

# Inclusion Through Digital Social Innovations: Modelling an Ecosystem of Drivers and Barriers

Jennifer Eckhardt, Christoph Kaletka<sup>(✉)</sup>, and Bastian Pelka

TU Dortmund University, Dortmund, Germany  
{eckhardt, kaletka, pelka}@sfs-dortmund.de

**Abstract.** The paper links latest insights from the field of social innovation research to the role of digital technologies and their potential to better address special needs. Therefore, it proposes a model to identify drivers and barriers for a broader use of digital social innovations in transformative processes towards inclusion. The paper develops a model of four distinct, yet interrelated contexts which analytically structure drivers and barriers in complex social innovation ecosystems, and which may also enable and support innovators to better understand driving and hindering factors for their digital social innovation initiative.

**Keywords:** Social innovation ecosystem · Digital social innovation · Inclusive DSI · ICF

## 1 Introduction

With the formal ratification of the Convention on the Rights of Persons with Disabilities (CRPD), the federal state of Micronesia became the 172<sup>nd</sup> state to formally acknowledge and concretise the UNs general human rights for person with activity limitations. With that event, not quite nine years after the first accessions, the CRPD was ratified faster and by more signatory states than any other treaty before. The ratification and implementation of the CRPD can be seen as a commitment towards an inclusive society to ensure full participation for all its members, regardless their physical condition, mental status or cognitive abilities. Inclusion as a process and target value is a core principle within the document and was adopted by manifold policy programs and strategy papers on national and international levels. Slowly, but steadily life-situations of people with activity limitations become a cross-cutting-theme. The 2030 Agenda for Sustainable Development and the inherent Goals (SDGs) has the central impetus to ‘leave no one behind’, whereby innovation is regarded as crucial to reach that goal. People with disabilities are explicitly mentioned in the SDGs, whereas this was not the case within the Millennium Development Goals. Another important pillar within the SDGs is the bridging of the digital divide and the further harmonization of digital skills to ensure inclusion and participation. In the concept of Digital Social Innovation those corresponding threads intertwine.

In recent years, social innovation has gained great importance as a theoretical concept and methodological matrix for societal development and for facing the present and upcoming societal challenges. Reducing social inequalities through social innovation and improving the quality of life is often concomitant by fostering inclusive structures in societal subsystems. In a comprehensive understanding, social innovations are understood as intentional new configurations of social practices, exceeding traditional innovation concepts relying on technology support programmes. Digital social innovation (DSI) can be characterized as a specific sub-set of social innovation which arises out of the observation that “many social innovations are driven by the use of ICT and cooperation supported by social media” [1]. Especially people limited in their functioning and activity (e.g. People with disabilities) might benefit greatly from these new developments. As an analysis of a world-wide mapping of social innovation initiatives has shown [2], people with activity limitations are an important actor and target group for social innovation initiatives worldwide. A considerable share of social innovation initiatives are at the same time inclusive, meaning they are accessible, available, adaptable and affordable to and for everyone interested while treating the needs of people with activity limitations as cross-cutting themes in their everyday-work. The development and scaling process of these initiatives is characterized to a large extent by inter-sectoral cooperation of public, private and civil society actors. Social innovation initiatives acknowledge the importance of involving actors from all societal sectors. The cooperation of civil society (marginalized persons’ stakeholders), policy making, economy and research on the basis of previously identified shared goals has been described as a quadruple helix, extending the triple helix figure from traditional innovation studies by systematically involving civil society in innovation processes [3].

Digital technologies may function as a transmitter on the intersections and are able to facilitate innovation processes on many levels. Accordingly, Bria [4] defines DSI as “*a type of social and collaborative innovation in which innovators, users and communities collaborate using digital technologies to co-create knowledge and solutions for a wide range of social needs and at a scale and speed that was unimaginable before the rise of the Internet*”. DSI is assumed to have potential as a powertrain regarding empowerment and role-change from being an inactive recipient of assistance towards an active role in social innovation processes. Results have shown a high prevalence for inclusive initiatives focused on ICT to involve the public sector while they generally seem to put greater emphasis on cooperation and knowledge transfer. This raises questions such as how professionalized this cooperation is, how it can be supported and how intermediary actors, such as social innovation labs and centres, can help to better facilitate cooperation throughout the whole social innovation process. An overriding question in this complex is how to understand the driving and hampering factors these initiatives, projects and collaborations face.

Within the EU funded research projects “Social Innovation – Driving Force of Social Change” (SI-DRIVE, 2014–2017) and “Boosting the Impact of Social Innovation in Europe through Economic Underpinnings” (SIMPACT, 2014–2016) social innovation and DSI were scrutinized for their role and functioning and extensive mapping and qualitative research have been applied. Outstanding typical cases have been identified to conduct further qualitative research. Embedded into the approach on

an Ecosystem of social innovation, this paper presents the results of these efforts, tailored to the question on how Digital Social Innovation might be an instrument to facilitate a socially inclusive society. To illustrate the model of an ecosystem of digital social innovations (which will be described in Sect. 2), two case studies will be presented (Sect. 4) in order to draw conclusions on the drivers and barriers leveraging or hampering the emerging and forthcoming of digital social innovations.

## 2 Background: Inclusion and the “Society for All” Through Digital Social Innovation

In reflecting and debating on the possibilities of formatting an open and equitable society, where everyone is able to outlive personal potentials in diversity, the term “inclusion” increasingly works as a signal word. Policy Strategies and position papers emphasize the importance of inclusive growth and sustainability while varying in their priorities, according to which political orientations and philosophies may prevail. The United Nations i.e. have a wide understanding of inclusion. In a United Nations publication Atkinson and Marlier define exclusion as the “involuntary exclusion of individuals and groups from society’s political, economic and societal processes, which prevents their full participation in the society in which they live” [5] they see the achievement of an inclusive society in creating a “society for all” (ibid.).

### 2.1 The Contexts of Inclusion

Questioning the level of society’s inclusiveness leads to the question of how far its members are able to participate in all societal subsystems. The capabilities to do so were, for a long time, individualized, which means individual functioning was held accountable for the level of participation someone was able to reach. The possibilities and the design of an inclusive society were not in the centre of discourse, the question was rather how people with low levels of participation could be integrated into pre-existing societal structures – a concept which became more and more contested. The societal view on people with activity limitations was driven through a medical-centric concept where the *disability* was located in the affected individuals themselves. Societal structures, which could hinder or leverage individual participation, were not given special consideration. Over time, and mainly due to the self-help movement of people with activity limitations, the competitive “social model” of disability emerged and prevailed. According to this model, the poor interaction between environmental factors and individual functioning leads to limitations in activities and participation and thereby to disabilities.

The focus shifted from the individual status as “*being disabled*” to “*getting disabled*” by societal structures. With the implementation of the *International Classification of Functioning, Disability and Health* (ICF) in 2001 by the World Health Organization (WHO) this paradigm-shift found its manifestation and wide acceptance. A person’s level of functioning therefore derives from the dynamic interactions between the environmental and personal factors as well as the individual health

condition. Following the ICF, people are disabled in their actions by environmental and structural factors (i.e. inaccessible environments) in interplay with personal factors rather than from their own functioning alone. Disabilities denote an accumulation of a physical or mental status that leads - in unfavourable interaction with the contextual factors - to limitations in activity and restrictions in participation. Figure 1 illustrates these relationships.

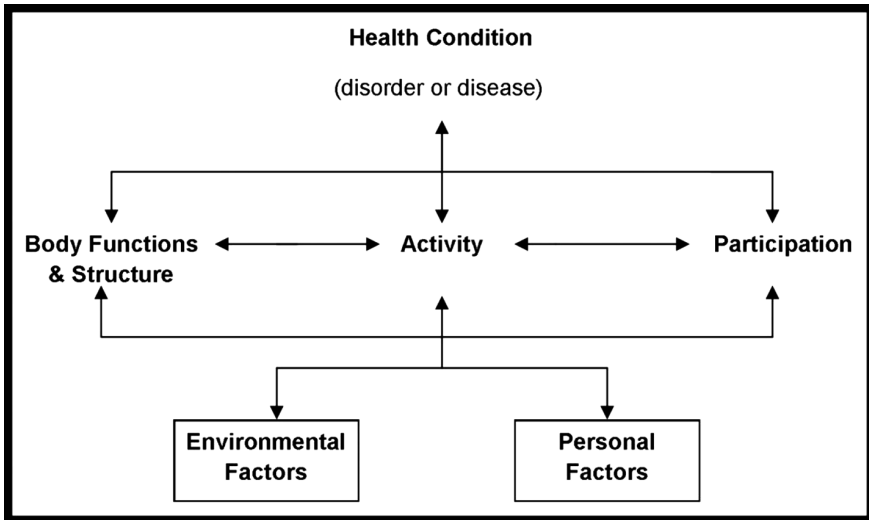


Fig. 1. International classification of functioning, disability and health

Viewed in this light, an inclusive society can be described as a society that allows everyone - regardless of personal dispositions - to participate fully in all parts of society. Therefore, to analyse the promoting and impeding factors for inclusion also means to characterize societal structures and contexts. According to Silver [6] at least three levels of context - specificity of the concept of inclusion are visible. First, the societal view on an inclusive society is strongly bound to its predominant schemes and frameworks on a *normative layer*. Secondly, there are *cultural and historical factors*, which “make some dimensions of social exclusion – economic, social, or political – more salient and important than others” (ibid.). And thirdly, there is the issue of the *material and economical context* that shapes “access to resources and social proximity”.<sup>1</sup> This third layer covers the pre-existent or developing structures and also the micro-perspective of the motivations and objectives of the acting individuals. Structured to three components (Body Functions and Structures, Activities and Participation and Environmental Factors) the ICF is an instrument to assess the degrees of individual participation related to life-dimensions. In its construction of protected rights, the CRPD follows roughly the life dimensions laid out in the ICF.

<sup>1</sup> [http://www.un.org/esa/desa/papers/2015/wp144\\_2015.pdf](http://www.un.org/esa/desa/papers/2015/wp144_2015.pdf).

As said above, the CRPD has vitally influenced the discourse on inclusion in the last 10 years by providing a legal framework that guarantees the right to participation and inclusion. With this new normativity the treaty forms the basis for a rights based approach to participation in all domains of inclusive social co-existence.

## 2.2 A Rights-Based Approach to Inclusion and Participation

With the ratification and implementation of the Convention on the rights of persons with disabilities (CRPD), a new normative setting gained clout and great impact. The rights in the CRPD are protected and enforceable for the addressed individuals. The CRPD plays an outstanding role within the discourse on inclusion as a rights-based framework to survey and examine society's inclusive potential and progress.

By subscription, the member states show "a commitment to a process of change toward a more inclusive society" [7]. Using the ICF as a bridge between scientific values and the political and social values expressed in the CRPD is a conception oriented towards the "rights approach to disability" that finds its expression within the paradigm shift from an integrative towards an inclusive society (ibid.). Article 19 of the CRPD is central for rendering the full right of everyone to participate fully, as it states:

*"States Parties to this Convention recognize the equal right of all persons with disabilities to live in the community, with choices equal to others, and shall take effective and appropriate measures to facilitate full enjoyment by persons with disabilities of this right and their full inclusion and participation in the community" (Article 19, CRPD).*

This also implies the freedom of choice and the freedom to decide over important areas of life, i.e. where and with whom to live, where to spend leisure time and where to seek for assistance, if necessary. It carries the message that no one should be determined to live, work or relax in predefined structures, because of a certain bodily, mental or cognitive status.

One precondition to facilitate this right is the provision of tailor-made community services on an equal basis. Due to restrictions to the social sector and the transformation of welfare states, as well as financial crisis and global challenges like demographic change, social systems and public services are suffering to guarantee this and are searching for new approaches. Digital devices are from increasing importance in these new solutions. The rights-based approach to inclusion and participation acknowledges and confirms the contextually ligation of a new paradigm of activity limitations. As the treaty renounces a specific definition of disability it also implies an emphasis on the particular structural, cultural and temporal contexts. It has set new goals for policy and decision making as it emphasizes the right to full participation in society for all its members. In its systematic the CRPD relies on the framework provided by the ICF and therefore classifies domains of activity and participation. In this way it is possible to allocate the rights protected in the articles of the CRPD into the ICF's systematics of domains. The following table provides some examples with an emphasis on the rights concerning the use of digital devices and new technologies (Fig. 2).

| <b>CRPD-Articles/Rights</b>  | <b>ICF Life-Domains</b>   |
|--|---|
| <b>Article 9<br/>Accessibility</b>   | All domains of life, especially Chapter 8 (Major life areas – Education, Employment); Chapter 9 (community, social and civic life); Chapter 4 (Mobility); Chapter 5 (Self Care) |
| <b>Article 19<br/>Living independently and being included in the community</b>     | Chapter 5 (Self Care); Chapter 6 (domestic Life); Chapter 9 (Community, social and civic life)  |
| <b>Article 21<br/>Freedom of expression and opinion, and access to information</b> | Chapter 3 (Communication); Chapter 7 (interpersonal interactions and relationships)   |

**Fig. 2.** CRPD articles and ICF life-domains

Still, the target of an inclusive society remains a vague concept. Whereas the definitions of inclusion of the European Commission usually target societal subsystems with a strong focus on employment (i.e. “Active Inclusion” as the enablement of “every citizen, notably the most disadvantaged, to fully participate in society, including having a job”) the United Nations draw a wider focus. Exclusion is seen as the “involuntary exclusion of individuals and groups from society’s political, economic and societal processes, which prevents their full participation in the society in which they live”. [4] The achievement of an inclusive society therefore lies in creating a “society for all” (ibid.). The “full participation” is central to all definitions of inclusion, and – notably - the right to participate in society is strongly bound to the given opportunities to outlive ones full potential in the local community.

ICT as a tool to facilitate the right to participate and to meet the requirements of the CRPD needs an environment to unfold to become practicable for public use. The pure technical presence of ICT doesn’t lead to a socially desirable exploitation of ICT as an instrument to boost inclusive societies. More has to be known on how ICT fits into the conglomerate by asking how it evolves and unfolds to be a digital social innovation. Digital devices are an important instrument to facilitate the right of full participation in all societal subsystems as they are able to offer “support for traditional offline tasks” as well as establishing “a new access mode to societal offers and discourses” [8].

### **3 An Ecosystem of Digital Social Innovations for Inclusion?**

To guarantee the right to full participation in society, social innovation initiatives are considered to play a decisive role. The European Commission, for example, has launched the “Social Investment Package” (SIP) in 2013, which builds greatly on social innovation. It declares SI as an essential instrument for addressing vulnerable people’s needs and so sets SI on the agenda of thinking about modernization of welfare service provision. Misuraca et al. [9] conclude that “(...) social innovation - and more concretely ICT-enabled social innovation - can provide an important contribution to social

policy reform, providing new/better/different ways of integrating the provision of social services”. However, this potential needs an environment to unfold. As well as Inclusion, (D)SI shows a high context dependency, which is described in the following.

### 3.1 The Context-Specificity of (Digital) Social Innovation

Social innovations (SI) appear in a variety of forms and influence our lives. They change the way we live together (flat sharing), work (tele-working) or handle crises (short-time work instead of layoffs). They enable new types of cooperation (co-working bureaus) and organizations (public-private partnerships). They are driven by civil society (urban farming), politics (parental leave), the economy (micro-credits), or in-between sectors (dual studies, sharing economy). As diverse as such examples may be, social innovation is always conceptualized in one of the following three ways: It can address new forms of cooperation and co-creation between stakeholders supporting an innovation, be it technological or social. It can be about an innovation and the societal impact it creates, leaving ground for interpretation whether this impact is desirable or not, and whether such normative perspectives should have a say in scientific concepts. And it can be a combination of the two.

All three concepts can be found in recent social innovation literature [10]. Our approach, which is also laying the ground for all empirical work on the above-mentioned research project SI-DRIVE [11], defines social innovation as a new combination or figuration of practices in areas of social action, prompted by certain actors or constellations of actors – addressing the HOW in line the first option presented above - with the goal of better coping with needs and problems than is possible by use of existing practices. An innovation is considered social to the extent that it varies social action, and is socially accepted and diffused in society [12], with all consequences in terms of institutionalizations this may lead to. The second part here focuses on the WHAT FOR, or WHY question, making the definition comprehensive. In order to understand the complex environment in which social innovations are created, develop and flourish on the one hand and take effect or perish on the other hand, we have developed the model of an ecosystem with four analytical layers. Each layer describes its one distinct context of drivers and barriers, factors supporting or impeding social innovation. While this model describes the ecosystem of social innovation in general, it can also be used for DSI, specific sub-set of social innovation which is compatible with the generic definition presented above and at the same time conducive to a better understanding SI’s potential for (digital) inclusion [13].

1. **Role context:** On a “role context”, socio-demographic factors and roles of social innovation stakeholders and beneficiaries are identified. This includes these actors’ political and social attitudes, motivations, socialization, self-concepts, image, capabilities and skills.
2. **Context of function:** A “context of functions” comprises factors such as management procedures, business and governance models. Questions such as how different actors are interlinked and collaborate, how they adjust their roles in a wider network context and how the network is governed are relevant on this layer. The functional

context also addresses the role of ICT in (digital) social innovation, concretely digital services and their inherent supporting or impeding potential.

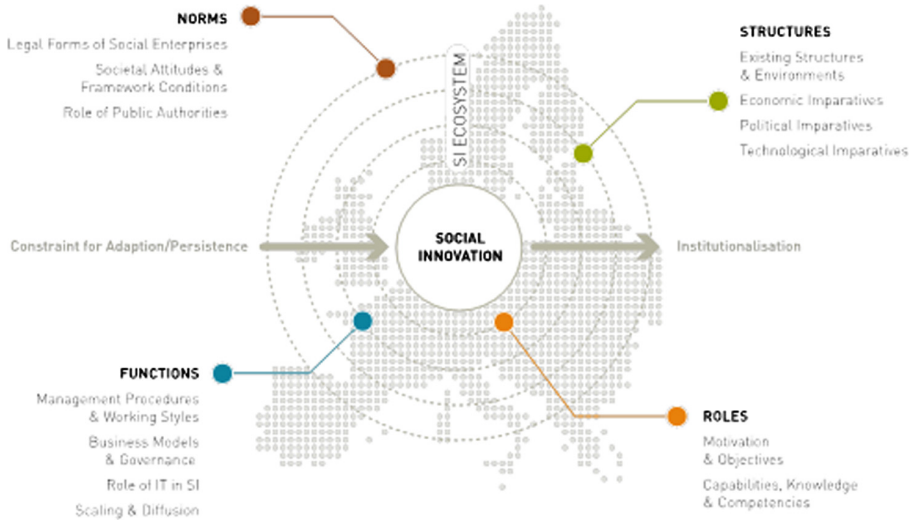
3. **Context of structures:** This context delivers insights into constraints and path dependencies because of existing institutions, economic, political and technological imperatives. These define factual boundaries or, on a positive notion, the contingency of social innovation. This can be the setup of a city administration, restricting what can be achieved on the role and functional context, or the political orientation of the government. Technological infrastructures (not) available and financial resources to be allocated also build the structural context.
4. **Context of norms:** Here, the societal framework conditions and challenges come into play. The normative context shows professional and ethical standards, historical and legal conditions, codes and other accepted social standards. What social innovation initiatives are legally allowed to do is defined on this layer, as well as which professional standards actors such as politicians, consultants, IT specialists or other parties involved will have.

These contexts, in synopsis, build up an ecosystem of four layers of (digital) social innovation. With this structure and its inherent characteristics of closeness within the contexts and simultaneous permeability, it resembles a model from communication sciences from Weischenberg [14]. He introduced a model to distinguish different contexts of news production which was meant to guide research on the diffusion of news and how and if they make it into mass-media. He emphasizes the strong context-sensitivity of the production of “news” and differentiates between four context layers arranging them in form of an “onion” in order to symbolize the interdependency and permeability of those contexts: “Actors” (the innermost layer; assembling socio-demographic features of the media actor, e.g. journalist), “functions” (the second layer; focusing on the process in which media are produced), “structures” (the third layer; collecting economic, political, organizational and technological imperatives) and “norms” (the outer layer; the legal and policy context). The following figure shows a possible model which transfers Weischenberg’s approach to social innovation ecosystems (Fig. 3).

The “onion” metaphor allows two directions of “cutting” the onion layers in an interpretative process: inside-out and outside-in.

If seeing the onion from the inner core to the outer layers (the “growing” process of an onion), the four layers can be understood as a process of growing institutionalisation. The innovation permeates through persons (the context of roles), through those persons’ doing (the context of function) and through organisations (the context of structures). Some innovations even influence the context of norms, for example by influencing what is considered as “ethical” or “right”. Car sharing, for example, has initiated new legislation in many countries, including tax reduction and the procurement of public places as parking lots for shared cars. This growth process reflects what Howaldt/Schwarz call “socially accepted and diffused” [12]. In reality of course, such growth across different layers is not linear, but characterized by constant feedback loops when objectives are challenged, new competencies are developed or cooperational structures are forged as a result of learning, in order to better sustain and institutionalize the innovation. In this inside-out perspective, a social invention only





**Fig. 3.** The “Onion”: four contextual layers of social innovation ecosystems

becomes a social innovation by being used, spread and turned into social practice. Therefore, the onion model helps to trace the transformation from an invention into a social practice through its different layers with a growing institutionalisation and societal diffusion. This transversal observation accredits the insight that innovations spread through people’s doing or, as Howaldt, Kopp and Schwarz quote Gabriel Tarde, the French pioneer of a sociology of innovation: “In the realm of the social, everything takes place as invention and imitation, with imitation forming the rivers and inventions the mountains” [15].

In a second analytical process, the “onion” can be cut outside-in. This perspective reflects the process of constraints and persistence. Norms, institutions and social practices are resisting change. This is the force that innovators experience when challenging long established practices: They see laws and norms restraining their innovative potential, institutions rejecting their support and practicing what [16] call “silo thinking”, and actors arguing that something has to be done in a traditional way.

This onion model, in both perspectives, helps to identify and analyse drivers and barriers both within and between the contexts. Every initiative, be it traditional social innovation or DSI, is operating within – partly visible, partly invisible – framework conditions forming this multi-layered social innovation ecosystem. Some factors are conducive to a good development or scaling of the innovation, some may be influenced and changed for the better, some simply have to be accepted.

In such complex ecosystems characterised by multiple actors from different sectors, all contributing to the initiative one way or another, ICT can play a catalysing role: “ICT is seen as a fundamental and transformative tool opening new ways of innovating as well as improving and making existing processes more efficient and effective” [8]. It simplifies collaboration between the project partners, increases the potential outreach and visibility of the initiative, and thereby considerably enhances the scaling and

spread of innovations, enabling an uptake across large distances and the development of similar initiatives. Contrasting case-studies will be the basis for analyzing the complex of mutual interactions between the different layers and the inherent stakeholders with the goal to illustrate the heterogeneous modes of action of DSI and non-DSI cases for Inclusion.

### 3.2 Drivers and Barriers of Inclusive DSI

In order understand how the “onion” model of driving and hindering factors can be applied to inclusive digital social innovation, the macrosocial alignment to inclusion, taken as a theoretical matrix, serves as a useful orientation. As it has been shown in the previous explanations, to both notional concepts - inclusion and digital social innovation – context-specificity is an important characteristic. While the operationalization of societal inclusiveness has one possible starting point in the description of existing structural, normative and interactionist contexts, ecosystems of social innovation can be regarded as having the same layers. If the overall aim is to elaborate the general role of a tool like digital devices for innovation processes, not only the layers of contexts need to be analyzed, but also the intersection between the layers and their interplay and fluidity.

Quantitative Data from the SI-DRIVE large-scale mapping of 1,005 initiatives of social innovation, from which 197 are considered to be DSI addressing People with activity limitations and the leverage of an inclusive society, give first insights into relevant drivers and barriers. Figure 4 shows the ranking of relevant drivers from DSI initiatives addressing an inclusive society (N = 193).

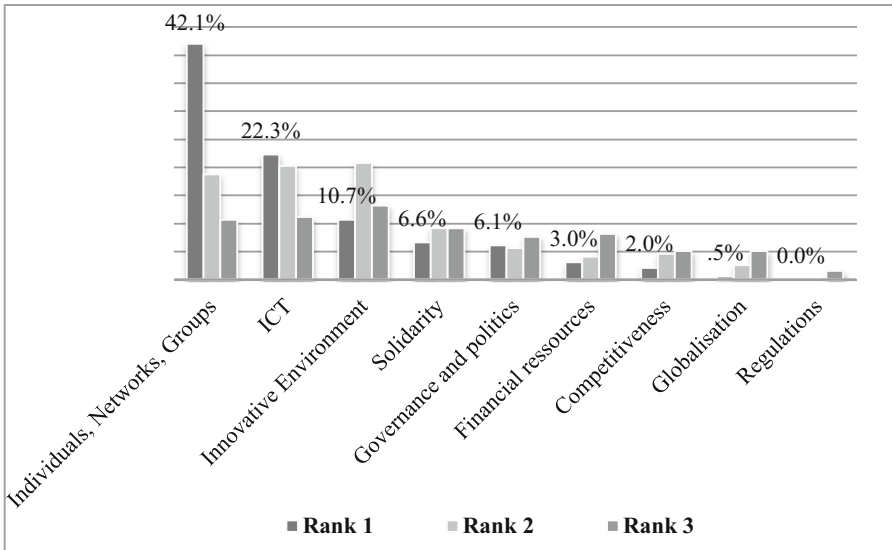
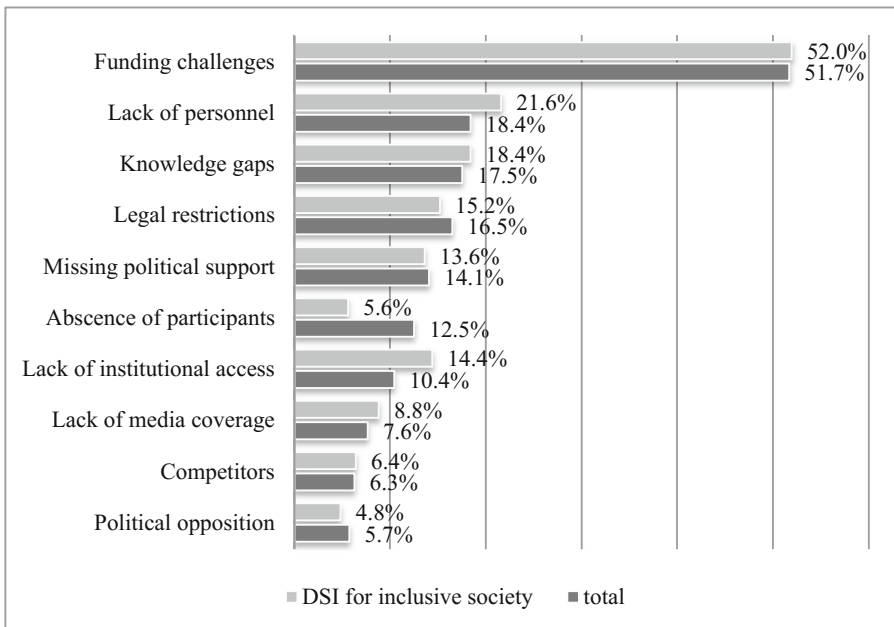


Fig. 4. Ranking of project drivers from inclusive DSI-initiatives

Individuals, Networks and groups are named as the most important promoters of inclusive digital social innovation initiatives. Asked for a ranking of the most important drivers of the project, the initiatives stated the influence of a single person, a network or a group to be the most important factor (42%, see Fig. 1). Also, an innovative environment seems to help an initiative to breach after the initial phase. The possible drivers Competitiveness, Globalisation and Regulations have a minor role. There are no distinctive differences between DSI-initiatives (for inclusion) and the whole sample in general. The in-depth case studies (see Sect. 4) reveal further drivers and contribute to the understanding of the interplay between those drivers and which contexts they may concern.

Regarding existent barriers, quantitative data shows that inclusive DSI initiatives differ slightly in the types of barriers from the average numbers in the total sample (see Fig. 5). While funding challenges, the lack of personnel and knowledge gaps are the three most important barriers for all initiatives alike, the lack of participants seems to be a much lesser problem for DSI initiatives for inclusion. Contradictory, the lack of institutional access is seemingly a more affecting barrier for inclusive DSI.



**Fig. 5.** Barriers to DSI for Inclusion initiatives compared to the average numbers

The following explanations give further insights into these and additional drivers and barriers, their interplay and their contextual classification.

## 4 Example and Further Elaboration: Case Studies

To learn more about drivers and barriers of digital social innovation two in-depths case studies were selected to further elaborate the outlined assumptions. The two projects will be briefly described in the following. While “Social Impact” was funded in the early 1990s and never conceptualized as a Digital Social Innovation, the “PIKSL-Laboratory” has been designed to reduce digital barriers through social innovation. Although the two projects clearly differ in their core idea, distinctive similarities exist regarding the influencing internal and external factors.

### 4.1 Two Contrasting Cases of DSI

**Social Impact – Enterability.** The core idea of social impact is to provide start-up assistance for Social Enterprises for specific target groups. It’s oldest and main-project was funded in 1998 and provides *start-up consultancy* to young unemployed people. “Enterability”, another project from Social Impact, transfers the idea and methodology from the original project (DGW) to the target group of people with disabilities. To date, several thousand companies have been set up with the support of Social Impact. For several years now, Social Impact has focused on supporting social start-ups that use their ideas to solve social challenges in an entrepreneurial way. Social start-ups are given grants that fund up to eight months of professional consultancy, coaching, workshops and co-working workplaces. The use of digital devices and ICT is not a core element of Social Impact. Nevertheless, over the years and with the technological development, digital devices gained more importance, especially for the beneficiaries and the enterprises they launch. Enterability may be the Social Impact program with the highest degree of institutionalization, as it is in the regular funding scheme of the state and city of Berlin as an integrational service. The specific innovative solution is “easy and logic”, as one of the interview partners stated: “No one wants them on the regular labor market, so – in self-defense – they create they own workplace”.

Empowerment is the most important cornerstone and work philosophy. People who are not able to work within the structures the regular labour market provides, or are constantly rejected, are empowered to become their own employers. The main tool here is an individual process and result-oriented support service before, during and after the business start-up. The Profiling is the phase, which works an opener for the counseling-relationship and clarifies whether or not there will be counseling at all.

1. *Profiling and orientation* – assessment of the personal aptitude
2. *Qualifying* - Pre – planning; Acquisition of business starter competences and development of the business plan – counseling, qualification, mentoring
3. *Implementation* - Mid – Implementation of the business – counseling
4. *Post* – growing and consolidation of the business – counseling; peer review; networking; controlling; coaching.

To underline this individualized approach, Participants are able to decide freely, which form of learning they want to practice: autodidactic with provided materials,

training-on-the-job or in Seminars/courses. It is also possible to choose all of the forms in combination.

**PIKSL Laboratory.** PIKSL is an organization that aims at reducing digital barriers and the complexity of everyday life using competences of people with and without disabilities and activity limitations. The Acronym PIKSL stands for “Person-centred Interaction and Communication for more Participation”. The staff consists of professionals with and without activity limitations. People with reduced learning capabilities function as experts within the team and counsel their colleagues in simplifying products and services in the digital world. The reduction of complexity is in the focus of PIKSL’s everyday work, which is seeking to facilitate participation in society, decrease dependency on professionals and support clients in living a self-determined life. Founded in 2011, PIKSL tries to achieve this by helping customers develop digital competences and by empowering them to use computers and mobile devices in a reflected way. Additionally, PIKSL is conducting research on the accessibility and user-centric opportunities of technology and universal design. In inclusive computer classes action-oriented learning is offered to diverse groups of beneficiaries. The overall target of the project is to expand the scope of action of the participants to rise the opportunities to participation and activity.

The ambition of PIKSL is to focus on everyone’s own potential, while searching for individualized solutions, regardless of the personal level of activity. In the lab, people with and without disabilities collaboratively develop innovative ideas for inclusion in fields such as social innovation, low-barrier ICT, or demographic change. Challenges of everyday use of digital devices are tackled from the perspective of the user. For their pioneering work, the PIKSL team was awarded with several prizes.

In order to achieve its goals, PIKSL is using modern ICT equipment and a flexible co-working and co-learning space. A variety of computers are equipped with different operating systems, e.g. Windows and Ubuntu. The regular program comprises courses, projects with a concretely defined goal, group activities such as movie time, joint breakfasts, or gaming events, and open hours for spending leisure time. The open hours do not address defined target groups. Here, customers can use the computers individually and ask for support from experts with and without disabilities, if needed. The courses for the elderly provide basic insights into the use of hardware and programs. The programs addressed can be chosen by the participants, according to their concrete wishes and needs. There is no pre-defined curriculum, but an open discussion at the beginning of each series of meetings. Usually, the courses help the participants to understand and use a PC, a keyboard and a mouse, to send and receive e-mails and to use search engines. The courses are facilitated by two to three experts with and without disabilities who are responsible for a small group of four to six learners, allowing for personal and direct support and communication. The same principle goes for tablet/iPad courses where the use of mobile devices is taught. Additionally, PIKSL is offering so-called mobile courses outside the venue, e.g. in homes of the elderly or people with disabilities, which reduces participation barriers. In cooperation with universities and companies, PIKSL is engaged in research and development on low-barrier digital services.

**Drivers and Barriers.** In synopsis, there are indeed drivers and barriers, which are applicable to both case studies conducted. The quantitative results concerning the drivers and barriers of inclusive DSI were retrieved also during the case studies. That means the drivers which were named from the majority of the mapped initiatives are also relevant for Social Impact/Enterability and for the PIKSL laboratory.

Within the **NORMATIVE CONTEXT** it became visible, how contradicting legal frameworks are a crucial barrier for the development of inclusive digital innovation. That means, i.e., even if the right to choose a certain form of living or – if needed – an assistance provider is theoretically implemented; environment specific modes of acting and thinking might thwart this right. On the opposite, it is evident, how congruent legal requirements are able to boost the forthcoming of an initiative. The CRPD's Article 9 on the Accessibility of all public spaces led to regional and communal agreements to the barrier-free renewal of infrastructure. For this field of interest this means that legal frameworks on Inclusion and ICT have to be congruent and in line with federal and local requirements.

Regarding the **CONTEXT OF STRUCTURES** it has been shown how both initiatives put a lot of effort into custom-fit working environments. The location and working materials are accessible and adaptable and they try to find personalized solutions. Normally, with the project character comes a defined time-frame after which the initial funding stops and a follow-up is needed. Both of the initiatives faced that situation. While "Enterability" found its solution through full institutionalization and getting into regular funding-schemes of the city of Berlin, PIKSL is still in the middle of this process. Furthermore, it seems like a strong relation and commitment to the local area is a decisive structural driver. Both projects are connected to regional networks and other actors caring about urban development. The CRPD (Art. 19) protects the right to live independently in the community and being included into local structures helps to facilitate these structural conditions. This is also reflected in the general openness to all sectors of both projects.

On the level of the **CONTEXT OF FUNCTIONS** both initiatives' approach to diversity mainstreaming in all working-processes and areas is probably the strongest driver. Also, both initiatives have managed to build a wide and multi-faceted network, which have positively influenced its recognition and support potential. Furthermore, Enterability as well as PIKSL has implemented a well-elaborated mixed methodology to enhance learning-effects amongst beneficiaries. Here, the consequent double-blinding of online-and-offline activities stands out.

"Role reversion" is a crucial characteristic within the **CONTEXT OF ROLES**. People with activity limitations leave "their" paternalized and rather inactive position as experts for the own cause. Through this process, both cases enable motivational pushes. ICT which is open for everyone plays a functional role as a tool especially in this context.

However, these outlined characteristics do not yet contain a deeper view on the mutual interdependencies between the layers of an environment for digital social innovation. To synergies the theoretical presumptions and the results and findings from the empirical work the next section provides a deeper analysis on the interplay of the normative, structural, functional and role-dependent circumstances.

### 4.2 The Interplay of Norms, Structures, Functions and Roles

To create a first idea of a matrix aiming to understand the four layers of context of (digital) social innovation, the right to participation was taken as a basis. With the assumption that creating an inclusive society is also a matter of being able to use digital devices for the own good, the interplay between the contexts has to be viewed in this light. This implies the need to consider the ICF’s framework and the rights based approach to participation. Figure 6 summarizes and extracts the main results conducted in the Mapping of digital social innovation and the follow-up case studies, reduced to outstanding examples and processes of interaction. The permeability of the onion-model becomes visible. The green boxes show positive effects elaborated within the case-studies, the red boxes inform about hindering relations.

To highlight, explain and interpret a few of these interrelations, the following explanations take a deeper look into these characteristics.

The CRPD was a major driver for both of the initiatives. The normative context and therefore protected rights give an impetus for institutionalization and in this way for

|            | Norms   | Structures   | Functions  | Roles  |
|------------|---|--|--|--|
| Norms      |   | Digital and physical structures are barrier-free per law; Institutionalisation is facilitated and therefore easier funding, also to guarantee access | Diversity Mainstreaming is a working philosophy, full participation the credo.               | Legal frameworks are accepted by all stakeholders & they are willing and open to digital and technical devices |
| Structures | Institutional imperatives and power-structures hinder breaching of DSI                                |  | Fast and easy communication over wide distances through ICT mixed with face-to-face contacts | Individualized accessible and adaptable working spaces lead to maintain peoples interest                       |
| Functions  | Legal restrictions prevent or exclude stakeholders, which could contribute to the initiatives success | Business model is not fitting into the existent administrative traditions, i.e. Entrepreneurship gets no funding                                     |  | Multi-stakeholder approach; charismatic core group or leader   |
| Roles      | Potential users and beneficiaries are not aware of the possibilities offered                          | The solutions are not customized, not everyone willing to participate is able to   | Working philosophies like Diversity Mainstreaming are not accepted by all stakeholders       |  |

Fig. 6. The interplay between the four contexts in drivers (green) and barriers (red) (Color figure online)

funding schemes as well as public recognition of a social need. Nevertheless, protected rights do not mean they are automatically implemented. There are contradictory effects within and between the context-layers visible. Deadlocked modes of thinking and social standards may hinder an innovative idea to unfold, especially if it's built on digital devices (**NORMS-NORMS**). This is mainly due to the fact, that there are little standards concerning digital rights and a lack of knowledge and concerns (**NORMS-STRUCTURES**). Furthermore this leads to low legal certainty regarding the situation of clients and beneficiaries. Whereas the CRPD provides a solid ground of protected rights it is still unclear what digital social innovation initiatives are allowed to and what not. Also, it became clear how much difficulties the projects face in finding adequate professionals who have internalized the CRPD's paradigm-shift from individualizing activity limitations to a rather holistic view on how a person interacts with the given structures (**NORMS-FUNCTIONS**). Especially regarding the life-situations of people with certified disabilities who live institutionalized or legal supervision this is from high significance (**NORMS-ROLES**).

In relation to the ICF, the set of questions to pose within the normative context-layer is the most extensive, because all areas of life are affected here. On a structural layer, the framework provided by the ICF seems less extensive, but specifically relevant. Chapter 1e of the Classification is dedicated to "natural or human-made products or systems of products, equipment and technology in an individual's immediate environment that are gathered, created, produced or manufactured" (ICF, ch. 1e). Here, the ICF refers to the ISO and recognizes that any product or technology can be assistive". Nevertheless, this must be recognized, too, within the everyday-work of initiatives dedicated to an inclusive society through DSI (**STRUCTURES-FUNCTIONS**). At this point, it has been shown how both initiatives put a lot of effort into custom-fit working environments, the location and working materials are accessible and adaptable and they try to find personalized solutions. This may also be a success factor for upholding a constant interest of participants and beneficiaries (**STRUCTURES-ROLES**). Regarding one cornerstone of social innovation research, the multi-stakeholder approach, it is evident how important a common level of understanding regarding such shared goals is. Both initiatives presented in this paper shared the strong aim to support inclusion through empowerment. This must be accepted by all stakeholders, which also demands a common understanding of working modes (**FUNCTIONS-ROLES**).

## 5 Conclusion: Contexts of Drivers and Barriers in Digital Social Innovation and Beyond

An awareness of the need to leverage an inclusive society for reducing inequalities and social exclusion is widespread all over the world. This assumption is strongly underpinned by the success of the CRPD, which has been approved and ratified faster and by more subscribers than any treaty before. There is a broad recognition that present and upcoming crucial social challenges can be faced successfully when everyone is able to participate openly and actively in all subsystems of society.



New modes of thinking and acting are emerging, and there seems to be great potential for initiatives led by new forms of intersectoral cooperation amongst partners. Within this ongoing process, the further and rapid development of ICT and digital devices leads to a growing innovative sphere. This sphere, nevertheless, needs an environment to unfold. Initiatives develop, grow and create huge impact, or they fail, for reasons which are largely unclear. Here, explicit legal frameworks are a helpful normative cornerstone and starting point for deeper analyses. The CRPD and the related ICF help to identify barriers as well as key levers to unfold ICT's catalyzing role and to open up new ways to solve both old and emerging problems. Still, a given legal framework focusing on "one side of the coin" (i.e. inclusion) cannot guarantee protected (digital) rights as long as the functional, structural and role related contexts are contradicting. Operationalization and interpretation need a matrix of categories and dimensions to conduct research on. The analytical approach to build a bridge between policy (Convention on the rights of persons with Disabilities) and scientific values (International Classification of Functioning's, Disability and Health), gains a promising new, positive and progressive component by adding the perspective of an ecosystem of drivers and barriers for (digital) social innovation.

The "onion model" helps to understand the complexity of such drivers and barriers and their interdependencies. It serves as an analytical framework for identifying and structuring the diverse set of reasons why initiatives flourish and scale, or why they fail. From a social innovator's perspective, the model can provide inspiration to scrutinize one's own strategy and pose the right questions at the right time.

What this article provides is a theory-based, empirical approach to conduct research on the complex ecosystem digital social innovations are depending on. This approach, which can also be applied to other domains of social innovation, describes a typology of drivers and barriers initiatives encounter and can thereby advance the emerging field of research on social innovation ecosystems as a whole. The four layers of the model can be considered separately, which helps to structure and analyze similar intervening factors in groups. And they can be analyzed more deeply by elaborating on their interrelations and thereby visualizing the ecosystemic complexity of drivers and barriers as a whole. In order to continuously elaborate the "onion model", further theoretical foundations and an empirical application on a larger scale are necessary. In a next step, the insights this model provides can then be translated for policy-makers and practitioners who can profit from a more differentiated understanding of the social innovation ecosystems they are designing and they are a part of.

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