

ICT4What? – Using the Choice Framework to operationalise the Capability Approach to Development

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Abstract— Identifying the specific contribution of the use of ICTs to specific development goals has proven to be extremely difficult. This paper argues that instead of trying to make ICTs fit with a linear conceptualisation of impacts and an often economic view of development, ICT4D should be used as a prime example of a development process which has to be analysed in a systemic and holistic way. Amartya Sen's capability approach offers a way of thinking about development not as economic growth, but as individual freedom. The Choice Framework is presented as a way of operationalising this approach and visualising the elements of a systemic conceptualisation of the development process. An individual case study, related to telecentres in rural Chile, is used to demonstrate the way the Choice Framework can be applied as a guide to a systemic and holistic analysis.

Index Terms— ICT4D, Amartya Sen, capability approach, Choice Framework, telecentres, Chile

I. INTRODUCTION

The paradox is this: ICTs and particularly the internet are widely regarded as groundbreaking inventions that have changed the way millions of people live their lives, and yet researchers and practitioners in the field of ICT and development often struggle to prove specific impacts of the technology to funders. There may be specific reasons why particular projects fail, even some generalisable patterns of failure [1], but the overall degree to which the ICT4D community has to struggle when trying to legitimise its work to funders is astonishing in the context of a general discourse about how much these technologies have changed our lives. This paper tries to unravel the reasons behind this paradox by arguing two fundamental points: On a theoretical level, while there have been interesting alternative theoretical approaches to development, including Amartya Sen's capability approach, the mainstream discourse's conceptualisation remains heavily focused on economic growth, which is too narrow to capture the impacts of ICT. Secondly, and on a practical level, the common way of measuring impact by defining the intended development outcomes top-down and a-priori is unsuitable in the context of multi-purpose technologies which could empower individuals to attain development outcomes of their own

choosing.

The paper is structured in six parts. In section one I briefly introduce Sen's capability approach before presenting, in section two, some important steps towards operationalising it. Building on this body of work, section three develops the Choice Framework as a further way of operationalising Sen's approach. Methodological implications are explored in section four before in section five the Choice Framework is applied in a case study of one particular individual's usage of the Internet in a telecentre in rural Chile. The final part points out limitations of the model, directions for further empirical research and calls for more theoretical work on the nature of the "development" element in ICT4D. The paper concludes by highlighting some concrete implications this theoretical work may have for practitioners.

II. EVOLVING THEORIES OF DEVELOPMENT

Research located in the contested intellectual space that is 'development' needs to be able to answer the fundamental question of what is understood as development. Broadly speaking, debates in development studies range from positions which equate development with economic growth (e.g. [2], [3], [4], [5]) through to critical perspectives stressing that uneven development, dependency and inequality are inherent in capitalist development (e.g. [6], [7], [8], [9]) to ideas of alternative, bottom-up development recognising social and ecological as well as economic goals (e.g. [10], [11]), and radical "post-developmental" critiques that often dismiss the entire "development project" altogether (e.g. [12], [13]).

The most influential challenge to the mainstream growth-focused view of development has come from Amartya Sen's capability approach (also known as the capabilities approach) in which development is defined as "a process of expanding the real freedoms that people enjoy to lead the lives they have reason to value" [14]. His understanding focuses on development as freedom of choice. While this understanding of development is a minority position within institutions such as the World Bank [15], Sen's approach has influenced the development discourse and it provides a

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means of building a bridge between those working in international development organisations and researchers in academia.

The approach developed by Amartya Sen ([16], [17], [18], [19]) argues that development is about the freedom of choice in the personal, the social, the economic and the political sphere. In Sen's approach, "functionings" are the various things a person may value doing or being, such as being adequately nourished, being healthy and being able to take part in the life of a community. In Sen's terminology a person's "capability" refers to the alternative combinations of functionings that are feasible for her/him to achieve [20]. The focus of development thus becomes increasing a person's capability set, or her/his substantive freedom to lead the life she/he values. Functionings represent the "outcome" component, while capabilities are the "freedom" component in this approach.¹ In Sen's more holistic view of development, economic growth plays an important, but not exclusive, role. Sen suggests ontologically focusing on human wellbeing and methodologically focusing on capabilities.

While welcoming Sen's approach at offering a more holistic view of development, scholars have been struggling to find a balance between its conceptual richness and its potential to be operationalised. Several scholars [21], [22], [23], [24] have attempted to operationalise the approach. Within this field the majority of studies use capabilities as a normative basis for the research while measuring functionings as a proxy [25], owing to the practical difficulty of measuring capabilities. Some authors (e.g. [26], [27]) have challenged Sen to draw up a general list of capabilities, but Sen has refused to do so, claiming that specific lists of capabilities ought to be drawn up for a given research or policy context [28] and, crucially, that the process of choosing capabilities should be left to the individual [29]. The dilemma which emerges is how to apply the capability approach to specific areas or sectors in a meaningful way while retaining open-ended development outcomes that do not presuppose individuals' choices.

II. OPERATIONALISING SEN'S APPROACH

Sen intended his approach to be combined with other theoretical approaches [30]. The following section explains how, in order to operationalise the approach for ICT4D and other areas of development, elements have been drawn together from the literature on empowerment and on sustainable livelihoods to enhance the application of Sen's approach.

A. Empowerment

One of the most interesting attempts to operationalise Sen's ideas is offered by Alsop and Heinsohn [31]. Writing for the World Bank, they link choice with their definition of

empowerment². They define empowerment as "enhancing an individual's or group's capacity to make effective choices and translate these choices into desired actions and outcomes" [39]. ICTs could be seen as useful tools in such processes of empowerment

Alsop and Heinsohn see material and non-material assets, or resources, as the basis of individual agency which, together with the structural conditions frame empowerment processes. In their attempt to use empowerment as a middle-range theoretical concept to convert the development paradigm of choice into a construct that is of use to practitioners, Alsop and Heinsohn build a crude framework which connects "individual agency" with an "opportunity structure" from which follow the degree of empowerment an individual has to achieve development outcomes. The different "degrees of empowerment" are: existence of choice, use of choice and achievement of choice [40]. Individual agency is measured by an individual's asset endowment, consisting of "psychological, informational, organisational, material, social, financial or human" assets [41]. These assets are listed, but not defined. An actor's opportunity structure is said to be shaped by the "presence and operation of the formal and informal institutions" [42] and measured by the presence and operation of laws, social norms and customs. Alsop and Heinsohn have applied their framework in the evaluation of World Bank projects with women, on rural water supply and sanitation, on school decentralisation and with school drop-outs.

B. The sustainable livelihood framework

Another literature which can be linked to the capability approach is the literature on livelihoods. Based on earlier work on livelihoods ([43], [44], [45]) the Sustainable Livelihood Framework (SLF) used by the UK Department for International Development (DFID) [46] offers an analytical tool to understand in a systemic way the elements influencing the lives of the poor. Duncombe has demonstrated how the SLF can be applied to ICT4D research with microenterprises [47], while retaining the focus on poverty reduction through economic growth. The SLF includes the concept of an individual's "capital portfolio" made up of five "capitals": human capital, natural capital, financial capital, physical capital and social capital.

In operationalising the SLF, human capital is measured by formal education and health indicators, but there has been a struggle to quantify "social capital" [48]. As a result, critics have argued that "everything social" gets packed into the social capital variable [49].

Individuals own or have access to this portfolio of capitals, their "livelihood assets" with which they negotiate "policies, institutions and processes". They operate within a "vulnerability context" and develop livelihood strategies

¹ For a more in-depth discussion of the capability approach, see also [32].

² The concept of empowerment originated in work on gender relations and community participation (e.g. [33], [34]) and has been increasingly discussed in development studies (e.g. [35],[36], [37], [38]). There are several competing definitions of the term.

which then result in livelihood outcomes. Livelihood outcomes are defined a priori – In the DFID version, “more income” is listed at the top, even before “increased wellbeing”. The SLF offers a broad and systemic view of development processes, but its

some degree. Mainly, the outcome component will map or measure the achieved functionings resulting from an individual’s choices as a proxy to the capabilities.³ An analysis based on the Choice Framework would then work backwards, from the outcomes, into the systemic

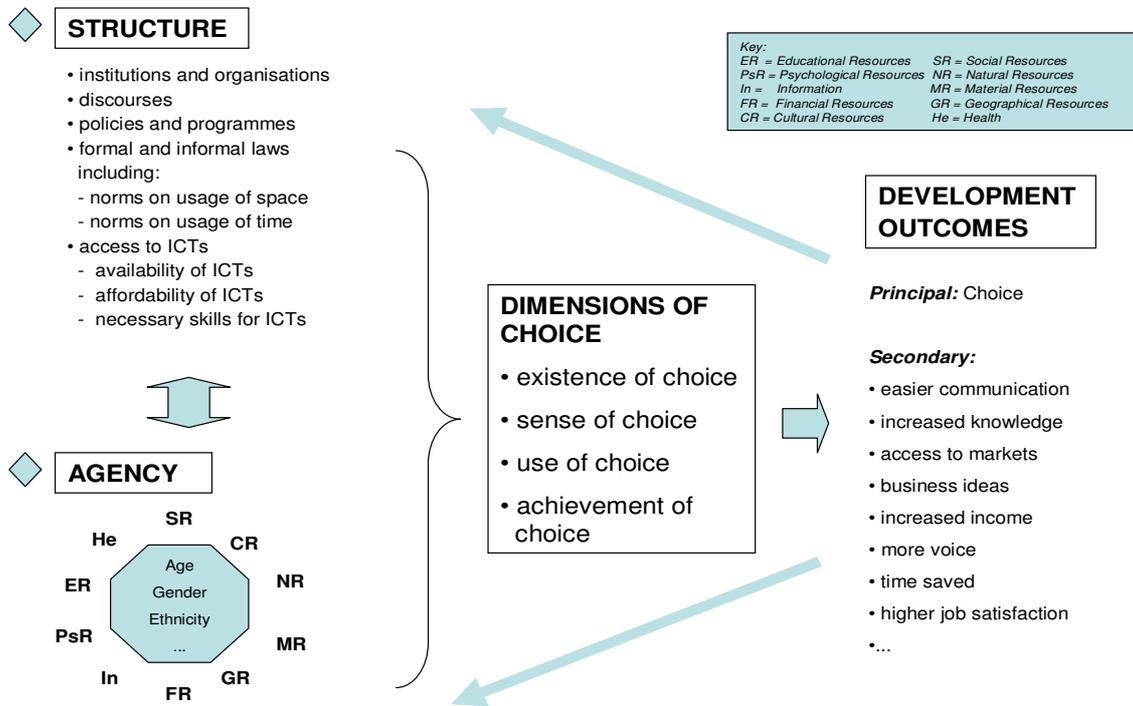


Fig. 1: The Choice Framework

set of capitals is limited and in it the development goals are predetermined and not up to the individual to choose. In this respect, the SLF fails to mirror the thinking behind Sen’s approach.

III. THE CHOICE FRAMEWORK

Based on Sen’s capability approach, inspired by Alsoop and Heinsohn’s work on operationalising Sen’s work, taking elements from the SLF and informed by an in-depth research project with microentrepreneurs’ use of ICTs in Chile [50], the Choice Framework was developed. After presenting it in diagrammatic form (Fig 1), the following sections will in turn explain each of the key components of the framework.

A. Outcomes

True to Sen’s statement that choice is both the aim and the principal means of development [51], the primary development outcome is choice itself. Secondary development outcomes depend on the individual’s choice as to what lives they value. These may include, for example, easier communication, increased knowledge, more income or time saved. *Information* and *communication* technologies might prove useful tools in achieving these outcomes. Just like other attempts to operationalise Sen’s work, here capabilities are not measured directly, though participatory research with individuals and groups may reveal them to

relationships between agency, structure and choice, thus analysing how the outcomes were arrived at.

B. Dimensions of Choice

Alsoop and Heinsohn’s dimensions of choice, which they call “degrees of empowerment” include, firstly, the existence of choice – whether the different possibilities exist and are, in principle, attainable for the individual if the combination of their resource portfolio and the structural conditions would allow it. The second dimension, a sense of choice, not originally included by Alsoop & Heinsohn, was added as a result of fieldwork experiences relating to ICT and development. Individuals were aware of some possibilities the new technology offered them, like email and online chat, but not of others, like Voice over IP. This was precisely because their educational resources (including computer skills) and the dominant discourse in the Chilean media stressed some usages over others. For any piece of research focused on a technology which is new to the respondents, the dimension of “sense of choice” will play a significant role. The “use of choice” dimension refers to whether or not an individual actually makes the choice and the

³ Two disadvantages of this method are that some of the individual’s capabilities are not captured in the achieved functionings and that it is difficult to trace the choices related to apparently negative outcomes. However, so far, capturing functionings is methodologically easier and

“achievement of choice” refers to whether the outcome matches the choice expressed.

C. Agency

Instead of using a terminology of capitals and asset or capital portfolios, Sen uses the term “resources” within the capability approach [52]. Resources can be interpreted as individual agency-based capability inputs which, together with structure-based capability inputs, can be converted into capabilities [53].

In the Choice Framework age, gender, ethnicity etc. are conceptualised as personal characteristics of an individual which may in a given social context become related to socially constructed axes of exclusion and influence the scope and scale of the resource portfolio. The resource portfolio consists of:

Material resources: These sum up the material objects owned, such as machinery, computer hardware and other equipment. They are also essential inputs in the production process.

Financial resources: These stand for financial capital in all its forms (cash, savings, shares etc.). The ability to obtain credit is a combination of the structural character of the banking rules and individual collateral.

Natural resources: This includes issues such as geomorphological and climatic conditions in a locality and related aspects such as soil quality and the availability of or access to water as well as the attractiveness of the surrounding nature.

Geographical resources: Covers the practical implications of location and relative distances, and also includes the intangible qualities of a location alluded to by writers from Marshall (who refers to the mysteries of the trade “in the air” [54]) to Storper and Venables (who describe the “buzz” of face to face contact in the urban economy [55]).

Human Resources: The term “human resources” has been used for decades in the economics and industrial relations literature.⁴ In the Choice Framework, this term needs to be disaggregated into Health and Education and Skills (educational resources). Within Sen’s paradigm of development, good health is a prerequisite for a person’s ability to choose the life she/he values. Educational resources represent education and skills acquired through formal and informal means.

Psychological resources: Alsoop and Heinsohn [56] recognise the significance of “psychological assets” and give as an example “capacity to envision”. More broadly, psychological assets may include self-confidence, tenacity,

optimism, creativity and resilience. Spiritual or religious beliefs stand in complex interrelation with psychological resources – they can strengthen or weaken an individual’s psychological resources.

Information: Alsoop and Heinsohn list informational assets as a key resource. Heeks [58] calls for putting information at the centre for analysis of ICTs and Development, and Giggler [59], adds “informational capital” to the capital portfolio. Access to information is the first step to knowledge acquisition, the process of filtering and transforming information into meaningful knowledge.

Cultural resources: “Cultural capital” – which in the Choice Framework is called cultural resources – exists, according to Bourdieu [60], in three states: an embodied state (the *habitus* a particular person lives in); an objectified state (objects like paintings, instruments and monuments which only the initiated can use or appreciate); and an institutionalised state (prestige attached to, for example, academic titles).

Social resources: “Social capital” – or social resources – is included in both the SLF and Alsoop and Heinsohn’s work. It has been both immensely influential and highly contested in development discourse. For the Choice Framework, Bourdieu’s definition of social capital is used:

“the aggregate of the actual and potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition – or in other words, to membership in a group – which provides each of its members with the backing of the collectivity-owned capital, a “credential” which entitles them to credit, in the various senses of the word.”[61]

Membership of these groups can be defined by kinship, friendship, shared ethnicity or class, friendship or informal commonality ties.

Thus, these ten types of resources – material, financial, natural, geographical, psychological, cultural, social, and educational (education and skills) resources; health; and information – represent an attempt to holistically map aspects of the agency element of the systemic framework.

However, it is important to recognise that this resource-based agency can only be realised within the confines of and in systemic interaction with a given structure. This aspect of the Choice Framework will be analysed in the following section.

D. Structure

Both the empowerment framework suggested by Alsoop and Heinsohn and the SLF take into account not only individual agency, but also structures which aid or constrain this agency. Alsoop and Heinsohn list “formal and informal laws, regulations, norms and customs” [62] as elements of this structure, while the DFID SLF includes these as laws

more precise – in regards to both quantitative and qualitative methods – than capturing capabilities.

⁴ For examples, see the collection by Fitzgerald and Rowley [57]

and “culture” – the latter running the risk of being used as a kind of black box into which all locally specific aspects can be subsumed. The SLF includes not only laws, but also policies, institutions and processes. Rules, laws, norms and policies are embedded in, and often emanate from discourses, and hegemonic discourses can define the thinkspace in which policies, including ICT policies, can be conceived. Thus discourses are included as part of the structure element of the Choice Framework.

In particular with respect to ICTs, relevant elements of the structure which influence an individual’s agency include dimensions of access, such as availability, affordability and capabilities needed for using different ICTs [63]. To avoid confusion with Sen’s use of the word, the term “skills” is used instead of capabilities. These dimensions of access are nationally and often locally specific, path dependent and embedded with other elements of the structure.

Structural factors such as these stand in a complex relationship with an individual’s resource portfolio. For example, with the help of social resources an individual might have access to the internet (at a neighbour’s house) which might lead to frequent email contact with a distant family member, thus increasing occasions of, in Bourdieu’s terms, legitimate exchange with both the neighbour and the distant relative, in turn potentially increasing social resources. Similarly, a person with higher educational resources (skills and education) and information might find it easier to use the existing access facilities to enhance their skills and gain information. The interface between the opportunity structure and individual agency thus includes a host of reciprocal and cumulative processes. Structural constraints need to be recognized as being as important an element as individual agency. To reflect this, structure is placed above agency in the diagram of the Choice Framework.

The Choice Framework is an attempt to operationalise the capability approach in a holistic and systemic way, thus maintaining much of its conceptual richness. While it may prove particularly useful in the area of ICT4D, the framework could also be applied in other areas of development work.

IV. IMPLICATIONS FOR METHODOLOGY

The basic challenge that the capability approach offers to the orthodox methodologies of development research, and ICT4D in particular is that, on a fundamental level, it questions the validity of outcomes that are defined a priori and without consulting the individual in question. Both the inclusion of a development goal and its position within a set of development priorities, however, relate to the question which kind of life people would choose to live and this, according to Sen, is what development is about. A funding institution or government may set, say, economic prosperity as the top priority. Once basic needs such as food and shelter

have been met, however, an individual may value being close to family members above earning more money, or may value a healthy environment for themselves and their children over economic growth. In the practice of development projects, this means that before undertaking an intervention designed to improve people’s lives and later measuring its effectiveness, practitioners and researchers would have to ask individuals about their own development priorities and let these guide the planning, implementation, monitoring and evaluation of development projects and programmes. Work done in this area includes participatory monitoring and evaluation [64] and, in a broader context, initiatives around participatory budget planning [65].

Setting development priorities in a participatory way may make the process of development planning more complicated, but it comes with major benefits: Firstly, morally it is the right thing to do to engage the people themselves in the decisions that will affect their lives. Secondly, if the outcomes have been agreed upon in a participatory way, they are more likely to be locally and culturally appropriate and may reduce the rate of failure. Thirdly, a participatory process will lead to greater local buy-in to measures and therefore higher future institutional sustainability. Fourthly, such a process harbours the chance that the current overly economic focus of development work can be broadened to include environmental, social and cultural aspects and thus better mirror the diversity of the kinds of things people value in their lives. Last, and perhaps not least, ICT and development practitioners work with multi-purpose technologies which offer far more significant changes to people’s lives than the economic impact they have been proven to have. Moving away from an a priori, top-down and often overly economic set of development priorities offers the chance to recognise the diversity of the contributions ICTs can make to the social, cultural, environmental and economic aspirations individuals may have for their lives.

The Choice Framework is one way of conceptualising such choices by the individual. There are some specific implications for research design which result from the model: A focus on the individual’s own development outcomes means that the research needs to start from these wished-for outcomes, measure the degree to which they have been attained and work systemically backwards through structure, agency and choice to understand how these outcome have come about. The extensive list of resources covers six less tangible resources (social, cultural, educational, psychological resources, health and information) which pose challenges to measurement but need to be taken into account. On the structure side, access to ICTs is conceptualised as availability, affordability and necessary skills. ICTs are embedded in the wider set-up of institutions, policies, programmes, norms and discourses. As such they need to be analysed as firmly and historically engrained in the societies they affect.

V. APPLYING THE FRAMEWORK: IMPACTS OF TELECENTRES IN RURAL CHILE

The following example is part of an extensive ethnographic study of how state ICT policies affected microentrepreneurs in rural Chile [66]. When interviewing microentrepreneurs and their partners who were using a telecentre located in a public library in rural Chile, open-ended questions revealed that apart from business-related usages such as looking up prices of machinery on the internet (carpenters), looking up photos of furniture models (carpenters), communicating via email with a supplier (carpenters, spice vendor) or buyer (spice vendor), looking up recipes (cake vendor), and looking up guidelines for government business assistance (carpenters), there were several answers which reflected what in many studies of telecentre usage is described as “personal usage”. Respondents’ faces lit up when they described how they now could exchange emails or chat with relatives who were living abroad, children who were studying in a larger town or family members who were working as temporary labour on fruit farms or in the mines in the north of Chile. One respondent, a woman in her 50s whose household income was around 440 USD per month and who together with her husband ran a carpentry business, described how while the World Cup was on in Germany in 2006 she visited the world cup site to find links and take virtual tours of some of the German cities she was not able to visit in person. As a young woman, she had had a pen friend from Kaiserslautern, and while he had come to visit her in Chile, her dream of visiting him had never been possible because, she said, the money she saved had been spent on her children’s education. Eventually, they had lost touch, but now, she told me with tears in her eyes, over 25 years later, she was finally able to “visit” Kaiserslautern, right here in the telecentre.

If one were to apply a typical questionnaire on telecentre usage to this case, this woman’s usage experience might be subsumed in the category “personal usage” or “other”. Yet the following section will offer a careful application of the Choice Framework to this case:

A. Outcome

The primary outcome was that the respondent had improved choice, in this case, between “no visit to Kaiserslautern” and “virtual visit to Kaiserslautern”. The secondary outcome achieved was defined by the individual: “to see more of the world” – which in this case, translated into “virtual visit to Kaiserslautern” - in Sen’s terms an “achieved functioning”. The aspiration was “visit to Kaiserslautern”, which since it is feasible, could be seen as a “capability” in Sen’s terms. The achieved functioning “virtual visit” is not equal to the capability “visit in person” but it is an improvement in outcome over no visit at all.

Studies of development outcomes, or more commonly of impacts, often operate with a set of impacts as defined by the funding body, government, international organisation or commercial sponsor. This set of impacts then acts as a checklist informing the construction of questionnaires and

interview guides, possibly with some scope for “other activities”. Sen’s approach, with the individual’s choice as the primary outcome, however, would suggest that the analysis needs to start from the ground up, asking people about what lives they value and what outcomes they want to see. For this individual, one of the greatest impacts the telecentre had made was that it had given her the chance to virtually visit Kaiserslautern, something few policymakers or researchers would have predicted. Indeed, some might question whether this is a valid “development outcome” or “impact” for a telecentre. In Sen’s approach, expressed via the Choice Framework, it is.

B. Agency

The individual in question was a Chilean-*mestizo*⁵ woman in her 50s, married with four children who were all grown up now and had left the home. Her material resources did not include a computer and internet access at home and her financial resources made it difficult for her to spend money on using a computer in the local cybercafés. However her social resources (contacts with friends) had helped her gain the information that there was free access to the internet available at the telecentre in the local library. Her geographical resources (the location of her house) and her state of health were such that she could easily reach the telecentre on foot. She had the cultural resources to not feel intimidated when entering a space like a library and to know the behavioural code there. With the help of her social resources (knowing the librarian who was now also the director of the telecentre), her educational resources (literacy, rudimentary English) and her psychological resources (extrovert, willingness to ask questions) she quickly learnt how to use the computers. The information she gained online, together with her psychological resources (curiosity, tenacity) allowed her to understand the choices she had and find the site which offered the virtual tour of Kaiserslautern, thus achieving her chosen development outcome.

C. Structure

The agency of the individual is a shaper of, and is shaped by the structure in which it operates. In this case, as part of the national ICT policy, the *Agenda Digital*, the state of Chile had signed an agreement with the Bill and Melinda Gates Foundation for them to provide 9.2 million USD worth of hardware to be installed in public telecentres based in libraries around the country, running Microsoft software. The local library was an existing institution which was able to accommodate the hardware, delivered as part of the *Biblioredes* telecentre programme (availability of ICTs). The Chilean digital literacy campaign provided free IT courses to adults, and public discourse in Chile stressed the importance to become “digitally literate”, so the woman had taken the course (necessary skills). The formal rules for users of the telecentre stipulated that access was free (affordability of ICTs) but limited to 30 minutes per person at busy times,

⁵ i.e. not considered part of the indigenous minority which had historically been discriminated against.

and the informal rules were that people were left to use the computers on their own unless they asked for help from the telecentre director. Norms on the usage of space made it easy for her to go to a library as a *mestizo* woman with a completed school education who was known in town. However, norms on the usage of time meant that she could only use the telecentre when she was not supposed to be home preparing meals (gendered norms on time) or when she was expected to attend to customers (business norms on time).

D. Dimensions of choice

In the Choice Framework, an individual's resource-based agency can operate within a given structure to achieve degrees of empowerment, such as existence of choice, sense of choice, use of choice and achievement of choice. In this case, both the choice "travel to Kaiserslautern in person" and "take a virtual tour of Kaiserslautern" existed, the latter only since the links were offered via the World Cup website in 2006. In a capitalist market system, however, the former choice required an amount of financial resources which the individual felt unable to dedicate to this idea. The choice "take a virtual tour of Kaiserslautern" however, required a good internet connection, a computer, the knowledge that the tour was available via the website, the skills to find and run it, and time. The individual, thanks to among others, her social resources, information, and psychological resources, knew that the telecentre offered a computer and a good connection, had acquired the skills to navigate the Internet and run an application in the free digital literacy courses offered at the telecentre. She felt that informal, gendered social norms allowed her to go to the telecentre during the morning before having to prepare lunch. Thus she developed a sense of choice, was able to choose (use of choice) and achieved her desired outcome (achievement of choice).

VI. CONCLUSION

Applying the Choice Framework to this particular case allows us to firstly, theorise the use of ICT in a systemic and procedural way which reflects the systemic and pervasive impact of ICT. The "impact of ICT" is not conceptualised in a cause- and effect chain, instead effects are carefully disaggregated and their systemic interrelatedness and co-causality is demonstrated. Secondly, the Choice Framework offers a way to operationalise Sen's capability approach in the context of ICT. Sen's approach is currently the most well known heterodox alternative to orthodox, growth-focused and often economic conceptualisations of development. Given the enormous potential of ICTs to give individuals choices, and indeed a greater sense of choice, Sen's approach is of particular interest to the ICT and development research community.

There are three obvious limitations to the application of the Choice Framework, and this is where more theoretical work needs to be done:

Firstly, the Choice Framework aims to be comprehensive

in its modelling of the complex relationships between agency, structure, degree of empowerment and outcome, and this automatically entails a trade-off with the depth of theorisation of each element. Behind each of the terms included in the framework lies a wealth of theoretical literatures which may need to be synthesised for different research purposes and key issues brought to the attention of researchers in the development field. While for example, social resources can be theorised by linking to the wider debate on social capital (see [66]), which has been received in the development studies discourses, work on cultural capital (in Bourdieu's sense) is hardly ever linked to development discourses in the South.

Secondly, the Choice Framework is relatively easily applied in qualitative work on the micro-level of the individual. A further challenge will be how to apply the framework to groups of individuals, communities, or even nations. Within this and related to a theoretical tension evident in Sen's original approach, there is a complex relationship between individual and collective choice which will have to be conceptualised carefully.

The example used here to illustrate the potential of the Choice Framework is part of a far more extensive ethnographic and longitudinal study of how the state ICT policies affected microentrepreneurs in rural Chile [66]. In this study, connections are made between individual and collective choice. For example, the local authority's public procurement policy was analysed as an expression of collective choice, but related to individual's views as to how their tax money should be used to create the community they wanted to live in. However, further empirical work is necessary to gather experiences in the applicability of the Choice Framework in other cultural and socio-economic settings. The relationship between individual choice and collective choice needs to be conceptualised carefully in these local contexts in order to allow for the empirical application of the Choice Framework at the more aggregate level such as so-called target groups and communities.

The third limitation is a very practical one: funders prefer predefined and clearly measurable impacts. The Choice Framework, however, suggests that impacts of ICTs occur in a systemic, pervasive and transversal way, and that outcomes should be defined, in line with Sen's approach, by the individual, based on their choices as to what kind of life they value. There are, however, some funders who are open to methods such as participatory evaluation and monitoring, and this means there might be hope for genuinely people-centred development work – and development theory.

There are some key implications emerging from this theoretical work for practitioners of ICT. Firstly, while no technology is ever completely politically neutral [67][68], ICT4D projects can be placed on a continuum of "directional control". At one end there are projects and programmes which focus on providing people with access to a technology which is recognised as multi-purpose, like some telecentre projects. On the other end of the continuum

are projects and programmes which carry a much more narrow set of intentions, for example training microentrepreneurs to use a specific e-procurement system in order to “train them” to operate in a more competitive market environment under a specific set of rules [67]. The further down the directional control continuum a particular project and programme is located, the more risk there is that the intended outcomes of an ICT4D project diverge from the capabilities, or desired outcomes individuals in the so-called target group would choose. Thus, the more directional control is involved in the project or programme, the more participation of the set of individuals who are the intended group will be needed to reduce this gap. This would include conceptualising the development process as open-ended and the so-called target group as individuals empowered to choose the lives they themselves value. Participatory project design and participatory monitoring and evaluation techniques would be most appropriate.

Secondly, there are some macro-methodologies which reflect the ethos of giving people the power to choose. Voucher schemes are a good pragmatic way to monitor, in a heavily supply-driven development field such as ICT4D, what products (hardware, software etc), services (trainings, computer repair, communication etc) and content (economic, social, political, cultural etc) people would, after considering their options, actually choose. From the field of participatory urban planning come methodologies for participatory budget design, where communities get to debate and decide which of their desired outcomes to prioritise and pursue. This is a practical and democratic way to aggregate individual capabilities in order to enable collective decision making, and could also be used for ICT4D.

Thirdly, practitioners may deduce that if the ideal is for development projects’ intended outcomes to reflect the individual’s choices, then the more individuals are aggregated to a group, the less probable it is that they can agree on a similar set of capabilities. From this follows that the further down the directional control continuum an ICT4D project is, the more sensitive/locally customised it has to be to the choices of a smaller number of people. Big, uni-directional development programmes with specific, a priori defined desired outcomes designed for a large number of people are most likely to be in contradiction to a people-centred holistic development process as proposed by Sen and expressed in the Choice Framework.

Ultimately, researchers working on ICT, particularly the internet, need to consider the question: Should we try and fit a groundbreaking, multi-purpose and potentially liberating technology into orthodox notions of development – such as more ICT for higher GDP, more ICT for better school results et cetera – impacts which we may struggle to prove? Or can the field of ICT and Development serve as a test case and breeding ground for thinking about development in a more holistic way, putting the individual and their own choices at the centre of development? If the latter is the case, then we have plenty of work to do, but the Choice Framework may serve as one part of the big puzzle we have

to begin putting together.

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