*, disconnected streams of literature related to co-creation and soft skills in the public service domain. Relational leadership emphasizes concepts of transparency and interdependence where citizens and service providers may be engaged to share responsibilities. Furthermore, relational leadership could be facilitated when soft relational skills are used (Bolden, Petrov and Gosling, 2008).

Third, living labs can be considered *spaces of experimentation* where soft skills are being (or may be) implemented to reinforce relational leadership and co-creation activities. This is a dimension of living labs that is insufficiently addressed to date, but they do remain important. The study of soft skills is impeded by poor measurement and lack of definitional clarity, and survey questions usually ask respondents to self-assess their personality characteristics (Deming, 2017). In this scenario, living labs provide useful sandboxes to study the role of soft skills on optimizing co-creative dynamics driven by living lab employees. Therefore, the analysis of soft skills could be a promising avenue of research to address the impact and evaluation of living lab activities which to the best of our knowledge is still quite underdeveloped.

Fourth, soft skills seem to be relevant irrespective of the different living lab framework and environment. This is a remarkable result, as the heterogeneous and

practice/context-dependent nature of living labs has made its evaluation rather difficult thus far (Ballon, Van Hoed and Schuurman, 2018). According to directed evidence collected from respondents in the three cases studies, trust and reliability, flexibility and versatility or active listening are some of the major soft skills commonly considered crucial to spur co-creation processes in public-oriented living labs that may be radically different from each other in nature and purpose. Notwithstanding, slight differences within soft skills may be detected according to the type of living lab under study. In that, personal skills seem to be more important in contexts where usually users' co-creation capabilities may be not so obvious (i.e. the case of those mentally impaired patients, who traditionally have been considered as passive recipients of care; European Platform for Rehabilitation, 2016). In contrast, social skills may be more important when dealing with rather different profiles of service users portraying very heterogeneous expectations and objectives. Yet, the final balance between personal, social and content/methodological skills is settled on a *project continuum* basis.

Fifth, the role of front-end employees is that of facilitators and relationship/building/networking. Relational leadership is a key concept here, as it focuses on interactions through which realities are co-created. Accordingly, front-end living labs 'employees should become relational leaders to spur co-creation and this can be done by nurturing soft skills of different types, be it of personal, social or content/methodological nature. Obviously, this is something that they need to learn and/or refine along the way, as the involvement of stakeholders to support co-creation is rather new (Fuglsang and Hansen, 2019b).

Sixth, in terms of perspective, the importance of soft skills vastly transcends the scope of living labs to enter other public spheres where co-creation with citizens and other stakeholders (e.g. the private sector), is increasingly becoming part of the public sector everyday-innovation-work. Soft skills are also usually associated with current and future educational and labor market requirements, but they are likely to become relevant in other contexts in the future (see, for example, Autor, 2015, or Deming, 2017). A major example is the optimal delivery of public services and public sector innovation. As stressed by the OECD (2011; 2017), new skill requirements are arising in the public sector, and a sizeable share are related to what are considered soft skills. The four major meta-competencies identified by the OECD are related to creative thinking (creativity and innovation), flexibility (flexibility and change management), cooperation (working collaboratively across boundaries and relationship building) and strategic thinking (vision and future orientation). These revamped skills required of public managers are essential to focus not only on institutional reforms or rational transformations but even more on developing long-term relationships and processes of co-operation/co-creation (Ekuma, 2017). As a result, stakeholders may be actively engaged and empowered and value creation may be boosted (Muir and Parker, 2014).

Seventh, front-end employees didn't necessarily have soft skills capabilities to drive front-end living labs activities when they started, which emphasize the importance of tailored training programs and capacity building actions implemented by public administrations. Learning-by doing in co-creation processes also becomes a powerful source to build up own soft skills. The case of librarians acting as front-end employees at the Library Living Lab illustrate the importance of both skills acquisition and the problems arising when inadequate motivations, incentives and expectations are at play.

Finally, the exploratory character of the analysis and its shortcomings are noteworthy. Evidence has been collected for living labs, but it would be interesting to conclude whether the results are similar to, or may be replicated in, other scenarios that are different from living labs (which are somehow *controlled scenarios*). Similarly, the educational background of front-end employees may play a part in determining the role of soft skills, that is, how these skills are effectively interpreted and deployed, thus conditioning co-creation outcomes. Furthermore, it would be desirable to obtain further evidence on the role of soft skills by analyzing a larger number of living labs in different countries and representing different labs types. Alternative methodologies could also be used to produce further and richer evidence. For example, it would be interesting to contrast and compare this evidence with direct feedback from users (i.e. which are the most relevant soft skills that front-end employees should be empowered with, according to end users?). Notwithstanding this, the map of soft skills needs to be ranked so as to know which are those that most important to activate. By doing so, positive outcomes on public service delivery or public value, amongst other aspects, may follow.

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Acknowledgements:

The authors gratefully acknowledge the generous collaboration of Raquel Losada & Rosa Almeida (INTRAS-IDES), Luis Navarro & Cristina Vera (GUADALINFO) and Fernando Vilariño (LIBRARY LIVING LAB) in the realization of the different case studies.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 770356. This publication reflects the views only of the author, and the Agency cannot be held responsible for any use, which may be made of the information contained therein. The paper has also been co-funded by the Spanish National Research Programme RTI2018-101473-B-100

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Appendix I: Interview guide: managers and front-end employees

Please conduct an appropriate number of interviews with managers and front-end staff.
Objective:

- To obtain knowledge on living labs as an environment
- To obtain knowledge of living labs as an approach
- To understand how value is created through living labs
- To understand how the impact of living labs can be measured
- To understand how actors perceive public value and citizen-orientation

For internal use only, please give information about the interviewer and interviewees. Information about interviewees is only for internal use during the project period.

Name and role of interviewee	
Name of organization/department	
Name of interviewer and date	

Questions for interviews:

1. Please briefly describe your role
2. Please briefly describe the living lab and its history and focus (to expose the life cycle/maturity of the living lab)
3. Please tell a bit about barriers/drivers for establishing a living lab in the public sector?
4. What value are you trying to create through the living lab?
5. Who is creating this value?
    a. The role of managers, frontline staff, public, private and civic organizations?
    b. What do you perceive as motivation/incentives and/or barriers for internal employees to engage with the living lab?
6. Who is a part of your network (external stakeholders/partners)?
7. What role do public service users play in creating this value?
    a. Do they participate as individuals, a group or a collective?
    b. Do they participate in setting priorities, co-design, co-implementation, co-assessment?
    c. When and how are they involved?
    d. With what impact?
8. Describe how value is created in different stages of the living lab or through different types of living labs.
    a. Design stage
    b. Implementation stage
    c. Other
9. What is the role of citizens and communities in creating value through the living lab?
10. What is the role of the physical environment of the living lab for creating value?
    a. An office, a neighborhood, a city?
    b. Real-time and every life environment or laboratory environment?
11. As an approach, how important is the living lab for creating value?
    a. Methods from participatory research?
    b. Methods from service design?
    c. Methods from innovation guidelines?
    d. Technology test beds?
12. How could the impact of the living lab be measured?