

Innovation in Informal Settings: A Research Agenda
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Executive Summary

Innovation in Informal Settings: A Research Agenda

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1. The **research area** the IID program has chosen for its focus is an excellent one. It captures an important set of dynamics in development; it fills a gap in innovation studies and induces development studies to incorporate innovation concerns; and it has barely been explored previously.
2. The settings
 - a. We recommend a **definition of inclusive development** that encompasses actions that are both by and for currently marginalized groups (which we will hereafter refer to simply as “marginalized.”) The definition draws into view processes in which marginalized groups are “agents, not patients.” Agency is the characteristic that qualifies these processes as development.
 - b. The program prospectus calls for a focus on innovation in the informal sector. We recommend broadening that focus, to innovation in **informal settings**. The phrase informal sector conventionally refers to firms that are operating at least in part extra-legally. The “informal economy” also includes informal employment, which may be for either informal or formal establishments. These definitions include groups that are not marginalized, and we recommend removing them from the focus. However, we recommend also including marginalized households and communities as settings for innovation. Informal settings, thus delineated, constitute an important grouping because the lives of marginalized groups are concentrated there.
3. Grassroots Innovation
 - a. Applying the concept of innovation in informal settings challenges us to locate its essence. We propose using **five criteria** (i) newness, (ii) adaptation, (iii) interactiveness, (iv) knowledge content, and (v) learning, scaling-up and diffusion. These criteria both help us to identify innovation and assess its transformative and capacity-generating potential.
 - b. Innovation for marginalized groups, but not by or with them, has received attention in the literature under the phrases “*bottom of the pyramid*” and “*below the radar*.” The kinds of activities described under these categories, while important and interesting, fall outside the definition we have offered for inclusive development.
 - c. Given our definitions, **grassroots innovation** – by and for marginalized groups in informal settings -- becomes the central focus of the research agenda. It has received some attention in the literature, but there is much more work to be done.

4. Theoretical frameworks

- a. We recommend that the research agenda in this area be thoroughly **theory-intensive**. The strong tendency to produce case studies will not build toward general knowledge unless the cases are used to build theory. However, we recommend theoretical pluralism, since no one perspective offers all the lessons to be learned. Each theoretical framework has its strengths and weaknesses.
- b. The **innovation systems framework** has been widely used in studies of innovation in informal settings, and even applied to what innovation the informal economy contributes to national systems of innovation. To be useful, the framework must be adapted to the analysis of problem-solving systems rather than purely economic goals.
- c. The **socio-technical systems framework** has also been used, including by one large IDRC-funded study. It has the advantage of conceiving of systems as mixes of people and technologies rather than seeing technologies as drivers, and is thus well suited to the definition of innovation as adaptation.
- d. Theories of **collective action** may be particularly useful in this field. They call attention to “strength of motivation” and “trust relationships” as crucial variables, as well as modes of interaction among participants in the innovation process.
- e. **Institutional analysis** is also likely to be fruitful. “Informality” refers to an institutional status (outside state regulations). Institutions have always been a central concern in innovation studies. The relationships among institutions, innovation, and informality are thus ripe for exploration.

5. Research agenda

- a. Although grassroots innovation is currently studied largely through case studies, it would be very helpful to have **broader-scale surveys** of the rate and distribution of these activities. Surveys akin to those used in the formal sector would be helpful. The five criteria for innovation should be included. The surveys should be designed in gender-neutral ways and be particularly sensitive to gathering information on both men and women as grassroots innovators.
- b. Analysis of **sets of case studies** could also play an important role in systematizing knowledge in the focus area. The grassroots innovation databases of the Honey Bee Network in India and the Social Technologies Program in Brazil are thus special resources to be mined. IDRC projects have already begun that work, and more could be undertaken.
- c. Case studies themselves are likely to continue to be the bread and butter method in studies of grassroots innovation, however. A **good case study** of grassroots innovation should, at a minimum, identify all the relevant actors and the role played by each of them in the innovation process for the reported or detected innovation; determine the main aim of the innovation or the main problem it is supposed to solve, in the perspective of each of the intervening actors; analyze each innovation in

- terms of its cooperation characteristics; and explore whether the innovation is satisfactory or unsatisfactory from the viewpoint of the various actors involved.
- d. The literature also suggests several particularly important sensitizing concepts to be explored in each case:
 - i. **Gender.** Women are as likely as men to be grassroots innovators, but have received less attention in the literature. We applaud the commitment of the IID program to paying explicit attention to women as innovators.¹
 - ii. **Knowledge dynamics.** Indigenous, traditional, and place-based knowledge play important roles in grassroots innovation according to many accounts. But grassroots innovations may also involve blending of knowledge and co-creation. Are particular combinations of knowledge more likely to be transformative and capacity-generating than others?
 - iii. **Intermediaries.** Existing studies have examined the roles of cooperatives, universities, research organizations, and extension services in blending indigenous knowledge with other forms and helping grassroots innovators scale up and diffuse their inventions.
 - iv. **Institutions.** Both formal institutions and the rules of the game that operate in the informal economy are of interest. Positive and negative effects should be included.

6. Action audiences

A number of audiences outside the research community should be interested in the results of these studies, including the grassroots innovators themselves, intermediary organizations, government agencies for innovation, and development agencies. We recommend including them in shaping the questions asked and research design from the earliest possible stage.

¹ The effects of innovation on women, however, mentioned in some program documents, is again a fascinating research topic, but it falls outside the scope we are describing.

Innovation in Informal Settings: A Research Agenda²

Susan Cozzens and Judith Sutz

Development depends not so much on finding optimal combinations for given resources and factors of production as on calling forth and enlisting for development purposes resources and abilities that are hidden, scattered or badly utilized. (Hirschman, 1958: 5).

1. Introduction

Everyday lives on Planet Earth diverge dramatically. A small minority of households are economically secure and technologically connected. But nearly half the world's people live in households that are continually on the edge of collapse, keeping regular company with homelessness and hunger in the Black Holes of the information economy (Castells 1998), scraping together a living in small-scale commerce or jobs outside labor and health standards. This article calls attention to innovation in the second setting, placing it in the context of other innovation processes and suggesting a research agenda to inform public and private interventions to improve the connections between innovation, livelihoods, and problem solving there.

Informal settings have received limited attention in the mainstream innovation studies literature, which has a primary focus on the development of new products and processes in research-intensive firms. We use the phrase informal settings to include a set of places where people live, namely, marginalized households and communities, as well as a set of places where they work, namely, the informal economy. The informal economy is generally defined as economic activities outside government regulation ("extralegal"), and in turn includes two elements, the enterprises in the "informal sector" and informal employment in formal enterprises. The formal and informal economies represent a continuum of inter-related activities rather than separate spheres, and marginalized households and communities earn a living in both.

We direct the attention of the innovation studies community to innovation in informal settings because of the importance of these settings in inclusive development, the process of increasing livelihoods and capacities among people who are currently marginalized. Inclusive development is a broader concept than "informal settings," and research on innovation for inclusive development studies many settings, not just informal ones. Currently marginalized people are not confined to living and working in informal settings; and the actors in informal settings are not all currently marginalized people. Nonetheless, if innovation studies neglected informal settings, we would leave a significant hole in our understanding of the role innovation can play in inclusive development.

² We gratefully acknowledge the work of Rodrigo Cortes and Desiree Sehlapelo in gathering literature for this review and helping to shape its early stages. The article is inspired by, and indeed commissioned by, the Program on Innovation for Inclusive Development (IID) of the Canadian International Development Research Centre (IDRC). The authors thank colleagues there for setting this intellectual agenda and contributing their insights to our formulations, including extensive helpful comments on an earlier draft. All views expressed are those of the authors and not of IDRC or the IID program.

In the first section of the paper, we review major concepts from the innovation studies literature and give some examples of research that has applied those concepts to informal settings, then introduce relevant concepts from the development literature and connect them to innovation. Emerging from this discussion is the scope we propose for the concept of innovation for inclusive development, the broader research area within which studies of innovation in informal settings can be located.

In the second section of the paper, we review the definitions of the informal economy offered by labor economists and sociologists and introduce the few studies that have been done of innovation there. In that section, we compare the concepts used in those studies with a related family of concepts in innovation studies developed to study inclusive innovation, including bottom-of-the-pyramid and below-the-radar innovation, and social technologies. We then turn to key concepts in the literature that need to inform case studies: grassroots innovation, indigenous knowledge, gender, and institutions. In the third section, we turn to a model of cooperative innovation that we find to be particularly suited to innovation in informal settings.

The final section summarizes key aspects of the research agenda we are proposing. We attend in particular to the action audiences for the results of research on innovation in informal settings, that is, actors outside innovation studies who should find the results of value in shaping their actions: informal innovators, non-governmental organizations, universities and research institutions, and governments. We include suggestions for involving these audiences in setting the research agenda and absorbing its results.

Our intention in this article is not to homogenize the creative research strategies of the variety of teams involved in research in this area. Rather, our goal is to clarify some concepts and enrich knowledge of existing work in order to stimulate further creativity.

2. IID in the landscape of innovation and development studies

The area we are trying to explore is currently a mostly empty space. On the one hand, informal settings have received very little attention from scholars of innovation. On the other, innovation has received scant attention from development studies. In this section, we speculate on reasons for the lack of connection and call out some concepts from each of the parent areas that could be useful in charting the territory of studies on innovation in informal settings. Each discussion begins with some background information that will be familiar to readers from one field and necessary for readers from the other. Please bear with us.

2.1. Innovation Studies

While the study of innovation is currently a multidisciplinary area, its deepest taproot is in the economics of innovation. Early in the 20th century, Joseph Schumpeter (Schumpeter 1934) articulated the importance of innovation for an industrial economy, theorizing that firms would use innovation to compete economically. The invention of a new product or process could give a firm a competitive edge, made stronger by virtue of the temporary monopoly provided through patent protection. Invention, in Schumpeter's view, became innovation when the new idea was incorporated into practice. He saw innovation as a major driving force in economic growth and change. Since innovations could change the landscape of economic competition, Schumpeter referred to this process as one of "creative destruction."

Evolutionary economics, introduced by Nelson and Winter (Nelson and Winter 1982), incorporated this view of firms as dynamic innovators, developing the notion that the new products and processes entered a selection environment created by market and non-market conditions. Economic vitality for a country depended on the introduction of many varieties of innovation, so that some strong ones could survive. Attention to the selective environment was later incorporated into the idea of national innovation systems (Freeman 1987; Lundvall 1992; Nelson 1993), in which a network of institutions, including research and governmental ones, created an environment that was either more or less conducive to firm-level innovation. Together, such a system could learn to be more effective through skill-building, knowledge accumulation, and experimentation.

The economics of innovation has been closely associated for some time with processes of technological innovation and change, and its focus of attention has been the kinds of inventions that happen in formal research institutions, universities, or firms doing “research and development” (R&D). “Innovation surveys” were traditionally limited to manufacturing firms and only recently extended to agriculture, service firms and public sector activities. The system of innovation concept has helped “the economics of R&D” to become “the economics of innovation” by broadening the concept of innovation itself to non-technological learning processes. But the strong empirical focus of the field has continued to be on formal institutions.

Many of the central concepts of innovation studies, however, could be applied to innovation in the informal sector, understood as the collection of income-generating activities and micro-enterprises that are producing legal goods largely outside state regulation. (We return in Section 5.2 to a fuller discussion of this definition and what kinds of activities are included.) Individuals or small firms in the informal economy are still firms in the classical economic sense, and they have been demonstrated to invent, innovate, and learn. They are different from formal firms in their access to intellectual property protection and potentially in their access to science-based knowledge for innovation; but the differences are in degree rather than kind

Furthermore, some innovation scholars (Von Hippel 2005) have argued that innovation systems concepts can be applied to other settings where the actors are neither self-employed individuals nor firms, but rather any person, organization, or group trying to solve a problem. A household building a latrine or a community organizing its water system would be examples of innovation in these informal settings. The goal is not just income generation, but getting the tasks of everyday life done more effectively. As von Hippel puts it, “to the extent that individual user-innovators benefit from the process of developing or modifying a product as well as from the product actually developed, they are likely to innovate even when the (economic) benefits expected from the product itself are relatively low” ((Von Hippel 2005): 77).

A recent study of the *jua kali* sector in Kenya illustrates the first kind of extension of innovation systems thinking to the informal sector (Daniels 2010). *Jua kali* firms are very small service or manufacturing firms that make goods from recycled materials. Partly scattered across the countryside, they also sometimes cluster in certain geographic areas and exhibit strong learning processes. Many workers in these firms are men, newly arrived in the city from the countryside, who are trained in the skills they need to make or repair products. New equipment may be purchased by the larger firms or built by the inventive craftsmen in the cluster after reverse engineering. Design innovation is common, but as soon as one firm puts its design on the market, others are likely to copy it immediately. As with formal

technological innovation processes, *jua kali* activities are heavily male. Policy options for helping these firms survive and grow are very similar to the kinds of help provided to formal-economy small firms: centers to provide access to technical assistance; information about global markets and marketing; etc.

Innovation in informal settings is illustrated by Catalán's work on community water systems in Costa Rica (Catalan 2011). The innovation here takes place within the context of a national program to improve sustainability through local action. The national program supplies an organizational structure for local efforts and some technical expertise if requested, but the community enrolls voluntarily, and it must develop its own solutions to local problems if it is to be successful. In this case, women are often the leaders in the community groups that take on operating local water systems. A study of "social technologies" in Latin America provides additional examples of community-based, bottom-up innovations, encouraged in some cases by formal programs of supports (Fressoli, Smith et al. 2011). An example is the establishment of a biofuels production capability in Southern Buenos Aires, as reported by Garrido and Lalouf (Garrido and Lalouf 2011). The combination of technical knowledge from a local teacher and community need for school transportation fuel created a new industry with the potential to produce multiple benefits for socially excluded groups. The effort was initially informal, operating within the school. When the formal regulatory environment intervened, the original social inclusion objective suffered.

The identification of innovation activities as problem-solving activities, so dear to evolutionary innovation scholars, permits the easy inclusion of innovation in informal settings into the analytical framework of "classic" innovation studies. This step leads to a different association between innovation and development, not completely centered on the economic consequences of innovation but now including the notion of sustainable livelihoods. It is interesting to note, too, that this shift in emphasis implies another one: from innovation as a sort of remote and hands-off activity with eventual trickle-down effects on livelihoods (as often occurs when innovators in formal settings set out to solve problems that exist in informal settings) to hands-on innovation directly concerned with solving livelihood issues. In the latter case, people living in informal settings are protagonists. This issue of "directness" has been forcefully put forwards by Amartya Sen, even if while referring to other aspects: "If the government of a poor developing country is keen to raise the level of health and the expectation of life, then it would be pretty daft to try to achieve this through raising its income per head, rather than going directly for these objectives through public policy and social change..." ((Sen 1984): 496).

2.2. Development studies

What do we propose to understand by development? It is easier to start at the other end and posit what we do not understand by development, that is, economic growth alone and economic development alone. We do not equate development with catching-up. This is not to say that the divergence in productivity between sectors in different countries is not an important barrier for development, given that it leads to remarkable differences in salaries and working conditions. But limiting development to catching-up is making the unspoken hypothesis that trickle-down will have a sustainable and positive effect particularly on poverty and inequality, a hypothesis that fortunately has fewer supporters nowadays, given that the evidence of its inconsistency with empirical reality is undeniable (see (Infante and Sunkel 2009) for the Chilean case).

The fundamental difference between economic growth and development was central in the Latin American debates on development from 1950 to 1970, with no small impact on concrete policies aiming at structural change. Afterwards, however, quite a different meaning of “structural change” prevailed, and economic growth and its perceived imperatives take precedence over everything else. The consequences are well summarized by Fernando Fajnzylber, from ECLAC, in his famous metaphor of the “empty box of Latin American development” (Fajnzylber 1989). Three boxes have countries in them, the boxes of (i) high growth and high inequality, (ii) low growth and high inequality and (iii) low growth and low inequality (generally only occupied by Uruguay); the empty box was high growth and low inequality. Fajnzylber analysis, even if made more than twenty years ago, continues to be valid: the rapid economic growth that Latin America is experiencing due to the high prices of commodities in the international market has not been accompanied by a noticeable diminution of inequality. Remarkable efforts linking such diminution and innovation are under way, for instance, in the Brazilian public health policy, where Local Productive Arrangements in health are promoted as a way to foster localized innovations able to curb the huge commercial deficit derived from the intention to include a population of around 200 million people into a common health system.³

Technology and development thinking have been integrated in the work of several scholars, including classical economists, particularly Marx, and economic historians. In the second half of the twentieth century, Frances Stewart, Charles Cooper, Norman Clark, and Gunnar Myrdal, to only name a few, were worried about technology and underdevelopment, the last expression being the title of a well-known book by Stewart in 1977 (Stewart 1977). The puzzling mismatch between the advancement of science and technology and the resilience of inequality was put forward also in 1977 by Richard Nelson in his “The Moon and the Guetto” (Nelson 1977). Edgar Pisani, the European Commissioner of the Lame Convention, wrote in 1984 a book, *La main et l'outil* (Pisani 1984), in which underdevelopment in Africa is analyzed from a technological point of view, showing in particular the pitfalls of technology transfer practices. In Latin America technology and development were fairly integrated in the reflection of developmental economists at ECLAC. The lessons stemming from these approaches are diverse. Nelson indicates the limits of our scientific and technological accomplishments to deal with problems that are at the heart of development and for which our knowledge and understanding is particularly weak. Pisani refers to the need for “re-appropriation” of technologies by those that would put them to use (“re-inventing” is the term he chooses) as the only effective way to achieve not what the technology can achieve but what people want to achieve through it, this being the hallmark of independent development. ECLAC, belonging to the structuralist tradition, put technology and innovation at the center of the development process through their capacity to foster industrialization and modernization processes.

However, the bulk of development studies, on the one side, and of innovation studies, on the other side, have evolved since the 1980s into quite separate realms of academic work. As Hirschman stated in 1981, this is in part due, to the decline in development economics:

... development economics started out as a spearhead of an effort that was to bring all-around emancipation from backwardness. If that effort is to fulfill its promise, the challenge posed by dismal politics must be met rather than avoided or evaded. By now it has become quite clear that this cannot be done by economics alone. It is for this reason that the decline of development economics cannot fully reversed: our subdiscipline has achieved its considerable luster and excitement through the implicit idea that it could slay the dragon from backwardness virtually by

³ Maria Clara Couto, personal communication.

itself or, at least, that its contribution to this task was central. We now know that this is not so; a consoling thought is that we may have gained in maturity what we have lost in excitement ((Hirschman 1981): 23).

Since then, development studies concentrated more and more on issues of poverty and the struggle for survival in least developed settings, while technology and innovation studies concentrated on issues of measurement of S&T activities, the innovative dynamics of productive sectors, the design of innovation policies, innovation country studies and, finally, “LICS”, that is, systems of learning, innovation, and capability building. LICS opened the road to acknowledging that definitively one size does not fit all in terms of an innovation systems approach, and the specific characteristics of innovation systems in developing countries started to be analyzed. However, it would be unfair to say that the latter was a totally different endeavor than the “classical” NIS approach. Some fundamental insights from the “Aalborg school” were particularly well suited to blend innovation to developmental concerns, mainly the insistence on fairness as a precondition for an innovative society or community (Dalum, Johnson et al. 2010) and on the richness of alternatives that exists to follow innovative paths: “The study of the processes of learning, searching and social choice has revealed many alternatives between the simple routines of a stationary society and an evolutionary system driven solely by individual entrepreneurs or big corporations” ((Andersen and Lundvall 1988): 34).

We would like to emphasize the importance of establishing again at least dialogues and, if possible, deeper convergence, between rather separate traditional intellectual traditions in the realms of development studies on the one side and innovation studies on the other side. In fact, this is a plea for interdisciplinarity or, at least, for a pluralistic process of mutual learning. Nobody made this plea more convincingly than Christopher Freeman, one of the greatest contemporary innovation studies scholars: “Neither sociologists, nor economists, nor political scientists have satisfactory theories of social change and it is unlikely that they will develop them unless they overcome their fragmentation into separate jealously guarded kingdoms and learn to cooperate with each other and with natural scientists...” ((Freeman 1977): 84).

More recently, even though development studies and innovation studies continue to have their own and quite separate agendas, an important process of blending is taking place. To take just one example, in 2003, Cassiolato et al. published a book, *Systems of Innovation and Development*, where the former assertion was echoed:

The point here reinforces the argument that there is not one unique 'model' to be imperatively followed, and that no culture has a monopoly on the factors for successful socio-economic development. Each case must be studied according to its peculiarities, its specific characteristics, and the international context -with its limitations and opportunities- in order to evaluate what should be its own, specific, strategies and modes of development. ((Cassiolato, Lastres et al. 2003): 17).

We have to bear in mind, though, that development in general is one thing and the situation of people living and working in informal settings is quite another: it must be said that on this specific front much remains to be done to build bridges between those that have a wealth of field information and analyses on poverty and informality and those concerned with the dynamics of problem-solving, knowledge production, and innovation in the most varied settings.

2.3. Inclusive development

To advance the way in which development is conceptualized in this direction, the effort must encompass the specific aim to be achieved. That aim is not only more economic development nor mainly sustainable development, but rather *inclusive development*. It is correct to say that inclusive development is an oxymoron: how can development not be inclusive, by definition? Be that as it may, the fact is that inclusive development is a term that has come into common use. Sometimes it appears as just a word in a title, as in the 2008 World Bank Conference Edition on “Strategies for Sustained Growth and Inclusive Development.” In this case, even the phrase *inclusive development* as such does not appear even once in the main text. Sometimes, however, the concept appears substantively. The United Nations Development Program (UNDP), for example, defines inclusive development as follows:

Inclusive development is development that marginalized groups take part in and benefit from, regardless of their gender, ethnicity, age, sexual orientation, disability or poverty. It seeks to address the deepening inequality across the world that has arisen despite unprecedented economic growth” (http://www.undp.org/poverty/focus_inclusive_development.shtml, last accessed February 8, 2012).

One of our main questions then arises: what kind of innovations, and what kind of innovation systems, can contribute effectively to inclusive development, taking for granted that any definition of this concept will include participation by and benefit to marginalized people? Several definitions have already been put forward; we can offer one more here: “A pro-poor innovation system could ... be defined as a multi-stakeholder social learning process, that generates and puts to use new knowledge and which expands the capabilities and opportunities of the poor.” ((Berdegú 2005): 15)

Finally, we would like to look into the issue of development from another angle, that of the contribution that innovation thinking can make to development studies. Again, the concept of development needs to be carefully clarified, because depending on how we define it, different ways of thinking around innovation can be more or less useful. One of the best conceptualizations of development from the perspective of blending it to innovation systems thinking is Amartya Sen's well-known conceptualization of development as the expansion of the freedoms that people have reason to value based on social values and prevailing mores, asserting as well that this expansion is at the same time the primary end and a fundamental means to development ((Sen 1999): 11). This leads us to conceive of people as agents, not as patients in the process of development. “Actor-centered” approaches to innovation can illuminate how people can be agents in innovation processes instead of patients, in a quite similar way as with respect to development processes. An actor-centered approach to innovation is what the evolving national systems of innovation approach provides:

Basically, the theory underlying innovation system analysis is about learning processes involving skillful but imperfect rational agents and organizations. It assumes that organizations and agents have a capability to enhance their competence through searching and learning and that they do so in interaction with other agents and that this is reflected in innovation processes and outcomes in the form of innovations and new competences. ((Lundvall 2010): 331)

To reflect on how this way of thinking of innovation can operationalize development concepts, we go to a not so well known dichotomy due to Amartya Sen: the “BLAST” and the “GALA” approaches to development (Sen 1997). BLAST comes

from Churchill's invocation to “blood, sweat and tears.” It can assume very different and even contrasting forms, all of them demanding toughness but diverging on what “temptations” must be

resisted. The latter may be market relations or state action, democracy and human rights or safety nests for the very poor and social services for the whole population, etc. (Arocena and Sutz 2005)

GALA is

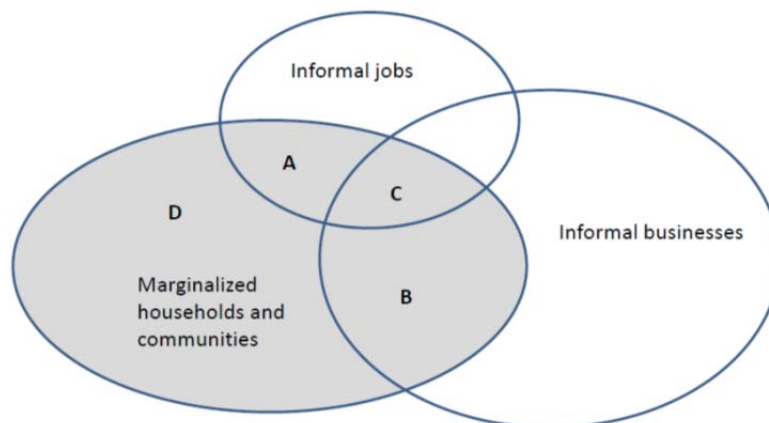
an acronym for ‘getting by, with a little assistance’ inspired by a well-known song which speaks of ‘get by with a little help from my friends. The characteristic attitude emphasizes the possibilities of people to help each other and themselves. Thus, GALA seems to be necessarily actors-centered, since it focus on what people do and how they interact and cooperate, on the enhancement of their individual and collective capabilities, and on the instrumental role of agency.’ (Arocena and Sutz 2005)

To be able to help in a GALA approach to development, innovation needs to be “inclusive” in at least two ways: inclusive in terms of the process by which it is achieved and inclusive in terms of the problems and the solutions it is related to. This “complete” way of being inclusive for innovation can be described paraphrasing Sen’s remark that capabilities are not only the main goal of development but its main means: inclusiveness is both the main goal of development oriented innovations and the only way such innovations can be achieved.

3. Informal Settings and Their Innovators

Within the concept of inclusive development lies the research area we are trying to define in this paper: innovation in informal settings. As we explained in our introduction, informal settings are the places where marginalized people live and work. There is an overlap with the informal economy, but the two concepts are not identical. For example, we leave out informal work by moonlighting computer programmers (which would appear in the area of informal jobs in Figure 1, but outside marginalized households and communities). We also exclude informal businesses that place their owners well above the poverty line (again outside the shaded area below). Instead, we focus on innovation in the parts of the informal economy that intersect with the lives of marginalized households and communities: Area A (informal jobs in formal businesses), Area B (formal jobs in informal businesses), and Area C (informal jobs in informal businesses). Area D then points to family or community innovations.

Figure 1
Informal Settings vs. the Informal Economy



We begin this section with some information for innovation scholars about the informal economy, since it is so seldom discussed in that field. We then present the work of the very few scholars who have tried to combine the concepts of the informal economy with those of innovation studies. Although innovation scholars have seldom paid attention to whether the activities they study are part of the informal economy or not, a number of them have tried to study innovation processes in other informal settings. In the third part of this section we point to some of this research. We end the section by comparing the territory we are focusing on with some related concepts that appear in the literature.

3.1. Informal economy

The concept of the informal economy emerged from observation of African economies in the 1970s (International-Labor-Organization 1972; Hart 1973). The International Labor Organization first used the term *informal sector* in 1972 to describe “the activities of the working poor who were working very hard but who were not recognized, recorded, protected, or regulated by the public authorities” ((International_Labour_Office 2002): 1). With modernization theory in full swing, the “informal sector” at that time seemed like a temporary phenomenon, destined to disappear as more and more countries moved up the industrialization ladder. It therefore came as a surprise when, in the 1980s, observers noted that the sector was not shrinking, but rather growing. Portes, Castells, and Benton (Portes, Castells et al. 1989) gathered a variety of studies in both North and South that demonstrated the dynamic character of this economic activity. Grappling with the many faces of informality, Castells and Portes treat the informal economy as a fluid concept with one central feature: “*it is unregulated by the institutions of society in a legal and social environment in which similar activities are regulated.*” (p. 12). Labor studies see informalization – the expansion of informal businesses and the transformation of formal into informal work -- as a major trend in the global economy. Together, informal businesses and informal work comprise what is now called the informal economy.

The informal economy is already very big. Estimates are that it provides 50 to 75% of non-agricultural employment in developing countries (Chen 2004). Even in affluent countries, the informal economy is estimated to produce as much as 18% of employment (Schneider 2002). The number of people earning their living informally includes both those employed in informal (extralegal) establishments and people with informal jobs in the formal economy. The International Labor Organization defines the latter: “Employees are considered to have informal jobs if their employment relationship is, in law or in practice, not subject to national labour legislation, income taxation, social protection or entitlement to certain employment benefits (advance notice of dismissal, severance pay, paid annual or sick leave, etc.)” (ICLS 2003) It is widely acknowledged that the formal and informal economies are thoroughly inter-twined, with informal businesses paying sales taxes and many fees and sometimes even being recognized in law (de Soto 1989; Guha-Khasnobis, Kanbur et al. 2006). Instead of two separate economies, there is a continuum of both work and business conditions, and strong interactions all the way along the way.

As it has been developed over the years, the concept stretches across urban and rural settings, including agriculture, mining, manufacturing, and services (although not every country measures informality in all these contexts). Appendix Table 1 provides estimates of the number of jobs in the non-agricultural informal economy for illustrative countries in Africa, Asia, and Latin America about a decade ago. The diversity of informal employment is illustrated by the four types of self-employed workers included in SEWA, the Self-Employed Women’s Association of India (SEWA 2008).

1. Hawkers, vendors and small business women like vendors of vegetable, fruit, fish, egg and other food items, household goods and clothes.
2. Home-based workers like weavers, potters, bidi and agarbatti workers, papad rollers, ready-made garment workers, women who process agricultural products and artisans.
3. Manual labourers & service providers like agricultural labourers, construction workers, contract labourers, handcart pullers, head-loaders, domestic workers and laundry workers.
4. Small producers like artisans and salt farmers.

Informality is not synonymous with poverty, but there is a strong overlap and a connection to gender as well. A good summary is provided by WIEGO,⁴ and we base this presentation on theirs. On average, wages are higher in formal than in informal employment, with the exception in some cases of informal employment in the public sector (NALEDI 2003; El-Mahdi and Amer 2004; Chen, Vanek et al. 2005). As to wages within the informal economy, studies have found that those who hire others in the informal sector are not poor, but those who work for them earn only the minimum wage, and household workers may earn only a third of that level (Charmes and Lakehal. 2003). Average earnings in different parts of the informal economy vary widely. As the WIEGO analysis reports,

To begin with, average earnings in agricultural informal employment are lower than average earnings in non-agriculture informal employment. Among non-agricultural informal employment, in all five countries, informal employers have the highest average earnings followed by their employees ... and other “regular” (as opposed to casual) informal wage workers, then own account workers, and then casual wage workers and domestic workers (Chen, Vanek et al. 2005).

Poverty is a household-level concept, but studies have shown that households are more likely to be poor when their primary wage earners are employed informally. Female-headed households and those with primary wage earners who are women are also more likely to be poor, but the differences are less pronounced when there is access to formal employment (Chen, Vanek et al. 2005). Women tend to make up the majority of the informal sector, and often end up in the most dangerous parts of it (UNRISD 2010). There is also a strong correlation with disadvantaged ethnic groups. In South Africa, for example, most workers in the informal economy are black (NALEDI 2003), and in Guatemala, indigenous groups are much more likely to find work there (Funkhouser 1996).

There are several quite different theoretical explanations for the existence and growth of the informal economy.⁵ One school of thought sees the informal sector as consisting of marginal activities that the poor undertake only in order to stay alive (Hart 1973; Sethuraman 1976; Tokman 1978). Another sees the informal economy as a structural prop for large capitalist firms, since it keeps labor costs low (Moser 1978; Castells and Portes 1989). Two other approaches stress the entrepreneurial element of informality. A legalist school (de Soto 1989; de Soto 2000)

⁴ Women in Informal Employment: Globalizing and Organizing, <http://wiego.org/informal-economy/links-poverty>, accessed January 7, 2012.

⁵ We base this presentation again on WIEGO’s excellent summary at <http://wiego.org/informal-economy/history-debates>, accessed January 7, 2012.

sees the informal sector as comprised of plucky micro-entrepreneurs who choose to operate informally in order to avoid the unnecessary and burdensome costs, time and effort of formal registration and who need legal rights to convert their assets into formal property.⁶

A voluntarist school stresses the choice business operators make to avoid the costs of regulation (Maloney 2004).

The variety of approaches underscores a major point: the unregulated character of the informal economy has two faces. On the one hand, for the informal business, it lowers costs of entry and operation. Registration fees do not have to be paid; taxes are not due. Likewise for the worker, taxes are not deducted from pay and cash goes into the pocket immediately. On the other hand, the business is not protected by contracts or intellectual property provisions, workers are not protected by labor regulations, and the environment is not protected by environmental laws. The unregistered status of the business may make it vulnerable to demands for bribes, from either government or criminal authorities. While keeping families afloat, informal employment can produce unsafe work environments, maimed wage earners, and child workers, without the benefit of unemployment protection. For communities, informal establishments can produce affordable goods and services and export income, along with unhealthy environmental conditions.

In the rest of this paper, we use the phrase informal economy rather than informal sector, in part so that we can reserve the term sector for studies of sectoral systems of innovation, a major branch of innovation studies, and also to include informal employment in the formal sector. Like Kraemer-Mbula and Watae (Kraemer-Mbula and Wamae 2010), we limit our focus to jobs or businesses where activities are in the open and the goods produced are legal, thus setting aside the informal criminal economy to be addressed by another innovation research agenda.

3.2 Innovation in the Informal Economy

Only a few innovation studies scholars have paid explicit attention to the informal economy. Kraemer-Mbula and Wamae (Kraemer-Mbula and Wamae 2010) include a discussion of the informal economy when they describe how innovation studies frameworks must be revised to take the African context into account. On a continent where more than three out of every four jobs is generated in the informal economy, innovation studies miss the mark if they ignore this activity. Kraemer-Mbula and Wamae argue that innovation scholars should study the dynamics of innovation in the informal sector, because it is big, because it is linked to the formal sector, and because the dynamics are likely to be different from those in the formal sector (Kraemer-Mbula and Wamae 2010). Five themes are particularly ripe for study, they argue, in the relation between the informal sector and innovation systems. The first is rapid innovation in *response to shifting demand*, something the informal sector appears to do very well with regard both to its low-income consumers and demand in the formal economy. Second, *skills development* is very much a part of the learning process in the informal sector, and proceeds without benefit of formal learning institutions. Formal education levels of informal sector workers varies greatly, but the open employment structure and physical arrangement of informal clusters apparently leads to rapid diffusion of new ideas. Third, the participation of informal enterprises in global *value chains* deserves attention. Informal workers certainly participate heavily in certain export industries, as with

⁶ Text from WIEGO, at <http://wiego.org/informal-economy/history-debates>, accessed January 7, 2012.

homeworkers and the textile industry, for example (Chen 2001). But in part because of the lack of contracts, innovations that informal establishments introduce into value chains are likely to remain isolated and not scaled up, and little is known about the role informal operators play in value chain governance nor about value chains that exist within the informal sector itself. Fourth, the roles of intermediary organizations such as producer associations, which have been studied widely in the innovation literature, needs study in the informal sector as well. Finally, the interactions between informal sector innovation and its societal and political context deserve attention. The policy actions that have been taken to support informal establishments are notoriously episodic rather than driven by internal needs of clusters of informal firms.

Other innovation studies have examined innovation in some famously informal sites but not analyzed how the informality of the sites interacts with their innovation processes. So for example, Mytelka and Farinelli (Mytelka and Farinelli 2000) include Suame Magazine in Ghana, a well-known concentration of informal businesses, in their discussion of clusters, without mentioning the legal status of the businesses there. They distinguish informal from formal clusters, but the terms refer to the role of government in creating networking activities rather than to the registration status of firms or protection of workers or the environment. Analysis of other clusters in low-tech or traditional industries provides some insight into the benefits such clusters can provide. Mytelka and Farinelli say that clusters in such industries can (1) enable deepening of local knowledge and extending it to design, quality control, and information on markets and marketing; (2) facilitate linkages to wider knowledge inputs, for example, on materials and suppliers; and (3) create the ability to transform “low-tech” industries into “tacit knowledge intensive industries” and to turn tacit knowledge into competitive advantage. Well-designed policies can stimulate new habits and practices, but they may take a longer time horizon than in other kinds of industries, they argue. But how would the informal status of establishments interact with such explicit policy actions? Because they ignore the registration status of the businesses, Mytelka and Farinelli do not raise this question.

The kind of analysis Mytelka and Farinelli provide is echoed in a monograph on innovation in Kenya’s informal economy (Daniels 2010). Clusters of businesses are the focus of his work, and he describes the invention and spread of new ideas and techniques through concentrations of informal metalworking businesses in Nairobi neighborhoods. Like Mytelka and Farinelli, he includes policy recommendations for stimulating innovation in these settings that sound very much like those that have been developed for any set of small businesses: government provision of technical and business assistance, for example. Daniels, however, does take the unregistered status of the establishments into account, noting in particular that being outside state regulations means that there is no intellectual property protection, a point that scholars of the informal economy make with regard to all kinds of property the firm owns. In Daniels’s account, however, the lack of even temporary monopoly does not seem to keep informal inventors and designers from making new things; it simply gives them less return on their inventiveness over time.

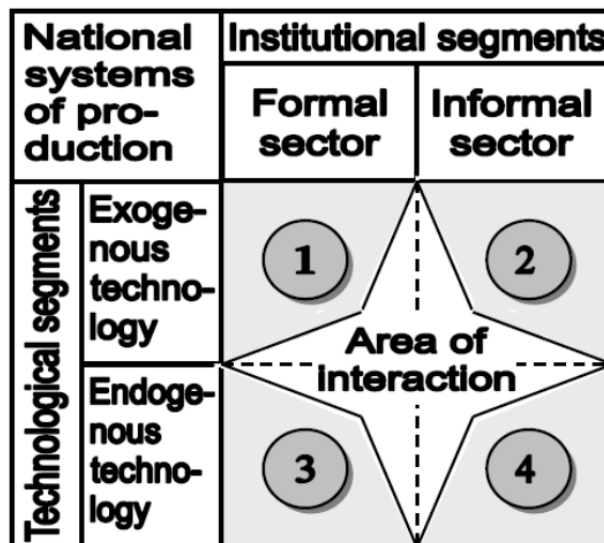
It is all too possible for informal clusters of this sort to be romanticized. Suame Magazine, for example, is not only a concentration of inventiveness and skill, but also a place where guns are produced that feed the emerging culture of violence in Ghana (McCaskie 2008) and a significant source of local pollution (Meagher 2011). Its culture is thoroughly masculine; women entrepreneurs appear in Suame

Magazine only as food vendors. Kraemer-Mbula and Wamae (Kraemer-Mbula and Wamae 2010) also point out the heavily male makeup of *jua kali* work.

Perhaps the most ambitious attempt to put the informal economy in the theoretical perspective of innovation studies is Jens Müller’s work on blacksmiths in rural Tanzania (Muller 2010). Müller did field work among these rural artisans between 1974 and 1977 and then again between 1998 and 2003. He was able to relocate some shops he studied earlier, and has good data for describing the transformations in the sector over two decades. Equally importantly, he is steeped in the central concepts of innovation studies and uses them, with critical perspective, to understand the changes. First, he recognizes and celebrates local knowledge, which in the case of metalworking in Tanzania is a skill that goes back millennia. The village blacksmiths are smart, skilled, resourceful, and very much in demand. They constitute an essential resource for the country not only in producing local goods but also in adapting equipment and products produced elsewhere to local conditions. The village artisans are illustrative, in Müller’s analysis, of the whole informal sector, which should be seen as a dynamic contributor to learning capacity in the national economy.

Figure 2 reproduces Müller’s typology of production systems and technologies. Direct technology transfer from North to South (Quadrant 1 to Quadrant 3) has largely failed, he claims, because local adaptation has not taken place. The informal economy can provide the capacity to adapt and produce locally, thus creating an effective route to absorbing what the world has to offer (1 to 2 is adaptation; 2 to 4 in assimilation; 4 to 3 is domestication). The interfaces between formal and informal economies and between exogenous and endogenous technologies are particularly interesting, since they are places where different kinds of knowledge and skills meet and new things emerge.

Figure 2: Matrix of the Four Segments of the National Systems of Production
(from Muller 2010)



The big Tanzanian government programs aimed at helping dynamic small businesses are far away from their workshops and irrelevant, Müller reports, but some more specifically targeted programs are helpful, and some of what non-governmental organizations are doing in public-private partnerships also

expands the network and learning capabilities. The key government action, in Müller's view, is to recognize the skill, knowledge, and value of the rural artisans and their businesses. Once that understanding is in place, their incorporation into the development process can follow.

3.3 Related concepts

3.3.1. Bottom of the Pyramid and Below the Radar

Innovation can be directed at the needs of marginalized households and communities without necessarily being “grassroots” or “bottom-up.” For example, multinationals can deliberately develop technologies for low-income markets. This is the core of the Prahalad argument (Prahalad 2006) that big companies can make a “fortune at the bottom of the pyramid,” by redesigning business processes to make products more accessible to low-income consumers. Hart (Hart 1973) has stressed that “market intimacy” is an essential element for making such products work in low-income contexts. Like Sonne, he cites the work of the Grameen Bank as an example of a revolutionary new business model that worked because the Bank was so immersed in the contexts where it needed to work. In the last few years, Simanis and Hart (Simanis and Hart 2008) have replaced Prahalad's original concept one that stresses the importance of businesses based on co-creation and blending of different kinds of knowledge.

A recent review of the literature on the BOP concept (Kolk, Rivera-Santos et al. 2010) reveals its weak conceptual and empirical base. The published literature is mostly normative and conceptual, with little empirical examination of either the phenomenon of BOP marketing or its effects. Of the cases reported, a few firms predominate in the stories. The initiators of BOP product design processes are more likely to be local rather than multi-national firms, as in the original claims. Marginalized households and communities are more likely to play the role of consumers than co-creators. Environmental considerations of the increased packaging and consumerism that the BOP marketing concept implies are almost never considered in the literature. In short, there is no reason to include the BOP concept in the business literature in the scope of “inclusive development” studies.

Some innovation studies scholars have taken up the “bottom of the pyramid” term, for better or for worse. Soete (Soete No date) has also discussed the importance of what he calls “bottom of the pyramid innovation,” which happens in places close to the people living at the bottom of the pyramid. Innovators in these locations know local conditions better than the big firms from the North, and their inventions are therefore more likely to be appropriate. Soete, however, also discusses only formal institutional settings for such closer-to-the-bottom activities. He is not talking about grassroots innovation, but rather innovation outside the established centers in affluent countries.

The Innovation for Pro-Poor Growth Programme at the Open University in the U.K.⁷ has systematized this concept and given it a new name: Below-the-Radar Innovation (BRI). This emerging phenomenon in the world economy refers to three inter-related trends, they argue:

- Shifting *capabilities*, with growing science and technology capacity in low-income countries generally and China and India specifically.
- Shifting *markets*, with growing numbers of relatively low-income households that nonetheless have disposable income, and who are living in communities with traditions of shared consumption like that represented by the sharing of mobile phones, which call for different marketing strategies.

⁷ <http://www.ipg.open.ac.uk/>, accessed January 16, 2012.

- A distinctive, if not new, set of *labor conditions* characterizing the environment within which the new innovators from the first point would manufacture the products they introduce.
- In summary, although “bottom of the pyramid” and “below the radar” innovations are interesting, important, and may have positive or even revolutionary consequences for the lives of the world’s poor, none of these concepts refers to the bottom-up innovations discussed by those who study either grassroots innovation or innovation in the informal economy.

Figure 3:
Capabilities, markets and production structures underlying Below the Radar Innovation

Capabilities	<ul style="list-style-type: none"> • Science, technology and project management skills • Capital goods • Business systems • Systemic technology development
Markets,	<ul style="list-style-type: none"> • Rapid growth • Particularly rapid growth in low-income market segments • Collective consumption • Seasonal markets
Production parameters	<ul style="list-style-type: none"> • Low wages • Unreliable and poor infrastructure • Low skill levels

Source: (Chataway, Clark et al. 2009)

3.3.2. Pro-poor and poverty-alleviating innovation

The BOP and BRI concepts refer overwhelmingly to the innovation activities of private firms. But public research institutions and universities can also target low-income users in their invention efforts. The IPG group lists among their areas of interest innovations that are “geared to producing products for the poor and developing processes which incorporate the poor as producers,” and give examples of public-private partnerships aimed at filling such gaps in the global innovation system (Chataway, Hanlin et al. 2010). (We discuss these examples further in a later section.) Cozzens and her colleagues have noted that pro-poor strategies in science and technology policy are among the options for reducing inequalities through STI policies and programs (Cozzens 2010; Cozzens and Kaplinsky 2010). Even emerging technologies at the high end of knowledge intensity and skill requirements can be the basis for innovations directed to the needs of very poor consumers, as recent work on nanotechnologies reveals (Salamanca-Buentello, Persad et al. 2005). University research can be formally called to contribute with new knowledge to alleviate situations of social exclusion, like in the case of the Universidad de la República in Uruguay (Alzugaray, Mederos et al. forthcoming).

All these analyses focus primarily on the top-down efforts of formal institutions and therefore at first glance also fall outside the scope of a research agenda on innovation in informal settings. However, many of the examples of successful bottom-up innovation using traditional or local knowledge involve partnerships with public or non-profit institutions, to provide access to complementary formal knowledge or business skills. Clearly, these institutions can be effective intermediaries between informal innovation

and the formal economy. But the case studies stress that for the partnership to be successful these formal knowledge institutions must respect both problem-definition and local knowledge, becoming followers rather than leaders in the innovation process. A recent publication of the World Bank supports this point:

Equally important to strengthening the capabilities of the poor is strengthening incentives, policies, and institutions. Top-down, supply-driven initiatives have often proved ineffective for addressing the needs of the poor. Inclusive innovation policy presupposes a change in institutional culture and mandates the involvement of the poor in identifying their development priorities and in providing incentives for various actors to serve their needs more effectively. This change will entail closer collaboration among public R&D entities, industry, universities, nongovernmental organizations NGOs, donors, and global networks. ((World-Bank 2010): 338)

Other literature stresses the issue of cooperation between informal settings and formal organization but in a more equal base, where the issue of leaders and followers is not a salient one, even if mutual respect and mutual trust are paramount. A paper by Elinor Ostrom introduces the concept of coproduction: “By coproduction I mean the process through which inputs used to produce a good or service are contributed by individuals who are not “in” the same organization” ((Ostrom 1996):1073). Her account of the successful coproduction of solutions between “individuals who are not ‘in’ the same organization” in poor Belen, Brazil, stresses the same things that other researchers dealing with dialogues across different types of knowledge, as Bunders (Bunders 1996), stresses: building trust is paramount, it takes a lot of time and willingness to understand each other, agendas need to be coproduced, this again needs a lot of time.

Poverty alleviation can mean reducing the number of poor people by producing jobs rather than by developing technologies that improve the lives of those currently poor. The literature on industrial policy and cluster growth in low-income countries focuses on the employment-generating potential of innovation. It is apparent that the classic examples of success, the Asian Tigers, have been hard to replicate because they emerged through a window of opportunity created by a major shift in the global “techno-economic paradigm,” the incorporation of information technologies into the productive order (Marin, Navas-Aleman et al. 2009), even though explanations associated with power structures, also hard to replicate, have been advanced (Khan and Blankenburg 2009). In addition, the standard literature on these successes focuses on state action (clearly from formal institutions) and pays scant attention to any informal sector contributions to cluster emergence. The literature on the informal economy actually does a better job of identifying some examples of the latter (Capecchi 1989). And the grassroots innovation literature already cited identifies growth and job-creation as an important feature of that set of entrepreneurs.

Amartya Sen warns against using reduction in the poverty rate as a performance measure, since one can perform well under this measure by lifting the best-off among the poor above an artificial line while leaving others in even more miserable condition (Sen 1992). “Poverty alleviation” is thus a slippery concept and uncertain objective for innovation processes.

3.3.3. The “social”

A set of innovation concepts that are clearly related to the theme of this paper carry the word social in their names. This is a term that carries different meanings in different places, and needs to be unpacked -- and probably replaced -- in order to differentiate the ideas that are named with it.

Sometimes social is used as the opposite of economic, to point to values and activities not explained by market-only analysis. This is the case in the phrase socially-oriented innovations, used by a

group of Brazilian scholars to capture community-based innovations. This kind of innovation is illustrated by the case of farm community innovation in Brazil (Soares, Cassiolato et al. 2008). The story of Pingo D'Agua takes place in the city of Quixeramobim in the semi-arid area of the Brazilian Northeast. Family farmers there were facing drought conditions. The Brazilian government was addressing the water shortage through large scale irrigation projects, which helped agribusiness but not family farms. So family farmers, who were already organized and understood local conditions well, brought in the expertise of Brazilian and French universities and developed a low-cost way to drill wells manually for themselves. Local government provided help through financial support and purchase guarantees for family farmer production. Only the combination of community, university, and government actors made the project work. This award-winning example has served as a model for others. The term social in this case refers to the problem-solving goal of the invention and its connection to marginalized users. While water was necessary for the livelihoods of the community, the inventors in the Pingo D'Agua case did not set out to invent a pump; they set out to solve the water problem in their farming. The marketability of the invention was secondary. (Note also the location of this invention in the rural non-farm sector, the importance of which we have already discussed in relation to world poverty.)

Another Latin American group likewise uses the concept of social technologies to point to community-based innovations where the main motivation is making life better, not making a profit in business (Dagnino 2010). Particularly interesting from this viewpoint are technologies that arise or contribute to the “solidary” economy, that is, worker-owned organizations like cooperatives, which may then serve as intermediaries connected the invention to formal research or business operations. A social technology, as Fressoli, Smith, and Thomas explain it (Fressoli, Smith et al. 2011), is not only “grassroots,” but owned in all senses by a community that is empowered by that ownership. Additional knowledge from outside the community enhances their effort, but the fact that power and control over the authority remains in their hands is the essence of the social. These uses of the term social parallel the phrase social entrepreneurship, which points to the primary goal of a company as social change, with the secondary condition that its business model is sustainable in the market.

In some cases, social has been used as the opposite of physical. Nelson and Sampat (Nelson and Sampat 2001) have written on the concept of social technologies in this sense, pointing to innovations in organizational forms or business models that accompany a change in physical technology. Chataway and Hanlin (Chataway, Hanlin et al. 2010) also use the term social technology, but make a stronger connection between physical and social, referring to the network of organizational changes that must occur for a physical technology to be produced and put into practice. Their case studies are the International Aids Vaccine Initiative (IAVI) and the Malaria Vaccine Initiative (MVI).

Using the social technologies framework to explore IAVI and MVI we have, as Nelson describes it, [we] attempted to understand the interactions between the creation of a tangible technology (new preventative AIDS and malaria vaccines) and the social technologies (the mix of organisations which will undertake the work) devised to undertake this work. ((Chataway, Hanlin et al. 2010): 2)

Likewise, Hanlin, in her analysis of bed nets as an anti-malarial innovation site in Tanzania (Hanlin 2009), uses *social technology* to refer to “the whole innovation value chain.”

Using the concept of ‘social technologies,’ the article highlights the importance of understanding the social context of the bed net innovation process. It therefore highlights the need to consider

the bed net story as one not merely of effective distribution but, more significantly, of the whole innovation value chain from inputs to the textile factories making the nets to consumer needs and demands. It enriches our understanding of the complex nature in which the physical technologies (bed nets) are accessed by the poor and how this relates to the overall health system.

This meaning bears a strong resemblance to the well-established concept of a sociotechnical system articulated originally in science and technology studies (STS) (Bijker, Hughes et al. 1987). Thomas and Fressoli arrive at a similar understanding of the importance of such systems in their work on social technologies (Fressoli, Smith et al. 2011).

4. Key Concepts

Although innovation scholars have seldom taken informality explicitly into account, they have developed concepts to study innovation in the other type of informal setting, namely, marginalized households and communities. In addition, the innovation studies literature is home to concepts that are relevant to understanding how innovation affects poverty and marginalization. In framing a research agenda focused specifically on innovation in informal settings, it is helpful to discuss how these overlap or not with our central focus.

4.3. Grassroots innovation

There has been growing attention in innovation studies to the phenomenon of grassroots innovation. The term was apparently coined by Anil Gupta and embodied in the Honey Bee Network (HBN). This organization finds people in the villages of India with inventions and provides resources to help them turn them into innovations. For example, “Innovations such as a modified pulley to draw water, a gum scrapper [sic] to enable women to collect gum from thorny bushes or trees, or large number of small machineries, herbal pesticides, veterinary medicines, new plant varieties, agronomic practices or other products have been developed by the unsung heroes and heroines of our society without any outside help.” ((Gupta 2003): 982) Gupta explicitly identifies the kinds of inventions the Honey Bee Network looks for as based on indigenous, traditional, or local knowledge; respect for such knowledge is central to his operation. Unfortunately, not many scholars have studied the Honey Bee Network phenomenon; most of the mentions of the network are in news items, Gupta’s own writings, or citations to the HBN use of information technology to share information about inventions and gather candidates for commercialization.

Similarly, in the Netherlands, a group called Prolinnova has focused on locating and diffusing grassroots innovations in agriculture.

Prolinnova is an NGO-initiated multistakeholder programme to promote local innovation in ecologically oriented agriculture and natural resource management (NRM). The focus is on recognising the dynamics of indigenous knowledge (IK) and enhancing capacities of farmers (including forest dwellers, pastoralists and fisherfolk) to adjust to change – to develop their own site-appropriate systems and institutions of resource management so as to gain food security, sustain their livelihoods and safeguard the environment.⁸

⁸ <http://www.prolinnova.net/>, accessed January 15, 2012.

For some, grassroots innovation comes from citizen organizations rather than individuals. For example, one definition is “... the innovative approaches to sustainable development pioneered by community activists.”⁹

Andy Hall and his colleagues have advocated using innovation systems thinking with regard to agriculture. But they came late to the recognition of the role of farmers in those systems. Their recent publications, however, provide some additional examples of grassroots innovation in the agriculture sector. Hall (Hall 2005) reports on an “integrated bottom-up approach (IBU)” in a biotechnology project in India. In this project, non-governmental organizations (NGOs) are intermediaries between formal research institutions and farmers, something Hall presents as an organizational innovation. Another case study involves the introduction of treadle pumps for irrigation in India and Bangladesh (Hall, Clark et al. 2007). An NGO takes the lead in this story, and local artisans make the technology work in context. Diffusion is minimal where the NGO tries to maintain “quality” with a branded product, since local variations are not encouraged. Thus the story illustrates how formal and informal invention and adaptation can work together to help rural economies both through farm and non-farm benefits.

The story of the development of spirulina algae cultivation and applications in India has similar features (Prasad 2005), but involves local women. The technology began in an independent laboratory with strong connections to an industrial group and led by a visionary scientist who wanted to focus on solving problems of rural development. As the initial feasibility of the technique became established, the laboratory worked with local NGOs to involve village women in production. The women again add an informal economy element to the story, since they were induced to participate by the prospect of earning a little extra money for their households through cultivation of an additional cash “crop.” This network of partners enriched the set of adaptations and innovative uses of the plant. The fact that it is still in use is not due to the continued efforts of the original laboratory but rather to the uptake of its application by a variety of other actors. Although the technology is not really introduced from the grassroots, formal and informal innovations work together again in the story.

The applications of the spirulina algae are in “post-harvest processing,” one area of rural non-farm technology. In a PhD done at UNU-MERIT at Maastricht, Lina Sonne, stresses the importance of grassroots innovation in the rural non-farming sector. Improvements in agriculture itself have not reduced rural poverty, she points out in a careful literature review. The greatest potential for improving rural livelihoods comes from growth-oriented, innovation-generating entrepreneurial activities off the farms. Unfortunately, her papers so far provide few examples, although she provides a compelling analysis of why public financing of such ventures has failed and bottom-up private financing, such as that provided by the Grameen Bank, is making a difference. She points to Ashoka as a source of examples of success in this model. Each Ashoka Fellow is certified to have a new idea that will transform his or her area of operations; this surely makes them all innovators. But they are overwhelmingly innovators in social rather than physical technologies, a distinction to which we return in a later section.

4.2. Indigenous, traditional, and local knowledge

Another common concept in the literature on innovation in informal settings is that of indigenous or traditional knowledge. This concept usually refers to what people know because it is common knowledge in their communities. The closely-related concept of local knowledge refers to what one learns

⁹ http://www.grassrootsinnovations.org/Grassroots_Innovations/GI_Home.html, accessed January 15, 2012.

from living and working in a particular place, whether that knowledge is handed down over generations or built through experience in an individual life. In either case, the knowledge is taken for granted, unlike formal knowledge that is deliberately produced in formal institutions. Note: formal knowledge is the newcomer and informal knowledge is the long-term (“normal”) state of things. Traditional and place-based knowledge can be the basis of businesses established in the informal economy, as the case studies of artisans in the previous section showed. In a strict sense, no knowledge is strictly based on one community, and no knowledge is entirely traditional; many kinds of knowledge mix in contemporary society. In particular cases, however, it is possible to identify some kinds of knowledge that are more traditional or local, and some that are less so.

What is clear from a considerable body of literature is that the confrontation between these kinds of knowledge and formal institutions creates conflict and controversy. One kind of controversy pits local knowledge against “expert” knowledge in environmental issues (Brown 2007; Blum 2008). Inequalities in the legitimacy given by formal institutions to the different kinds of knowledge lead to uninformed decision-making. People who live near industrial installations may notice patterns in health, for example, that are not evident to “experts.” The industrial firms who are the suspected polluters have the resources to hire formal-knowledge “experts,” who may end up opposing local knowledge in legal struggles. This kind of inequality ends up in the literatures on “expertise” and “controversy.” (See for example, (Whatmore 2009).)

“Indigenous knowledge,” on the other hand, appears in controversies over the ownership of knowledge – an institution only put into place long after traditional knowledge accumulated and became useful. In this set of controversies, some knowledge-based institution in the formal economy (often one from the North) learns about and appropriates indigenous or traditional knowledge and profits from it, without payments to the original knowledge holders. These cases have become common enough for governments to pass laws forbidding them and protecting the rights of traditional knowledge holders. Certain intermediary organizations have focused on enabling communities to commercialize their traditional knowledge themselves; these organizations bear strong resemblances to the technology transfer offices that work with informal producers in manufacturing. They provide the business know-how and the legal advice to help traditional knowledge-holders (whether inventors or not) to commercialize their knowledge to their own advantage.

The knowledge and problem-solving capabilities possessed by “minds in the margin,” as Anil Gupta call them (his complete phrase is “minds in the margin are not marginal minds”) is often dismissed by a sort of intellectual imperialism or at least dogmatism that only accepts one best way of doing things. In the case of the indigenous blacksmith artisans in Tanzania already introduced, it is reported that after independence, they were conceptualized by the Planning Offices as “backward, lazy and crazy” and totally disregarded when devising industrial policies ((Bertelsen and Müller 2003): 129), even though they were responsible for a huge process of technological adaptation that rendered possible the use of imported technology. Dismissive policy attitudes towards what “minds in the margin” know and how they use such knowledge to take decisions that affects their lives have been widespread. The point of departure of a systematic inquiry based in a totally different assumption has been put forwards by Elinor Ostrom: “Instead of presuming that some individuals are incompetent, evil, or irrational, and others are omniscient, I presume that individuals have very similar limited capabilities to reason and figure out the structure of complex environments” ((Ostrom 2008): 25). This assertion is in tune with one made recently by an Indian Manifesto:

This Manifesto will argue that other forms of expertise— often pejoratively labelled as non-scientific—need to be incorporated into scientific policy making when aiming for a long-term sustainable culture and society. Without such incorporation, societies will develop tensions and schisms that threaten their sustainability. (KICS 2011)

4.4. Intermediaries

Innovation in informal settings can be enhanced by interactions with other sources of knowledge. The difficulties to establish this type of interactions in a meaningful way are well known, and failures have been documented through the literature, particularly in relation to the diffusion of innovations (Rogers 2003). The figure of “intermediaries” has been proposed to encompass those social actors that mediate between people that knows differently and knows different things, or between communities and diverse sources of knowledge such communities have difficulties to grasp and to integrate to their knowledge and their actions. The definitions of what a “knowledge related” intermediary is, what are its functions, and in which way it gets integrated into the network of other actors, are quite diverse. A general way to approach this issue is, following Mona Dhamankar (Dhamankar 2011), to state that these types of “intermediaries are basically organizations that function in the midst of producers and users of knowledge” (p. 3). This does not go without problems, though: Michel Callon (Callon 1994), reflecting on the costs associated with supply of knowledge and demand for knowledge, precisely the type of costs that would perhaps need intermediaries to be lowered, indicates that this can be “a meaningless distinction in the case of a continuous process where the user...participates in the coproduction of the good that he or she ‘consumes’” (p. 405). However, even if the concept of “coproduction” has widely challenged that of “transfer” regarding technology, knowledge or innovation, the problems of co-producing knowledge have not faded away, and interventions by intermediaries seem to be needed to overcome them.

The concept of knowledge or innovation intermediaries evokes two functions of the developmental state in Peter Evans’s well known taxonomy (Evans 1995): midwifery and husbandry. In the case of knowledge intermediaries, the need to create awareness about the usefulness of other sources of knowledge and innovation to solve the problems the community is facing led to the midwifery function; once such awareness arises and interactions begin, the need to provide support in different ways to keep the interactions going led to the husbandry function.

Besides any precise definition or characterization, several lessons from practical experiences of intermediaries’ actions aimed at bridging different social worlds are worth recalling. If we take for instance the issue of bridging informal and formal economic settings, a series of empirical analyses have distilled a small number of recommendations for intermediaries, whatever their origin –state organizations, NGO’s, development donors, etc.- of which the following seem particularly appropriate for knowledge or innovation intermediaries ((Guha-Khasnobis, Kanbur et al. 2006): 10)

- (i) Intermediaries should act as close as possible to the actors which behavior need to be influenced, but at the same time they should try to imbed their action into larger systems to get support for their autonomy and to get access to back-up services;
- (ii) They should take care of the “balance between ‘formal’ interventions and ‘informal’ practices. In other words, ‘formal’ interventions are more effective if they are not meant to replace or ‘crowd out’ ‘informal’ rules, but help fine-tune them instead.”
- (iii) They should “design the intervention to be consistent with the implementation capacity of government, and the absorptive capacity of people it is meant to help”.

- (iv) They should be aware that their intervention will probably not be sufficient on its own to solve problems. “Interventions that work are usually in the form of a package. Complementary measures are needed to support the core intervention for it to work.”

Be as close to the community as possible and the same time assure linkages to wider networks able to provide support; add “formality” in all possible ways taking care to do this by fine tuning previous informal ways of doing things instead of ruling them out; do not design and propose actions that public policy cannot implement (for lack of specialized human resources or other type of resources) and/or that communities are not able to creatively appropriate and carry-on; take care of the rest of the package that usually need to be in place to assure that the action in which the intermediary is involved will add-up to the well-being of the community. Those can be part of a set of indicators to assess intermediaries’ actions.

The long experience and critical assessment of international aid can also be usefully integrated to the reflection on knowledge intermediaries. The two “don’ts” and three “do” in Ellerman’s (Ellerman 2009) analysis are particularly suited for this purpose. Ellerman uses the term “doers” to refer to those that receive support from the “helpers”: in our case, “doers” represent the community and “helpers” the knowledge intermediaries. The five general recommendations to helpers recollected by Ellerman are as follows: (i) first don’t: don’t override self-help capacity with social engineering; (ii) second don’t: don’t undercut self-help capacity with benevolent aid; (iii) first do: start from where the doers are; (iv) second do: see the world through the doers’ eyes; (v) third do: respect the autonomy of the doers. These general recommendations turn into specific recommendations when the intermediaries are involved in knowledge-related activities. Ellerman, heavily influenced by thinkers and practitioners like Albert Hirschman and Paulo Freire, states that:

In order for learners to have an ownership of new knowledge and for the new knowledge to have a transformative effect, the knowledge must be more the fruits of the learners’ own activities. Such knowledge comes out of a constructivist active learning process, not out of a pedagogy of teaching, imparting, transmitting, disseminating, or pouring new knowledge into passive students. ((Ellerman 2009): 217)

From this, the two don’ts and the three do for knowledge intermediaries are (slightly adapted from (Ellerman 2009): 123): (i) first don’t: don’t give biased information and one-sided arguments to induce a certain belief in the community you are working with; (ii) second don’t: don’t give answers to the community so beliefs are at best borrowed opinions, not knowledge; (iii) first do: start with the community’s present knowledge, not from a tabula rasa; (iv) second do: promote learning that starts with how the community sees the world; (v) third do: promote self-directed learning, resulting in owned knowledge (able to give reasons, arguments, and evidence). The process of coproduction of knowledge to build sanitation infrastructure described by Ostrom in a poor community in Belen, Brazil, seems to have followed these recommendations (Ostrom 1996).

4.5. Gender

Innovation scholars have paid scant attention to women or issues of gender, while development scholars describe women as centrally important to the development process. As with the impossibility of development that is not inclusive, it is impossible to conceive of male-led development with women left behind. The neglect of women in innovation studies reflects the under-representation of women in the spheres of engineering and technology generally, even in affluent countries. In much of the developing world, women are held back by cultural norms and traditional divisions of labor more strongly than in

affluent countries. The gap between men and women in education is much larger than in affluent countries. The specificity of women in informal settings regarding innovation has been already acknowledged: “Owing to social norms, poor women may be prevented from taking on certain roles required for innovation” ((World-Bank 2010): 336).

Women’s grassroots entrepreneurial activities in the developing world have received a great deal of attention through the literature on microfinance, which finds its main clients in women. The examples given, however, seldom feature the innovations of the women themselves. The famous mobile phone ladies, for example, help with technology diffusion; but they do so through the traditional route of marketing a good in smaller packages that are more affordable in the budgets of low income families. If they have introduced other innovations, they have not been described in the published literature. The literature is split on whether microfinance produces much in the way of economic growth, and there is some evidence that while microfinance directed to men results in capital accumulation (Karlan and Appel 2011), microfinance directed to women does not. This research may neglect, however, the investment women might make by investing their business proceeds in human capital development within their families.

Instead of appearing as innovators, women tend to appear in the published literature on innovation in the informal economy as defective innovators or as the victims of technological change. John Powell, for example, in Survival of the Fitter (Powell 1995) tells the stories of the few women who wanted to become engineers in the informal sector in Ghana, the best of whom was lost to emigration. He also points out that mechanization, which is usually the basis for rural industrialization and building businesses in the informal sector in the city, has a tendency to displace women’s traditional skilled activities, which tend to be done by hand. A collection of examples of innovations by farmers includes one collection of innovations by women (Lemma, Abay et al. 2000). This collection could only be gathered once a team of female researchers was put together because of prohibitions on men outside the village talking to women. The women were inventing effective new ways of doing the tasks that were in their traditional part of the division of labor, usually growing food crops for the family. As soon as a crop is seen as having the potential for cash production, however, men may take over the production (Hall and Clark 2010).

Would research on women’s informal innovation only produce role models to inspire women to participate in processes that are already well understood; or are there more fundamental questions involved? Are there distinctive theoretical issues involved in women innovating in the informal economy? One set of fundamental questions might arise from the marginality of the roles they play there, from household workers to food service. If the most economically productive innovations are in manufacturing rather than service, then focusing on the role of female innovators helps to bring innovation in service sectors into focus. Another set of fundamental issues could be connected to entrepreneurship. Perhaps studies of entrepreneurship have been skewed towards the conditions that men rather than women need to start businesses, and need to be made more general in the same way that health research has to study both men and women in order to be universal. If we paid more attention to organizational or socio-technical rather than physical innovations, would we find more women entrepreneurs? Are those kinds of innovation more comfortable, and therefore more likely, in relation to women’s traditional roles? If this is the case, then men may actually be likely to under-innovate in these areas, and public policies might want to direct rewards to these areas to produce maximum public value. Finally, the very basic connection of division of labor in the household to the capitalist, industrial economy, with women excluded through

unpaid traditional roles, comes to play in the study of women as innovators in the informal economy (Engels 1884) How have women transformed household work in environments of scarcity? What is the value of these innovations to the development process?

4.6. Institutions

In summary, studies of grassroots or community-based innovation have probably already studied innovation in the informal economy many times, without knowing that they have done so. Grassroots innovators, local village women artisans – all these people are being inventive without benefit or cost of state protection or regulation. But they are clearly solving problems and creating livelihoods in their communities. The research agenda we advocate in this paper places these innovators at the center, rather than the peripheries of case studies where they often exist, and asks what they need to do their work better.

The change in terms, however, does not dismiss the important question that the work on the informal economy raises for innovation studies. The major reason for the lack of attention to the formal status of these innovators is that such forms of innovation precede the imposition of state regulation of business and formal knowledge creation. They are the default, not the exception. Innovation studies can therefore ask the question, how does the state enter their work? Does it help or hinder, in what ways and under what circumstances? To whose benefit? The lack of intellectual property protection for the treadle pump, for example, clearly facilitated its diffusion, alteration, and adoption. These questions are crucial for addressing the possibility of policy responses to growing understanding of innovation in informal settings. We return to that issue in the last section of the paper.

5. Innovation as a result of group action

5.1. The centrality of interaction

When considering the role of innovation in development processes and, vice-versa, the influence of styles of development on the kind of innovation searched, introduced, incorporated and diffused (that is, the issue of the “actors of innovation”) is not always explored systematically, even if it is acknowledged as important. Fortunately, innovation studies nowadays are following the path of von Hippel's work by recognizing the importance of users as innovators; in the same vein the issue of “demand-side innovation policies” seems to be flourishing (OECD 2011). That means that the innovators whose behaviors are recognized as important are not only business firms but include different types of actors.

Lundvall has already stressed that focusing only on firms as innovation actors is a big mistake, signaling that workers as well as the public in general should be incorporated into innovation approaches (Lundvall 1988). This is in line with one of the main messages of the “Aalborg's school”'s innovation systems approach: innovation is viewed fundamentally as an interactive process involving different actors, interests and expectations. “Perhaps the most basic characteristic of the innovation systems approach is that it is ‘interactionist’” ((Johnson and Lundvall 2003): 16). If this is so, we are entitled to conceptualize innovation as a sort of multi-actor or plural endeavor and, perhaps, in some particular circumstances, as a process of collective action. Several narratives of innovation are always possible: Bijker has shown convincingly that innovations that are told as single events, like Bakelite or the electric

bulb, were often in fact much more entangled and plural in terms of who (and why) participated in the processes of invention, innovation and diffusion (Bijker 1995).

Within firms something similar occurs. A firm can be seen as a single actor when innovation is analyzed at macro level, but firms are also spaces where multiple actors interact. This interaction determines whether innovation is achieved at all, which innovation happens, its degree of novelty, etc. The kind of interactions supporting or leading to innovation will depend on the specific settings where the process of innovation is taking place and the actors involved; but the point to be stressed is that interactions always occur. The strength of these interactions; how horizontal or hierarchical the exchanges are in which they are based; and how wide the net of participants is, are all heavily context-dependent and innovation specific. Given that we are interested in understanding a specific type of innovation, those that “occur” in informal settings, we posit that all along our work we need to analyze the types or kinds of interactions involved in such innovations.

5.2. Innovation

Scholars working on innovation and on development both face the thorny issue of defining or characterizing the field of their inquiry. When efforts are made, as in our case, to combine the insights stemming from these frameworks, each containing widely different approaches, it becomes fundamental to clarify the concepts we are using.

What is innovation? Not only there is no one definition of innovation but understanding innovation dynamics empirically depends critically on the definition adopted. Innovation surveys make this point clearly. In Latin America, for instance, the “Bogotá Manual” was a late 1990s effort to get a more realistic picture of what innovation looked like in the region where the Oslo Manual guidelines emerged; similar concerns were expressed in the case of Africa (Red Iberoamericana de Indicadores de Ciencia y Tecnología (RICYT) 1999). The framers of the Bogotá manual argued something that is definitely accepted now, that context matters for how innovation is defined, conceived, and understood. Besides the issue of defining innovation for measurement purposes, several other issues indicate that innovation is a multi-layer phenomenon. Innovations are developed in the realm of private goods but also in the realm of public goods; we have innovations conceived as an intrinsic part of the economic process and innovations conceived as solutions to problems that may have no direct contact or concern with economic performance; innovations led by private firms and others led by national, regional or local public policies; innovations led by small specific communities or by cooperative arrangements, within or outside market relations and with or without adherence to formal governmental norms. Besides that, innovations can be studied in terms of results and impacts but also studied as social processes, taking into account different actors along with their motivations and conflicts. The insights of the school of thought known as “evolutionary economics,” discussed above, are useful for approaching innovations as complex social processes. The formal look into innovation as a rational utility maximizing activity is replaced there by more “organic” hypotheses, where incomplete information, tacit knowledge, accumulative learning, etc., come to the forefront.

All these valid but different ways of conceptualizing innovation suggest the following question. What are the common grounds that allow us to recognize innovations wherever they show-up, particularly so in informal settings? We need a definition that is precise enough to prevent our calling just anything innovation, but wide enough not mis-identify innovations just because there are different from what we are accustomed to. Before suggesting a concrete set of issues to be looked after when researching on

innovation in informal settings, it is worth recalling that innovations can be seen as processes and as outputs. This distinction becomes blurred when we pass from individual innovators to a group, because what is an output innovation for one innovator can be a process innovation for another innovator. Moreover, beyond the concrete outcome of an innovation, the process of searching for an innovation is particularly important.

Five characteristics seem especially important for recognizing, describing and assessing innovation in informal settings, both as processes and as outcomes: (i) newness, (ii) adaptation, (iii) interactiveness, (iv) knowledge content, and (v) the learning, scaling-up and diffusion perspective.

(i) Newness is a first mark for any innovation. Everett Rogers provides a working definition, one that is “people-centered” and not necessarily technology or market centered: “An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption” ((Rogers 2003): 12). We are particularly interested in practices and objects that are new for those that use them, regardless of whether they involve “absolute” newness or are related to new knowledge. The distinction between “new to the world” and “new under my roof” was established long ago in industrial innovation surveys, the former indicating front-runner firms and the latter less-dynamic but still innovative firms. The distinction among firms is not useful for our purpose, but the newness of a practice, device, or artefact should be assessed fundamentally in relation to the community that adopts it.

However, if we want to keep in mind the specificities of innovation in informal settings but still make the most extensive use of general categories on innovation, we should reflect on the distinction between radical and incremental innovations. This distinction is context-dependent, even if this trait is rather tacit in the literature. In highly industrialized countries and in formal settings, radical innovations are those that are not only new under the sun but also strongly transformative, giving rise to new industries or deeply transforming traditional industries. What might the concept of radicalness mean in informal settings? A grassroots innovation may be labeled radical if it leads to new and important activities for the community or for part of the community. On the other hand, an incremental grassroots innovation is one that implies a new way of doing things (process innovation) or a new or modified artifact (product innovation) that improves older ways of working but does not change working processes substantially. These aspects, along with the newness in the sense indicated earlier, form part of what needs to be assessed in this characteristic.

(ii) Adaptation is an important characteristic of innovation worldwide, but especially so in developing countries and more generally where scarcity conditions prevent solving a problem by just “plugging-in” an imported device. Adaptation is much wider than reverse engineering. Adaptation can indeed lead to innovation:

An imitator working with an extremely sparse set of clues about the details of the imitatee's performance might as well adopt the more prestigious title of 'innovator', since most of the problem is really being solved independently. However, the knowledge that a problem *has* a solution does provide an incentive for persistence in efforts that might otherwise be abandoned. ((Nelson and Winter 1982): 124).

Innovations in informal settings will probably emerge to a fair degree from imitating or adapting other solving-problem performances (belonging to other communities, coming from a known but for different reason unusable technology, a blending of the former two, etc.). Identifying this reality can facilitate a better understanding of the phenomenon under scrutiny and helps us to understand it as true innovation,

“this more prestigious title.” Here we have a difficult research challenge, because since adapting/imitating is probably present extensively in innovation in informal settings (as it is elsewhere), characterizing innovations would require the researcher to identify from what or from whom the innovation under scrutiny is being adapted or imitated. Other actors enter the scene, and the nature and logic of the networks in which grassroots innovators enter in contact with them should at least be depicted as part of the description of this characteristic.

(iii) The interactiveness of an innovation can be seen as its capacity to foster linkages: “A linkage exists whenever an ongoing activity gives rise to economic or other pressures that lead to the taking up of a new activity.” ((Hirschman 1981):76) In this sense, interactiveness is a proxy for the dynamics of an innovation. To assess an innovation’s interactiveness, the notions of forward and backward linkages, also proposed by Hirschman, are useful. The idea is to get to know if an innovation is expected to benefit from an improvement in its inputs, be they raw materials or working methods (backward linkages) or if new investments are induced to make a better use of the innovation (forward linkages) ((Hirschman 1981): 65). Innovations in informal settings need to keep on moving and not get locked-in to a sort of circular or stationary mode; this is why assessing interactiveness can be useful. The interactiveness of an innovation can also be evaluated in terms of its capacity to keep the community strong, for instance, because making it work promotes collective action. This is not a forward or a backward linkage but more like a “social linkage” able to build social capital. Building social capital can be particularly important to identify when characterizing innovation in informal settings.

(iv) The knowledge content of an innovation is an important feature to assess its social roots and its future prospects. Any innovation has a knowledge component that need not be science-based. Joel Mokyr proposes a definition of “useful knowledge” that even if a bit restricted, because it does not include organizational knowledge, is nevertheless wide enough to encompass the kind of knowledge in which innovation in informal settings is expected to be embedded: “useful knowledge ... deals with natural phenomena that potentially lend themselves to manipulation, such as artefacts, materials, energy, and living beings” ((Mokyr 2002): 3). Mokyr proposes that useful knowledge describes two types of knowledge: Ω or propositional knowledge, related to “what,” that can be applied to create λ or prescriptive knowledge, related to “how.” Modern science is part of propositional knowledge, but the concept is much more inclusive, encompassing folk wisdom as well as informal knowledge about nature. ((Mokyr 2002): 5) Prescriptive knowledge consists “...of designs and instructions for how to adapt means to a well-defined end, much like a piece of software or a cookbook recipe” ((Mokyr 2002): 10). This knowledge can be largely tacit, acquired and transmitted much more through a DUI mode (doing, using, interacting) than through a STI mode (science, technology and innovation). The DUI mode is characterized by “focusing on the learning from informal interaction within and between organisations resulting in competence-building often with tacit elements” ((Jensen 2007): 280).

What is central for assessing the scope of innovations that originate or are produced in informal settings is the following observation:

...the wider and deeper the epistemic base (propositional knowledge) on which a technique rests, the more likely is that a technique can be extended and find new applications, product and service quality improved, the production process streamlined, economized and *adapted to changing external circumstances, and the techniques combined with others to form new ones.* ((Mokyr 2002): 14, emphasis added).

If the knowledge on which a technique rests is too narrow, any transformation of such a technique will be made by trial and error, a methodology that can be so costly that the technique is preserved without change, until it is totally obsolete. Giving support to innovations in informal settings should include identifying the propositional knowledge on which such innovations rest, not only to get a better picture of the innovations as such, but also to identify ways to put this knowledge in dialogue with other knowledge to widen the innovative base. Besides what people know about facts (what), the explanations they have about them (why), and what people know about how to do things (how), another important source of knowledge is related to “who knows what.” This is a form of relational knowledge of great practical importance (Lundvall and Johnson 1994) that should also be identified when studying innovations in informal settings.

(v) Learning can be more or less related to innovation. An innovation can be an end in itself or it can scale-up and be diffused. These three sub-characteristics of innovations in informal settings are critical in assessing the social impact of innovations. Regarding learning, it is worth recalling that even if Schumpeter indicated that introducing an innovation always implies changing routines, the latter does not necessarily foster learning processes among the adopter or users of the innovation. If this is or is not the case depends to some extent on the nature of the innovation but much more on the process by which the innovation is developed. David Noble (Noble 2011), examining the way in which numerically controlled machine-tools were developed in the USA in the early 1950s, describes a process in which any possibility for collective learning was banned, by removing any contact between the developers of the innovation and the shop-floor workers that earned the hands-on knowledge needed to manipulate the conventional machine-tools. Cases are common in agriculture that are not so blatantly exclusionary but nonetheless lead to innovations introduced without accompanying learning processes.

The Interactive Learning Approach, ILA, developed at the Athena Institute in The Netherlands, is an example of a process of innovation-building through collective learning. In this case, learning is a means towards the end of innovation. Things can happen differently: for instance, only a small group within a community may be involved in innovation design, but nevertheless a parallel process of learning around the innovation can be put in place. Detecting the “learning bias” of an innovation is far from easy; this can only emerge through qualitative analysis that needs to be tailored to each context. But it is worth doing, because the prospects for scaling-up and diffusing innovations are related to the problem-solving capacities of the innovation, the latter being enhanced the more it is used in a reflexive way. The latter is only possible if the process of innovation allows for thorough processes of learning. However, scaling-up and diffusion, even if tightly related to learning processes, have dynamics of their own. Some of them can be purely physical (different infrastructural conditions may difficult or promote the scaling-up and diffusion of an innovation) but other are social and cultural, deserving a careful analysis. This aspect is particularly important: when an innovation has a wide potential to solve pressing problems, its scaling-up and diffusion means that several communities may profit from the solution. Things are not so simple, though, and different types of barriers can prevent this from happening.

These characteristics form a sort of check list that help by putting empirical research around innovation in informal settings on a minimum common ground. Two last comments will be made in this regard. First comment: as some earlier quotations show, innovation in informal settings can be studied making use of classic neo-Schumpeterian innovation work; this is particularly so in relation to the framework of National Systems of Innovation that emphasizes learning and competence building (Lundvall 1992). We are aware that the usefulness of the NIS concept applied to developing countries is

controversial (Lundvall, Joseph et al. 2009). Some critiques are related to the kind of innovations that we can find in developed and developing countries, which are so different that it could be of little analytical value to use the same term, NIS, to refer to both (Viotti 2002). These critiques notwithstanding, when the NIS concept is used with care regarding context, it stresses usefully that attention should be paid to identify linkages between widely different actors (successful or failed), which is analytically very important. Second comment: the suggested characteristics of innovations are probably not enough to judge whether a given innovation is “below the radar,” “social,” or some other kind. Even more, they do not allow us to assess directly if the innovation contributes to enhance fairness within the community or if it has good prospects to foster the achievement of lower levels of inequality. For that we need a more general framework, precisely what a characterization of development can give us.

5.3. Innovation as Collective Action

We propose to rely here on a literature that, even if it does not incorporate knowledge and innovation in its framework, dwells deeply with issues of collective action and is empirically rooted in marginalized social groups. If we are going to conceive of grassroots innovation processes as the result of either socio-technical or innovation systems, it is sensible to propose that innovation in informal settings can be seen as an expression of collective action. (“Collective actions arise ‘when the efforts of two or more individuals are needed to accomplish an outcome’” ((Sandler 1992): 1, quoted in (Hess 2007): 5). If we exclude the Prahalad-type “bottom of the pyramid” type of innovations, innovation processes within communities or involving communities and external actors can be seen as interactive and collective. The D-Lab at MIT presents in Figure 4 the evolution from hands-off to hands-on involvement of poor communities in the design of technological solutions to their problems.

It seems clear from the description of the different stages involved in the innovation process that the more collective, probably democratic, the innovative process, the more it will require dialogues, conflict-solving procedures, and ultimately innovation-related governance issues. This implies that people involved in innovation in informal settings or in co-designed multi-actor innovation processes need to have a strong motivation to interact. Given that innovation outcomes are by nature uncertain, it is important when devising inclusive innovation policies to foster the likeliness of trust-relationships between the different actors that participate in the process. From the collective action literature related to governing the commons comes a pair of policy-useful concepts, *crowding out* and *crowding in*:

External interventions *crowd out* intrinsic motivations if the individuals affected perceive them to be *controlling*. In this case, both self-determination and self-esteem suffer, and the individuals react by reducing their intrinsic motivation in the activity controlled. External interventions *crowd in* intrinsic motivations if the individuals concerned perceive it as *supportive*. In this case, self-esteem is fostered, and individuals feel that they are given more freedom to act, thus enlarging self-determination. ((Ostrom 2005): 260)

Crowding-in innovation policy interventions require a lot of listening to people, which is time consuming and cumbersome in relation to the more top-down strategies that lead to crowding out results. Listening to people requires a respectful attitude towards what other people know, something that “people that know”, for instance medical doctors (see for instance (Caron-Flinterman 2006)), policy makers, or for that matter, innovation scholars, can find particularly difficult. As Ostrom forcefully asserts:

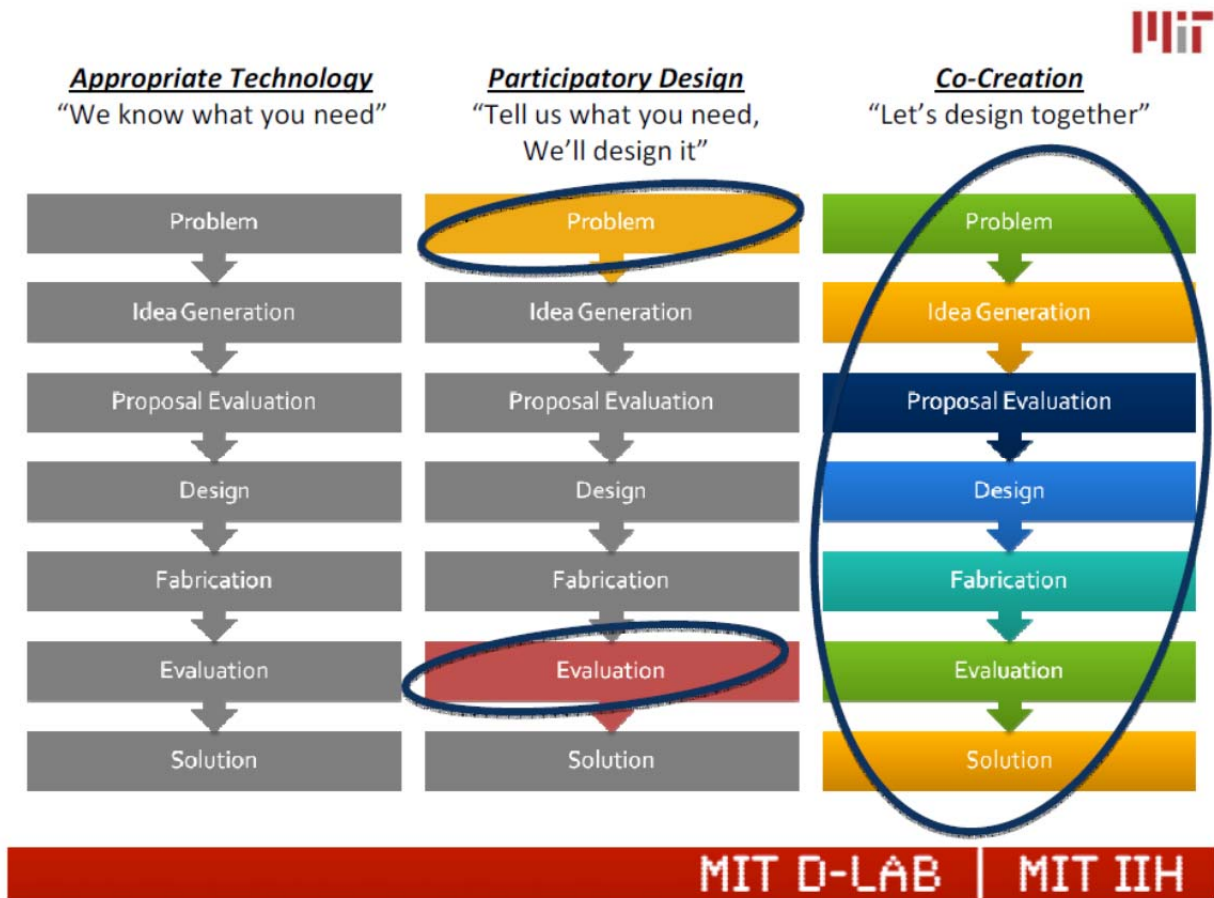
The intellectual trap in relying entirely on models to provide the foundation for policy analysis is that scholars then presume that they are omniscient observers able to comprehend the essentials of how complex, dynamic systems work by creating stylized descriptions of some aspects of

those systems. With the false confidence of presumed omniscience, scholars feel perfectly comfortable in addressing proposals to governments that are conceived in their models as omniscient powers able to rectify the imperfections that exist in all field settings. ((Ostrom 2008): 215)

It requires strong political commitment or the capacity of some actors to convey such a commitment to include the knowledge of those that are regarded usually as not knowledge-rich people in an innovation policy or innovation process.

Figure 4

Source: (Gomez-Marquez 2010)



One interesting and widely known exercise on alternative technology design stemming from a cooperative project between people knowing widely different things and occupying quite different positions in the "knowledge ladder" is the UTOPIA project. Running between 1981 and 1986, UTOPIA was a project where the five Scandinavian countries' unions of printers, typographers and other skilled workers of the printing and newspaper industries participated, along with public research centers and universities. The guiding idea was "translating social values regarding job skills, quality of work, and quality of products into new computer hardware and software for the graphic industries." ((Lundin 2005):

2) The workers were convinced that technology shaped their working lives, eventually making them redundant, and were prepared to influence technological design; they were able to establish alliances with system engineers and computer scientists, conveying as well a strong state support. This project gave rise to what is known as the Scandinavian “collective resource approach” to system design, where the involvement of the users was a key element ((Lundin 2005): 5). UTOPIA was analyzed with admiration in an article published in 1985 in MIT’s Technology Review; leaders from the CWA (Communication Workers of America) visited the UTOPIA premises in Stockholm and they were reported saying “We’d love to be able to do something along these lines” ((Howard 2005): 349).

Obviously, they were not actually able to do so. UTOPIA is not an example in the sense of opening roads for similar endeavors; its circumstances were fairly unique. But three aspects of this project deserve to be kept in mind when reflecting on innovation policies aimed at social inclusion, particularly so when “minds on the margin” are involved: i) those whose knowledge is socially less valued need to value what they know and play the game on equal grounds; ii) other actors with other knowledge, more formalized and more socially valued, must play the game as well on equal grounds; iii) representatives of the “common good”, local, regional or national, must be genuinely interested in the innovation search and back the innovation process. Besides that, it is important to recognize that innovations in general, and even more so innovations where quite different actors interact, are influenced by the dynamics of the group in which innovation as a collective processes is taken place. The governance or mode of operation of such groups constitutes an important part of the understanding of the innovation process.

We have a special interest in reaching a better knowledge and understanding of the innovation processes that occur in informal settings. Even if not focused on innovation, several accounts of the dynamics of survival of different types of communities that can be conceptualized as informal settings from an economic point of view stress that the best unit of analysis is not the individual behavior but the group behavior. It is interesting then to explore the literature linking group behavior and development, particularly so because one of its main concerns is to analyze the determinants of group capabilities (Heyer, Stewart et al. 2007). What these authors want to achieve is quite akin to what we would like to achieve centered around innovation: “...identify major factors influencing group behavior, in order to improve our understanding of groups functioning, with a particular focus on the effects on equity and well-being” ((Heyer, Stewart et al. 2007):1) There are three modes of operation of groups that are considered in this literature: P/C (power/control in hierarchical relations); M (material incentives); Coop. (cooperation among members achieve group objectives) ((Heyer, Stewart et al. 2007): 8-10). Groups and their modes of operation should not be looked at in isolation, “...since the behavior of groups is strongly influenced by the society in which they are embedded, in particular by the prevalent norms and the socio-economic structures which they face” ((Heyer, Stewart et al. 2007): 21) One of the main contributions of this approach is to show how changes in norms and socio-economic structures are indeed changing groups' modes of operation in recent times towards a much more M-style mode of operation.

While we are aware of the danger of a too-superficial analogy, we find it worthwhile to explore how this taxonomy of modes of operation could be translated into “styles of innovation” and moreover how those styles could lead to different innovation outcomes, both in terms of innovations as such and in terms of their impacts. “P/C innovations” can be seen as innovations that are imposed on a group based on a hierarchical dominance of those that “know more” over those that “know less.” This can occur by forces external to the group or through hierarchical relations within the group (males versus females, for instance). The outcomes of hierarchical knowledge dominance are, generally, what Lundvall termed

“unsatisfactory innovations” (Lundvall 1985). Even if his reflections originated in empirical work done in Denmark, it is surprising how useful the analysis seems to be for our purpose. The starting point is the following:

It might be possible to locate situations where the actual rate and direction of innovations does deviate from the potential in a conspicuous way. A systematic analysis of technical opportunities and user needs can demonstrate that actual innovations do not exploit fully the opportunities present, or do not reflect user needs. ((Lundvall 1985): 18)

Some of the examples Lundvall gives of such “unsatisfactory innovations” provide insights for our purpose. A first example relates to “equipment and systems more capital intensive, more inflexible, and more highly automated, than what corresponded to cost-effective solutions and to the needs of the users” ((Lundvall 1985): 19). The main explanation for this unsatisfactory result is that “the competence of users and producers was only partially overlapping and in certain key areas it was very unequally distributed.” A sort of ‘I know better than you what you need’ and the difficulty to stand-up and vindicate that this is not the case on the part of users is the mark of this example, where the innovation producer was a private firm and innovation users were agrarian cooperatives. But even within the same kind of ownership, similar situations can be found: the relationships between a state-owned computer firm and the municipalities to whom such firm provided data services were such that

...80 percent of the users were passive. They had no strategy of their own in relation either to data processing or to office automation. They procured programs from Kommunedata but made no efforts to adapt the programs to their local needs. They were often frustrated in their use because of breakdowns in the central computer and because of limitations built into the programs. ((Lundvall 1985): 23)

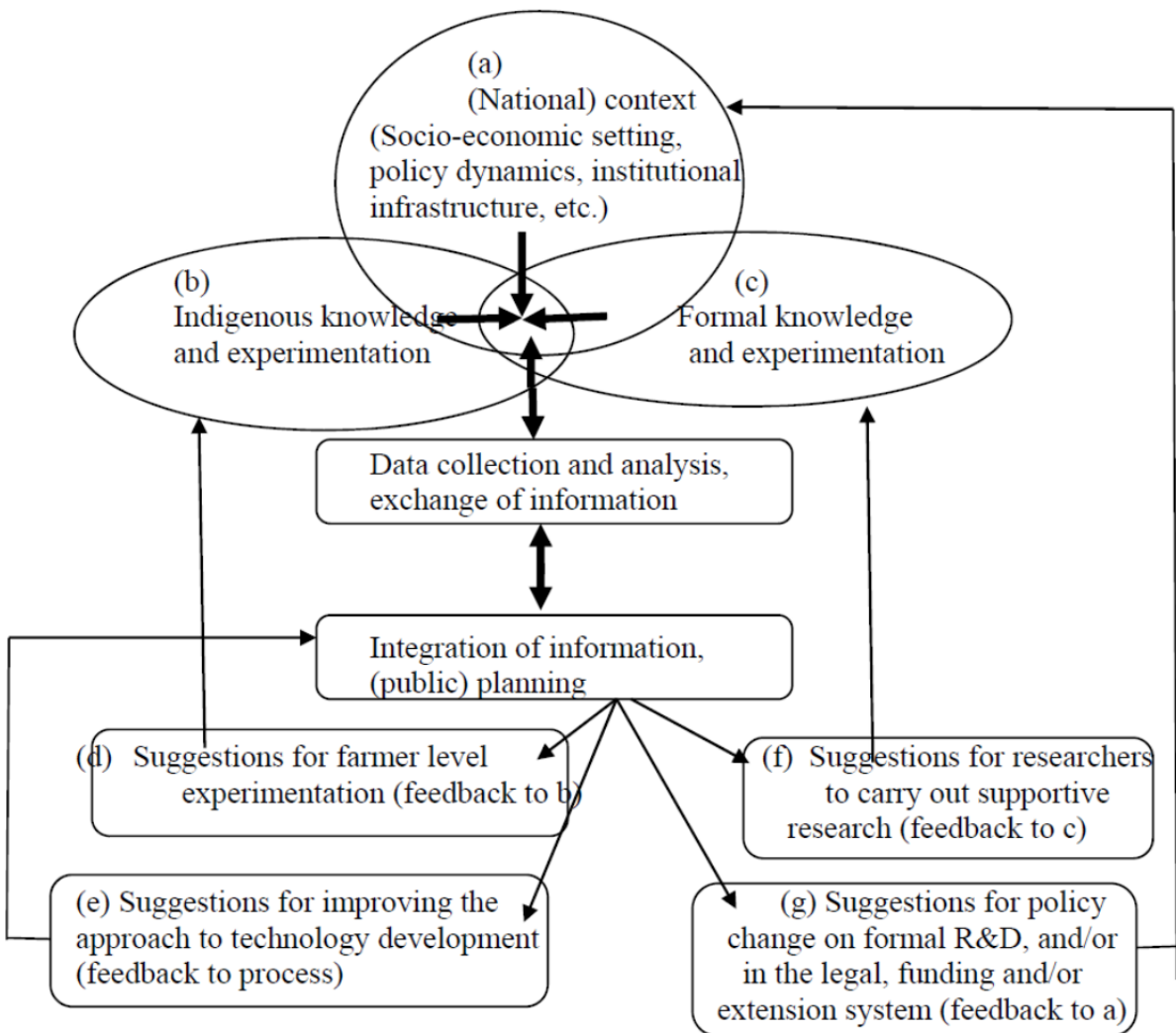
“M innovations” are easier to imagine: they are more “arms-length.” “Bottom of the pyramid” and “below the radar” innovations, discussed earlier, may belong to this category. M-innovations can also occur within a community or a specific group. A socio-technical division of labor allows some people to become innovation producers for other people within the community or the group through market or material incentives mechanisms. The outcomes of these innovations are in principle satisfactory in the sense that if they would not be satisfactory people would not buy them. But since “M innovations” are more “arms-length,” there is no assurance that their motivation and results are devoted to solving pressing problems of excluded groups.

“Coop innovations” can be seen in principle as satisfactory innovations, mainly because regardless of whether they are internal to the community or the group or result from user-producer relationships that include outsiders, knowledge cooperation assures that dialogues occur in which each partner listens to the other meaningfully. The Utopia project is an example of “coop innovation.” However, such innovations, even if they are satisfactory in the sense that they are willingly accepted and even highly valued, can also be “objectively” unsatisfactory.” In the mid-1980s, disappointed by the performance of the formal system, NGOs began working more intensively with farmers at village level, concentrating in low-external-input-agriculture (LEIA).¹⁰ The knowledge and technologies of these farmers became the starting point for informal research and development, using methods such as trial and error and learning by observation. In contrast to the formal system, technologies were to be developed and implemented by the people that actually use them. (...) This approach soon showed that it, too, had its

¹⁰ See earlier reference to Prolinnova.

limitations. The improvement brought about through informal research and development were too small to deal with the immense problems afflicting some LEIA systems, which needed more radical change” (Bundlers 1996). But “radical change” is rooted in the kind of suggestions that modern research can provide, particularly because the need for some of this radical change comes from largely external, unforeseen and culturally alien transformations. However, dialogue and true cooperation between farmers or more generally most people in informal settings and researchers, firms, or even government officials, is far from easy. A glimpse of the complexity of this issue is given by the following sketch (Figure 4) of the “interactive-bottom-up learning approach,” later re-baptized “interactive learning approach,” ILA, developed by researchers at the Athena Institute of the Amsterdam Free University to precisely foster this type of dialogues.

Figure 5



Source: (Bundlers 1996): 208.

In sum, future research that uses this framework would:

- i) identify all the intervening actors and the role played by each of them in the innovation process for reported or detected innovation

- ii) ask what is the main aim of the innovation or the main problem it is supposed to solve, and get the opinion of each of the intervening actors
- iii) analyze each innovation along the lines “mode of innovation”: C/P, M, or Coop
- iv) ask “is the innovation satisfactory or unsatisfactory?” and get the opinion of each of the intervening actors on why.

6. Discussion and conclusions

This overview of the landscape of innovation and development studies allows us to see where research on innovation in informal settings appears in that landscape. Its place is distinctive. In addition to demonstrating the intrinsic importance of the informal economy in employment and livelihoods in the global South, the review shows that there is a set of theoretical questions that these studies raise more sharply than others in innovation studies. In this final section of the paper, we describe a research agenda to address those issues, then end by describing the action audiences for the results of such a research agenda.

6.1. Research agenda

What we have seen in the literature suggests a set of key points to bear in mind as the research agenda in this area emerges.

Focus on the grassroots.

The focus on grassroots innovators is harder to maintain than it might appear. This research topic is emerging in a space that is crowded with related but different studies: entrepreneurship, microfinance, under the radar, pro-poor, etc. But each of these related areas, as we have tried to show, either relates to business activity without innovation or innovation for rather than by marginalized groups. We therefore stress again the importance of studying what informal operators and marginalized households and communities themselves do to produce new products, processes, or services. These activities are inevitably going to be rooted in their own ingenuity and knowledge, some of which will be traditional or place-based. Their innovations are as likely to be socio-technical as technological, and these innovations must be included in the research agenda.

Look for both women and men as innovators.

The dominant neglect of women as bottom-up innovators needs to be addressed with explicit and systematic attention to women across the research agenda, by both male and female investigators. Making gender a ghetto within the field will not help develop a full understanding of the dynamics of exclusion and inclusion. Every study should pay attention to similarities and differences in the innovation processes and experiences of female and male innovators.

Describe, not prescribe, the roles of formal organizations as they appear in informal settings.

A wide range of organizations appear in the accounts of innovation in informal settings. Some are formed in the informal settings themselves and some are formal organizations that intervene in those settings, in roles such as helpers, protectors, or regulators. A research agenda that is focused on the

bottom-up innovation must not start from an assumption about the positive or negative role of any of these organizations, but instead develop an analytic framework that accounts for their effects, whatever they are. It is unlikely to be true that either universities or research institutions or cooperatives or local governments have completely positive or completely negative effects when they intervene in the processes of innovation in informal settings. We need to know descriptively what these kinds of organizations have tried to do in order to move towards an understanding of the conditions under which certain consequences appear. Only after understanding those dynamics descriptively will the results from the research agenda be able to inform action in a positive direction.

Ask, do not assume, whether systems of interaction exist.

Take a critical view of all systems concepts developed in other settings, including both systems of innovation and socio-technical systems concepts. If these concepts are useful, they form models that serve as hypotheses about how a particular innovation process arises and moves forward. But the hypotheses must be tested. Every instance of innovation in informal settings is an opportunity for modifying the models or indeed discarding them and developing new ones. The extra-legality of the informal sector opens the possibility of quite different patterns of interaction, and the originality of the rules of the game that operate within the sector strengthen that possibility further. The study of innovation in informal settings could be the seedbed for new theories that push the understanding of innovation beyond its formal-setting limits.

Keep the larger picture of economy and society in mind.

As fascinating as the study of innovation in informal settings might be, those of us concerned with development as a whole should always keep the larger development context in mind. What is going on in economy and society outside the informal activities? What larger consequences are the grassroots innovators creating? We need to consider the outcomes of these innovation processes in political, social, cultural, and economic terms. Where major shifts have occurred in livelihoods, have they come from inside the informal sector, or from outside?

Be ambitious in theoretical terms.

Studies of innovation in informal settings could be seen as the next broadening of innovation studies concepts. Without sound theoretical roots it is easy to fall in the trap of accumulating case studies from which it is difficult to get analytical insights. The latter are fundamental to reach a deep understanding of a overwhelmingly complex process as well as to be able to build policy advice.

Follow (if you think it is worthwhile to follow them) some recommendations made in the text to foster better comparative analysis.

Comparative analysis is always rich, if well done. To achieve this some common grounds for empirical research must be agreed upon. The idea that innovation in informal settings should at least be assessed in terms of (I) newness, (ii) adaptation, (iii) interactiveness, (iv) knowledge content and (v) learning, scaling-up and diffusion, can be useful.

Try to understand how innovation in a given informal setting interacts with other sources of knowledge.

It is highly probable that any innovation occurring in an informal setting will establish different types of bridges with other sources of knowledge: other informal settings, NGO's, other type of intermediaries, public policy officers, university researchers, etc. Mapping them and analyzing the dialogues maintained with the people involved with the innovation process in the informal setting can shed light to the whole process.

Try to disentangle the prospects for learning, scaling-up and diffusion of any innovation detected.

This can only be made through a thorough analysis of the social process of negotiating, building, using and eventually reforming the innovations. Two intertwined hypothesis -to be tested- are:

1. the more agreement around the importance of the need to which the innovation is an answer, and the more agreement on the suitability of the proposed innovation, the stronger will be the involvement in the process that lead to build the innovation and the larger will be its use.
2. the stronger the above mentioned trends, the larger the detected scaling-up and diffusion effects.

6.2. Action audiences

In summary, then the research agenda starts from the informal innovators themselves and moves outwards, through the organizations they interact with, the patterns they create, and the way they contribute to the larger society. The agenda is both empirically and theoretically rich and deserves the attention of the innovation studies community. But who else is likely to care about the results?

Clearly, the research agenda should be carried out in a way that it produces understanding that is useful to the grassroots innovators themselves. This research area would be enriched by considering every project as cooperative research, undertaken in collaboration with the grassroots innovators and their communities. The innovators will have useful input on research questions, methods, and results. They may also be helpful advisors on the other actions audiences researchers in this area will want to reach.

This review has already pointed to some of the organizations that are likely to be interested in the results of the research because they want to undertake positive interventions, such as NGOs, cooperatives, extension services, research organizations. The research agenda can extend their understanding of what the grassroots innovators do and care about, and also how their own efforts can either help or hurt. When the innovations performed in informal settings include the efforts of other organizations, the research results can be particularly useful to understand the dynamics of collaboration, the nature of the blockages that may occur as well as the nature of good interaction practices.

Finally, the actors in the formal innovation system should be framed as a potential audience for the results of this research. This group would include firms, research organizations, and government actors from local to national and sometimes even international levels. Studies of the informal economy have shown the rich interface between formal and informal activities, with informal settings providing workers and inputs to formal firms, among other relationships. But there is little reference (except in the rare studies cited above) to the way innovation processes stretch across that boundary. Different types of public policies may find the results of the research agenda quite useful. Health policies, housing policies, educational policies, other types of social policies, need to take carefully into account people's knowledge,

understanding and wisdom. They must remember the already mentioned phrase from Gupta, “people in the margin do not have minds in the margin.” Research around innovation in informal settings is a way to inform public policies on the knowledge, understanding and wisdom people have there, helping that way to the design of more efficient instruments.

Government actors may be very interested in those dynamics, and indeed may want to stimulate them. Research-based understanding can then help the various bodies to design interventions with the goal of preventing exploitation and stimulating the broadest development possible. Some programs to encourage either grassroots or socially-oriented innovations already exist (Brazil, Argentina). In the case of Brazil several programs point to nurturing different types of creativity in informal settings, from incubating social or community cooperatives in municipalities and universities to the opening of a special budgetary line in the Ministry of Science and Technology to foster social innovations. One of the main ideas beyond these initiatives is that the “solidarity economy” is an answer to the challenge of poverty and marginalization and that innovation in informal settings is part of this answer. The program of research offers policymakers a chance to share experience and hear systematic analysis of successes and failures. Many of the cases already reported point to extension services, either rural or industrial, as helpful government actors. Again, these services have important experience to share in shaping the agenda and much to learn from the results and broader context they will provide.

Studies of the informal economy suggest, however, that the range of state actors that will appear in the studies is likely to be quite broad, including labor and environmental regulators, police, and registry bureaus – any of these might have lessons to learn. Ministries of Social Inclusion or Social Welfare might be the right places to articulate these issues and develop plans for taking them up throughout government.

Finally, development agencies will be interested in learning more about this neglected area of innovation in order to think about interventions they might be able to undertake to encourage equitable development.

Research around innovation in informal settings, oriented by the understanding that people must be seen as agents and not as patients, has practical importance for all the actors involved in the betterment of the actual life conditions and the building of development prospects for people living in the margins. This is so because any policy or intervention needs to start from the strengths, particularly the cognitive strengths, people have. The research agenda proposed in this paper points, ultimately, to knowing more and more deeply about these strengths.

6.3. Conclusions

In conclusion, this research area is both intellectually rich and practically important research. Exploring it will demand that the innovation studies community not only articulate new research questions, but also develop new research attitudes. The innovation studies community is certainly equal to the task.

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Appendix Table 1
Informal Employment as Percentage of Total Non-Agricultural Employment, By Sex (2003–2004)

Country	Year	Informal employment		Employment in the informal sector		Informal employment outside the informal sector	
		Women	Men	Women	Men	Women	Men
		as percentage of total non-agricultural employment					
Brazil (urban)	2003	52*	50*	32	42	24	12
Ecuador (urban)	2004	77	73	44	36	33	37
India**	2004/05	88	84	73	71	15	13
Mali	2004	89*	74*	80	63	10	13
Republic of Moldova	2004	18	25	5	11	14	14
South Africa	2004	65	51	16	15	49	36
Turkey	2004	36	35

Sources: For all countries except India, ILO Department of Statistics; for Brazil, ILO estimates based on official data from various sources; for Mali and South Africa, ILO estimates computed from labour force survey micro data; for the rest, ILO estimates based on labour force survey data; for India, estimates provided by Jeemol Unni based on the Survey of Employment and Unemployment. This table was prepared by Ralf Hussmanns of the ILO Statistics Department and published in the United Nations, 2010 *The World's Women 2010: Trends and Statistics* (United Nations Publication, Sales No. E.10XVII.11) p.89.

Notes: (a) *The sum of the components “employment in the informal sector” and “informal employment outside the informal sector” exceeds total informal employment due to the presence of formal employment in the component “employment in the informal sector;” (b) ** Data refer to persons aged 5 or over.

Source: <http://wiego.org/informal-economy/statistical-picture>, accessed January 7, 2012