

# Co-design with Communities. A Reflection on the Literature

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## Abstract

This paper reviews the literature focused on co-design with communities, studying its applicability in the field of Information and Communication Technologies for Development (ICTD). Texts dated from 2002 to 2013 have been surveyed, covering both subjects: “co-design” and “development”. Based on their disciplinary orientation, three clusters were identified: (1) information and communication for development, with a focus on developmental goals; (2) information systems, with a concern for technology design; and (3) social design, in which social issues are prioritized. The analysis reverted on the identification and discussion of the themes emphasized in the literature as the most important aspects for linking co-design activities with development. Five themes emerged from the analysis: *stakeholders*, *context*, *ownership*, *social learning*, and *sustainability*. The paper defines each theme and shows how it has been approached differently in the three clusters of related literature. This review is meant to inform future co-design studies in community settings, by providing a map of the most important research issues in this field coupled with considerations on how different disciplinary orientations – developmental, information systems, and social sciences – are likely to inform different approaches in dealing with these issues.

## Keywords

Co-design, community informatics, ICT for Development (ICTD), participatory design.

## 1. INTRODUCTION

The goal of this study is to investigate and conceptualize a thematic framework for the analysis and applicability of co-design in the field of Information and Communication Technologies for Development (ICTD), aiming at supporting researchers, practitioners, individuals, and institutions seeking to co-design ICTs with local communities in developing

contexts. As such, this study is concerned with understanding how technology design is marked by its applicability in the development field, and what are the underpinnings, explanations and implications for the tendencies to involve users in technology design. This investigation requires a comprehensive vision of what design is, in its cultural and historical dimensions, what role was played by the user in the historical evolution of design, and how does its application for developmental goals mark different approaches in the design process and its outcomes.

Design has been around since the birth of humanity, with other denominations that evolved through time. The craftsmanship model of production characterizing the beginning times of design required that end-users and producers be fully involved in the conception, development, and evaluation of products (Shah et al., 2009). With the industrial revolution, mass production emerged, positing a divide between end-users and the whole production cycle (Castellacci, 2004). End-users or clients became mainly targets of marketing and selling activities.

From the industrial revolution, marked by the transition of manufacturing processes from hand production methods to machines, up until the present time, several inventions have become fundamental to improved life standards, e.g. electricity, domestic appliances, communication media, transportation means (Brewer et al. 2005). Design “as a plan or scheme devised by a person for something that is to be implemented” (Bernhard and Bürdek, 2005) became highly specialized, and left little space for the involvement of end-users in the design process. More recently, higher standards and increasing competition on the quality levels determined an increased attention to the needs and views of the end-users. This motioned the inclusion of end-users within the design process as a means for ensuring better quality and higher relevance of products and services for users’ needs (Wheelwright, 1992).

A similar path may be recognized in the evolution of approaches to technology design for socio-economic development. ICTs have long been acknowledged as a contributing factor for the improvement of socio-economic conditions in developing countries (Mann, 2004; Sahay, 2005). Yet what technologies, with what features and how these should be designed to maximize effective usage is a matter of debate. The approaches to technology design for developing contexts evolved in relation to considerations and beliefs on the nature of development and the effective means to pursue it. The poles of this evolution can be associated to two approaches: a transfer and diffusion approach characteristic of the first years of ICT for development (ICT4D) initiatives, and a social embeddedness approach that gained increased attention in the more mature years of ICT4D research and practice (Avgerou, 2008).

The transfer and diffusion approach, associated with the tenets of conventional development, was based on the premise that developing countries can be propelled on the development path by knowledge and innovations emanating from developed nations (Avgerou, 2008; Waisboard, 2001). The design of technological innovation was therefore fully conceived by experts in developed countries and transferred in developing areas. Yet, the evaluation of projects fuelled by this vision revealed that the transfer of innovation with no attention to local factors incurred a high risk of failure (Avgerou, 2008). A notable example is that of the Lincos project, a well-financed initiative that aimed to drop recycled shipping containers with high-tech into areas with low or no access to technology (Braund & Schwittay, 2006). The project failed to reach up to the high objectives it had set, for

reasons that were related to inattention to design features and the impact of cultural factors (Sterling & Rangaswamy, 2010).

On the contrary, the social embeddedness approach emphasizes the importance of local factors in the design and appropriation of innovation. This new understanding of development stresses the importance of design partnerships and participation by the civil society as the best method to achieve actual adoption and appropriation, and hence sustainable development (Sonnenwald, 1997). In this paradigm, user participation in the design process is considered a key factor for designing technology that has relevance and can be used sustainably in a socio-cultural context (Waisboard, 2001).

The integration of co-design in developmental initiatives appears therefore to have been motioned and legitimated by two convergent waves: in design, the move towards user involvement as a means for ensuring higher product quality and relevance; in development and especially ICT4D, the evolution towards participatory methods framed by discourses on the social embeddedness of ICT and the importance of local factors in technology appropriation. Different takes on co-design approaches and processes are further shaped by different research and disciplinary orientations. For example, information systems researchers are concerned with the intertwined processes of technology development and organizational change, while social sciences researchers place emphasis on the role of the socio-economic context on shaping technology usages, and on their impact in building towards sustainable community development (Avgerou, 2010).

These considerations framed the perspective for conducting the present study, and drew attention to the bearing of different theoretical and disciplinary orientations in approaching co-design for community development. The study identifies three core disciplinary strands - ICTD, information systems, and social design - and shows how each puts forward a different understanding of co-design and prioritises different issues in relation to its employment and assessment. After outlining different definitions of co-design in each strand, the paper proceeds with an outline of the themes emphasized in the literature surveyed as the most important aspects linking co-design activities to community development goals.

## 2. METHODOLOGY

In order to find relevant documents, a combination of two keywords has been used: “co-design” and “development”. Queries have been done on the archives of the *Electronic Journal of Information Systems in Developing Countries (EJISDC)*, and *CoDesign: International Journal of CoCreation in Design and Arts*, then a snowball sampling method was employed, using the documents retrieved to identify other related documents. Beside EJISDC, the Journals of *Information and Technologies & international Development (ITID)*, *Information Technologies for Development (ITD)*, *African Journal of Information and Communication (AJIC)*, *International Journal of Design (IJD)*, and *Journal of International Development (JID)* have been searched following the snowball approach.

The applied technique resulted in a first list of 189 documents. These were analysed, then reduced to a final sample of 36 fully relevant items, considering the following criteria: the studies surveyed had to (i) be related to co-design and communities, (ii) include case studies or reviews related to development programs, and (iii) provide clear evidence when

social aspects were investigated. Only research papers, conference proceedings, literature reviews, books, and doctoral theses have been included in the sample. Notes, master theses, and practitioner reports were not taken into consideration in this study. Selected documents were grouped depending on their approach and the field where co-design interventions were applied.

The analysis indicated that co-design as a design technique is applied in the field of ICTD, having a relation with information system (IS), as well as to social design (SD). This prompted the identification of three research areas where co-design is studied and applied: (1) ICTD, (2) information systems (IS) and (3) social design, as shown in Figure 1. The documents classified as ICTD are those in which co-design has been used to serve goals related to education, health, climate change, waste management, social communication through the use of ICTs, and to reduce digital divides and gaps between rural and urban communities. The documents categorized as IS are those where design is presented as creation of software or hardware that has inherent value to modern society. The documents in the social design strand emphasize social issues in design and the goals to be served by the resulting products and services. Furthermore, the documents included in this study were also classified according to the geographical location of presented cases studies.

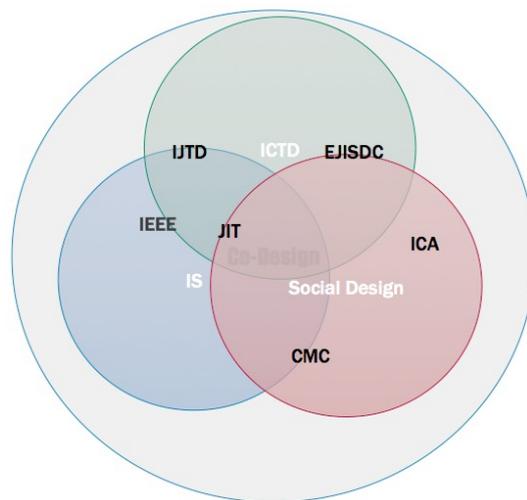


Figure 1. Journals presenting co-design manuscripts clustered along three main research and disciplinary areas

### 3. CO-DESIGN STUDIES AT A GLANCE

From the 36 selected documents, 26 are conference proceedings, nine are journal papers, and one is a Ph.D. thesis. Studied documents were published between 2002 and 2013. From the three research areas, IS has the highest number of documents, with 11 conference proceedings, five journal papers and one Ph.D. thesis. The field of ICTD comes second with 10 conference proceedings and three journal papers. The field of social design has five conference proceedings and one journal article.

It is interesting to note that the field of IS has the highest number of manuscripts. The

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result is supported by the fact that IS has been the pioneer field exploring the design paradigm through the need to provide e-governance and information and communication means to rural communities using web applications and mobile technologies (Sanders, 2008).

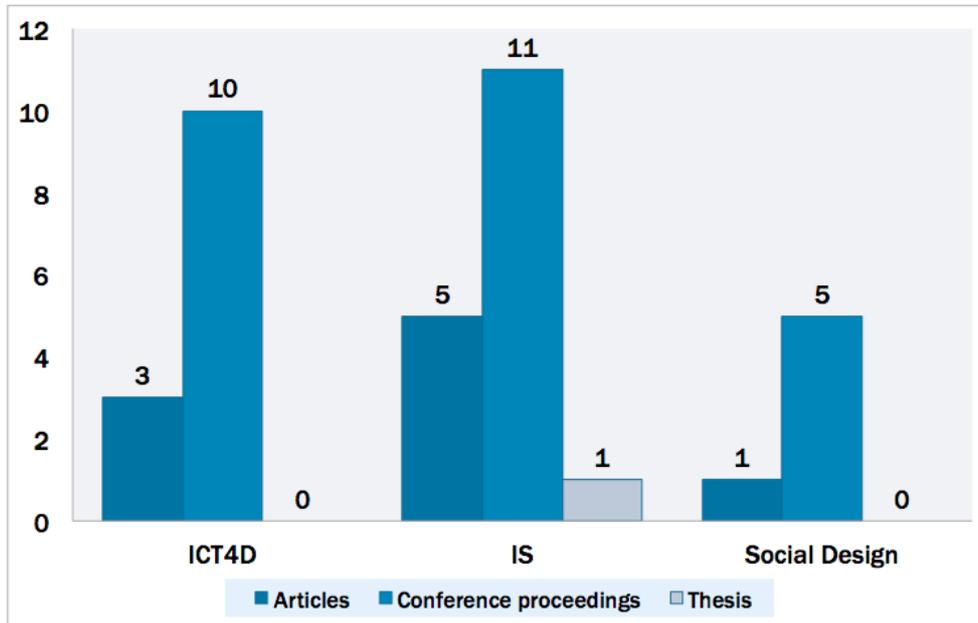


Figure 2. Manuscripts clustering according to research area and type of publication.

Figure 3 shows that the highest numbers of countries with case studies applying co-design are located in Europe where eight countries have implemented co-design projects, followed by the Asian continent, Africa, and North America. When accessed by country, the highest numbers of co-design projects are located in United Kingdom with six projects.



Figure 3. Geographic provenance

## 4. DEFINING CO-DESIGN

The emergence of co-design can be linked to two design approaches: user-centred design and participatory design. In the 1970s, design firms initiated an approach that came to be known as user-centred design, characterised by the reproduction or translation of user knowledge into principles and prescriptions that designers could work with (Santos, 2000). The underlying principles were that designers should understand users and their needs and build trust to increase the efficiency of design outcomes through dialogue and participation. By giving a prominent place to the user, it was thought that more useful and relevant design ideas would emerge (Nisbett and Wilson, 1977).

Research in engineering systems and software design prompted the emergence of a novel design approach, from user-centred design to participatory design (Schuler & Namioka, 1993). The user-centred design approach considered users as subjects who provide expertise to formulate and conceptualize an idea or service (Ehn, 1993). The participatory approach, pioneered by Kristen Nygaard, was described as a set of methodologies, a mind-set, and an attitude towards accepting that people have different perceptions of the design process. These perceptions and perspectives can be articulated only if users themselves are provided with appropriate tools to express them (Sanders, 2003). Consequently, participatory design covers theories and practices that emphasize the role of the end-users as full participants in the design process.

Co-design is seen as the step forward from user-centred design, and closely associated with participatory design. Some studies describe user-centred design as a United States driven approach, and participatory design as a Northern European approach (Sanders, 2007). These two approaches have been influencing each other in their historical evolution, and marked the way co-design came to be defined and understood. Co-design can be considered “an updated term of participatory design”, as it shares its key principle of involving all stakeholders in the design process in order to ensure that the end-product meets user needs, and has a high rate of adoption (Steinmueller, 2001).

The review shows also that there are strong similarities among the definitions of co-design in the fields of ICTD and IS, and a slight difference when it comes to the field of social design.

The approach to co-design in ICTD is shaped by the concerns of practitioners, researchers and international development organisations with raising public awareness and spreading ICT knowledge and skills to promote sustainable community development (Kang, 2010; Freeman, 1984). Nevertheless, there is also contention on the role of ICT in promoting development, in particular because countries development priorities might be different (Ramachandran and Kam, 2008; Krocze et al., 2013). *Co-design* refers to the conception or creation of artefacts drawing on a shared vision, social learning and mutual understanding among all key stakeholders, taking into account that all those involved in the design process have somehow different perspectives and expectations, which should be adequately considered (Fien et al. 2007). Co-design is thought to result in higher quality of system requirements, higher system quality, a better fit between the system and users, and higher user or customer satisfaction (Kaza, 1988: 75-81). Better value for users due to proactively reduced development time and costs on system testing is also mentioned as a key benefit (Steen et al., 2011: 53-60).

The field of social design defines co-design as “a plan or method to do something” placing beneficiaries in positions of power and influence in the design and implementation process (Murcott, 2007). The underlying vision is that one can design an unlimited number of views on reality but to be considered effective design, every view implemented should relate to the specific social groups that will benefit from the outcomes, and reflect their views – something that can be done best by involving the beneficiaries in the design process (Markus and Keil, 1994). Therefore, to optimize the value of co-design, instead of designing technology that can be pushed towards communities, a bottom-up approach rooted in community participation should be employed.

## **5. RESULTS**

The literature review has identified five key themes closely associated to the concept of co-design with communities: stakeholders, context, ownership, social learning, and sustainability. The quantitative findings indicate these themes as being the most representative ones across the three disciplines analysed, yet the importance assigned to each theme, as well as approaches in defining and tackling them, are different. In the following sections, the key themes will be presented.

### **5.1. Stakeholders**

A stakeholder is defined as an organization, a social group, a community or an individual who can affect or is affected by the achievement of the objectives set by an organization or initiative (Heeks and Kenny, 2002). The relationship between stakeholders and ICT design and development is emphasized by the sample of surveyed studies that employed field research and mixed research methods (qualitative and quantitative).

In their position of project stakeholders, local communities are on the one hand contributing to the success of initiatives by investing their own resources, and on the other are affected by a project’s success or missed outcomes. Co-design creates opportunities for communities to contribute with their social and cultural knowledge in the design process, providing information to designers about their local context (Thompson, 2008), cultural habits, and taboos. Studies positioned in the ICTD literature, and in particular those implemented in developing contexts, note that communities tend not to use artefacts designed for their own benefit, in some cases due to local taboos and beliefs (Parker and Gallagher, 2007). This raises attention to the importance of properly identifying and involving the right stakeholders, who may be identified not necessarily by geographical location, ethnicity, or economic level, but by the common interest they have in a project (Narayan, 1995). Gaps in participation may therefore be formulated in terms of whose interests are represented. Several groups may be systematically excluded from participation even if their interests are at stake, for instance women (Kanji and Greenwood, 2001). Mismatch of benefits appears when during co-design sessions a community is represented by a single person of relevance in the developing context structure (Parker, 2007). These co-design processes tend to end in “design-reality gaps”, or missed outcomes (Proenza, 2001).

Studies conducted in Africa and Asia point out the benefits that designers and academic practitioners gain from working with communities, ranging from increased efficiency, sustainability, and adoption, to the effectiveness of the delivered ICT solutions. There is a higher quality and effectiveness in decision-making, which leads to the deployment of relevant activities for program development. The participation of the right stakeholders

reduces the potential presence of conflicts and resistance to change. The involvement of influential people in the community (traditional leaders, religious leaders, government structures, political figures) creates space for social acceptance (adoption) and the effective employment of local expertise. These elements are determinant for ICT projects' success (Albinsson et al., 2007; Kleine and Unwin, 2009).

## 5.2. Context

The notion of *context* begins to appear in the co-design and participatory design literatures in the 1990s, when co-designers and participatory designers started to take this aspect into consideration and link it to others such as *empowerment* and *effective design* (Ehn and Badham, 2013). The local context emerged as important amidst discourses on the design-reality gap, brought to light by the evaluation of ICTD projects in developing areas. These evaluations highlighted the important place of cultural values, habits, and taboos, and their bearing on the development of artefacts that are deployable and practical (Avgerou, 2008). As Avgerou (2001) argues, technological innovation in developing countries has often been done through the transfer of solutions that proved successful in developed contexts. Yet, the value and fit of these solutions in new socio-cultural contexts can never be taken for granted.

There is no universally agreed definition of *context* in the literature surveyed. Many studies tend to refer to it generally as the socio-cultural and physical environment in which a social group lives. The notion of *context* and that of *culture* appear to be very closely related. Those studies that give accrued importance to the local context tend to embrace social constructionist theoretical perspectives, which emphasize the interpenetration of the social and technical sphere (Avgerou, 2008). In this theoretical perspective, *context* has a quality of dynamism and evolution, and includes equally physical places, artefacts, and people. The focus falls on invisible patterns of relatedness that link people, artefacts, and activities (Dourish, 2004). This take on context contrasts with the positivist outlook in which the context is the outer environment surrounding people and the activities they perform (Idem). While this latter perspective can be and has been employed in accounting for the local context in technology interventions, it has some important drawbacks. Especially, it tends to see it as a stable entity open to be studied and represented from an outer, objective stance, and it disregards the relation with people and their activities (Dourish, 2004: 4-5). On the contrary, a constructionist view of context emphasizes the key role of the local people in defining meanings, understandings and usages of technology as they interact with it in their own social milieu. Thus, it provides a theoretical foundation and an explanation as to why it is important to involve the local people in the co-design of technological solutions.

The way *context* is understood can be linked to differences in methodological approaches. Studies that point to the importance of the local context favour a bottom-up approach, where relevant design solutions are sought through the involvement of local people since the early stages of a development program (Avgerou, 2010). Studies that indicate more broadly the importance of the local culture tend to employ ethnographic approaches (Crabtree, 1998).

The papers surveyed agree that communities are the ones that know best their own life context, and are therefore the most entitled to contribute to expanding knowledge for the implementing agencies. Local knowledge is thought to be fundamental for the success of an initiative especially for initiatives concerned with local knowledge production and

communication (e.g. Rodil et al., 2012; Winschiers-Teophilus et al., 2010). When the aim is to create culturally representative and locally useful artefacts, it becomes fundamental to conceive the design process starting from a local viewpoint, and allowing activities and design solutions to emerge from it (Rodil et al., 2012), favouring community involvement in all design stages. Nevertheless, the literature outlines as well some of the reasons for failing to take into proper consideration the local context. Studies point to the challenges faced by researchers and practitioners during fieldwork, such as the lack of basic resources as well as communication barriers (Zaharia, 2008).

### 5.3. Ownership

The concept of “community ownership” is linked to the success of a project and its capacity to become sustainable. It has been argued that by participating in the design of technology artefacts, a community may be prone to develop a sense of owning the artefact, which quickens the process by which it is appropriated and integrated in its practices (Ramirez, 2008). Yet, caution should be paid in establishing a direct relation between a community’s participation in design and the development of a sense of ownership. Not all forms of community engagement are likely to foster this sense of ownership.

The co-design process creates a framework in which a certain dynamic of interaction between stakeholders (local and external) is generated and nurtured. It is believed that a sense of ownership emerges when the community provides meaningful contributions from the beginning stages of the design process, starting with the definition of priorities, and leading to what Ramirez (2008) calls “ownership of the problem and its solution”. Fake or superficial forms of involvement would likely fail to achieve this result. Parker and Gallagher (2007) generated the notion of *empty promise* where “communities are quick to recognize an empty promise of a greater artifact”. The co-design literature indicates this is likely to occur when consultation with community members bears no reflection on final decisions, and where bottom-up decision-making continues to be undermined by top-down directives (Walsh et al., 2006).

The relation between *ownership* and *sustainability* is emphasized in the analysed documents. Especially in the ICTD disciplinary strand, it is indicated that apart from financial aspects, one of the chief reasons for failure lies in the fact that projects are not embraced by the communities (Kujala, 2003). On the other hand, studies point out that through community involvement comes understanding, and with understanding comes public support and commitment (Harris et al., 2003). Studies indicate as well that communities in developing areas have not been participating enough in co-design processes, or the studies reporting community involvement fail to outline precisely how much a community contributed to the development of the artefact (Merkel et al., 2004).

### 5.4. Social learning

Social learning refers to the sharing and development of adaptive group strategies for individual learning based on observation and problem solving in group settings (Sanders, 2005; Huxham, 2000). Sanders and Stappers (2008) place social learning at the heart of current changes in the design landscape, characterized by the emergence of new forms of collective creativity. Co-design with communities at the same time promotes and relies on social learning, which is seen as a process of knowledge advancement through exchanges between a local community and the design team (Conruyt et al., 2010). The *social* in

*social learning* relates to the collaborative nature of the co-design process. Learning takes place through participation in group settings, through sharing and exchange (Sanders and Stappers, 2008).

Learning is also a condition for local people's effective participation in design decisions (Hearn et al., 2009). ICTD studies tend to emphasize the importance of learning as participation in the co-design process especially for producing artefacts that represent or store representations of local identity, culture, and knowledge systems (e.g. Rodil et al., 2012; Verran et al., 2006). In these cases, knowledge of the local context, culture and history are used to better define the functionalities and uses of the technical artefact to serve community needs for knowledge production and communication. These practices are successfully introduced when a person from the community is previously trained by researchers on the topics dealt with (Ramachandra et al., 2007), as it takes time to design relevant for the local context and culture when design is conducted by people outside the community (Winschiers-Teophilus et al., 2010).

## **5.5. Sustainability**

Sustainability can be defined as "the ability of a project or intervention to continue in existence after the implementing agency has departed" (Harris et al., 2003: 2). Economic or financial sustainability refers to the long-term ability of ICT projects to generate enough income to meet their operational and maintenance costs (Johnson, 2000). In the studies surveyed, two aspects of the relation between the co-design process and sustainability can be identified.

Firstly, it has been argued that the co-design process itself can be instrumental to boosting a project's potential for sustainability, if people's involvement in design contributes to fostering a sense of project ownership (Ramirez, 2008). At this level, a community's social capital, inclusive of communal values and aspirations, needs to be accounted for as a crucial factor for sustainability (Simpson, 2005). By becoming involved in the initial stages of the design process, people are prone to embrace and integrate its solution in their practices. Moreover, they may become sensitive to the identification of communal issues that can be adequately met by technology usage, and knowledgeable of socio-technical aspects that they can apply in activities promoted after a project's completion.

Second, studies point to the importance of including local members in decision-making and management of financial issues. Financial sustainability is one of the greatest challenges ICTD projects face (Zaharia et al., 2008), and co-design projects are not an exception to it. This aspect is entangled with the duration of typical ICTD projects, as in many cases donors have a limited time and resources to set-up and develop a project (Kumar and Best, 2006). ICTD projects tend to be created with a business plan that oversees the generation of sufficient money ensuring continuous access for communities at a lower cost. This aspect has not been given sufficient attention in many community-based initiatives (Roman and Colle, 2002, 2003; Harris, 1999; Harris et al., 2003). Based on repeated evidence of past projects failure, the literature shows the importance of co-designing a business plan with the joint involvement of financial donors, implementers, and beneficiaries (the local communities) in the planning process (Luk, 2008).

## 6. DISCUSSION AND CONCLUSION

This paper described the results of a literature survey on co-design with communities serving community development goals. The studied documents were grouped according to their research and disciplinary area in three strands: ICTD, information systems, and social design. The survey highlighted five themes that were found to be most closely connected to the process of co-design with communities: *stakeholders*, *context*, *ownership*, *social learning*, and *sustainability*. These themes connect and converge into a frame marking the conditions and impacts of successful co-design processes with and for communities. These themes demark key topics permeating the state of the art literature, and also delineate the areas that researchers and practitioners should focus on, or take into consideration in their critical analysis and set-up of future co-design initiatives. A few considerations can be advanced from the analysis of connections and relations among the themes.

*Firstly*, with respect to the theoretical orientation, it is noticed that taken in their togetherness the five themes are associated with the social embeddedness discourse in ICTD, by which in order to be accepted and appropriated, technological innovation needs to be embedded in the socio-cultural and organisational context (Avgerou, 2008). These tenets are evident in the concern with the local context and social aspects, and the importance assigned to these for a project's success and sustainability. There is an underlying belief that the implementation of development projects should not be focused only on technical means to deliver services. The lack of contextualization and knowledge of local social structures makes it difficult to run a self-sustaining ICT venue. The importance of these social aspects emerged in practice in the aftermath of many ICTD implemented projects, after the funds invested by governments, non-governmental institutions and development agencies faded. Failure to take into account social aspects is reported to result in low adoption of ICT solutions, difficulties in maintaining the technical infrastructure, and low capacities and internal resources to sustain the venue beyond project completion.

*Secondly*, different orientations were evident in the literatures surveyed with respect to the legitimation of co-design initiatives depending on whether the stress falls on community involvement as a means to an end or an end in itself. When the focus falls on communities as main stakeholders, community participation in design appears to have an intrinsic value, as it empowers people to take agency over activities of immediate relevance for their lives. In this optic, it is important to understand the way stakeholders participate, inform and communicate their involvement in design. *Learning* is valuable as it enables people to pursue the expansion of abilities and choices that can contribute to their overall well-being. On the contrary, in a *means to an end* optic, co-design emerges as a solution for improving the success rates of ICTD projects. This underlying belief is evident in the accent placed on sustainability and community ownership. Some studies (e.g. Ramirez, 2008) hold it that by involvement in the early stages of design, local people are likely to develop ownership of a project and ensuing products, therefore boosting its potential for sustainability. In this perspective, social learning gains a different value, as a means by which a project can benefit by enabling reciprocal exchanges of knowledge and information between local communities and implementation teams.

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