

CROWDSOURCING SUSTAINABILITY: Evaluating the impact of crowd-led strategies for the sustainable development of local low-income communities in Brazil.

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ABSTRACT

This work illustrates an innovative approach to crowd design processes focused on sustainability, developed at the Design for Sustainability Research Centre (Núcleo de Design Sustentavel - NDS) of Paraná Federal University (UFPR) from March to November 2014; NDS objective was to involve low income communities into a co-design and crowd design process to solve some urgent sustainability problem they are facing.

Designers and researchers of NDS collaborated then with the low income community of Águas Claras (located in the city of Curitiba metropolitan area) and its residents. NDS also established a strong collaboration with the local Households Association to provide support throughout the whole project.

The project, called Sustainability Maker Brazil (SuM Brazil), is integrated into the European funded project Sustainability Maker (Life+), that has as Italian partner Design and system Innovation for Sustainability (DIS) research group, of the Design department of Politecnico di Milano.

The thesis has as primary objective to present and evaluate the methodology and tools adopted and developed for the crowd design project in the Brazilian low income community.

The first part of the thesis illustrates a theoretical background of crowd design and other crowd-led initiatives sustainable social innovation, co-design processes and design for sustainability; a special attention is given to the crowd design scene in Brazil with focus on low-income communities and their connection with ICTs; some best practices.

The second part of the thesis describes the methodology and the tools used during the different stages of SuM Brazil design process: identification of sustainability issues within the community (according to Águas Claras residents); crowdvoting to directly involve people in the decision process; transform all the informations acquired into a crowdsourcing challenge, called “the Kitchen challenge” and promote it both online and offline; sustainability evaluation of posted ideas and identification of winning ones (for further detailed design); sustainability evaluation of proposed solutions and identification of winning one; realization of winning solution (product). The whole SuM Brazil process, that ended in April 2015 with the first product prototyped by the EcoDesign company.

Some prototypes have been delivered to Águas Claras.

Both the crowdvoting and the consecutive crowdsourcing steps were physical and digital; the digital crowd design process has been supported by the new Innonatives.com web platform (developed by the EU funded project), and the challenge has been promoted via facebook, while the physical touchpoints were mainly scheduled visits to the community and design jams to encourage designers in taking part in the crowdsourcing phase.

The final part of the thesis is a critical analysis of SuM Br is a pilot project proposing some possible improvements. Its main results has been to verify NDS working methodology and tools, as well as the effectiveness of Innonatives.com web platform in the Brazilian context. NDS also developed some tools and guidelines to use for future analog projects.

In the thesis is clearly identified the role of the candidate. In particular was responsible of the organization of the design Jams that happened between August and September at UFPR. She also created a toolkit, including: a visual presentation of SuM Project, a step-by-step guide to develop an “ideas jam session” and some printable material to allow the replication of the Jam in other contexts.

Keywords: crowdesign; sustainability; action research; pilot project; emerging countries; low income household.

Research Overview

This research is integrated in the larger work of the Design for Sustainability Research Center, and this investigation is giving continuity to the topic of Brazilian social housing problems and low income communities issues.

The on-going work of the PhD Candidate Isadora Dickie is focused on crowd design; the dissertation of Fukushima (2009), "Social dimension of sustainable design: Insights from vernacular solutions from low income users" analyzes the impact on sustainability (with focus on social dimension) of self-build or DIY improvement in furniture by low income customers; the on-going master thesis of Karam (2014) collects tools and methods for co-design together with users from low income communities.

This works, together with all projects focused on low-income context, offered a solid base for the development of this pilot project: all of them contributed in creating a shared knowledge and a set of good practices for working with low income communities.

The Sustainability Maker Brazil pilot project focus on the investigation of the impact of ICTs and alternative, crowd based models of product and service development on the low income context.

List of abbreviations.

NDS - Núcleo de Design Sustentável - Design for Sustainability Research Center

UFPR - Universidade Federal do Paraná - Paraná Federal University.

IBGE - Instituto Brasileiro de Geografia e Estatística - Brazilian Institute of Geography and Statistics

MCMV - Minha Casa Minha Vida - My Home, My Life - Federal Government Housing Program

ICTs - Information and Communication Technology

BoP - Base of Pyramid

GCG - Global Connectivity Group

UNDP - United Nations Development Programme

CEF - Caixa Econômica Federal -

PBM - Pesquisa Brasileira de Mídias - Brazilian Media Research

DHDE - Demanda Habitacional Demográfica - Demographic Housing Demand

SNHIS - Sistema Nacional de Habitação de Interesse Social - Social Interested Households System

FNHIS - Fundo Nacional de Habitação de Interesse Social - National Fund for Social Interested Households.

PAC - Programa Aceleração do Crescimento - Accelerating the Growth Program

MCM - Minha casa Melhor

Chapter 1: INTRODUCTION

1.1 Definitions

Ecological economists and environmentalists, in the last few decades, look back to the industrial revolution to find the reasons of the need of beginning of a new revolution, the era of sustainability.

Since its beginning in the mid XIX century, the Industrial Revolution and its inventions brought to humanity new technologies, economic growth, safer and longer lives; during the industrialized era, the idea that a given human necessity has to be fulfilled by an artifact was the central paradigm; as a result, a “never ending” production process and growth is seen as the paradigm. Nevertheless, the Industrial Revolution marked a turning point for our society in the relationship with the planet environment, and the consequence is around us: filthy cities, toxic industrial sites, contaminated soils, polluted and acidified oceans, destabilizes climate systems, ultimately heats the overall surface temperature of the planet etc

Although the positive impact of the Revolution on human and economical development of the society, there were many indicators that the Industrial Revolution propelled the world human population into an era of growth at the expense of the human condition; critics to industrialization already began during the Revolution:

“the Luddites questioned the necessity of machines that put so many people out of work. Engels questioned the horrendous living and working conditions experienced by the working classes and drew links between economic changes, social inequality, and environmental destruction. Thoreau questioned the need for modern luxuries. Mill questioned the logic of an economic system that spurred endless growth. Muir revalorized the natural world, which had been seen as little more than a hindrance to wealth creation and the spread of European settler societies around the globe.” (Caradonna - The industrial revolutions and its discontents).

Traditional critics of the industrializations were intellectual inspiration for the birth of the sustainability movement; over the years, concerns over environmental degradation increased indeed, exploding in the middle 60s, when the environment became increasingly important as a world issue and sustainability was adopted as a common political goal.

In the same years, the Organisation for Economic Cooperation and Development (OECD) was created to promote policies that would achieve ‘the highest sustainable economic growth and employment in Member countries in order to stimulate employment and increase living standards’¹. The society has been awakened on the implication of the unsustainable growth and dependence on limited resources, and raised important question on the human impact on nature (Carlson, 1962); while coal and other fossil fuels were taken for granted as being inexhaustible, the fossil fuel era were predicted to be very short and that other energy sources would need to be relied upon (Hubbert, 1949). Nowadays, although a larger part of the world population agrees with Hubbert’s prediction, the use of fossil fuels had become irreversibly connected to human and economic progress in our society; changing our energy consumption habits is not an easy process: it would demand a drastical change on how people carry on their lives and how the society works.

¹ Global Sustainability, ‘Global sustainability: the history/time line of an idea’, RMIT, Melbourne, 2001, p 4, at RMIT’s Global Sustainability website,

In 1987, almost two centuries after the beginning of the first Industrial Revolution, the report “Our common future”, created by the World Commission for Environment and Development (WCED), introduced for the first time internationally the concept of “sustainable development”, defined as:

“development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. (Brundtland, 1987).

Brundtland’s definition is nowadays commonly cited as a definition of sustainability in general and it exposes the necessity of development rather than focusing on strategies for the maintenance of current conditions; as a primary consequence, it focus on areas in which development is most important, such as emerging countries; the following Commission (Rio 1992 and Johannesburg 2002) confirmed this international agenda of environmental protection through sustainable resource management.

In 2005, the World Summit on Social Development identified the following years’ sustainable development goals, identified as environmental protection together with economic and social progress, for present and future generations. These three aspects are commonly known as “three pillars of sustainability”, where the social and economic growth are limited by environmental limits.

Defining Social, Economic and Environmental Sustainability;

Three dimensions of sustainability can be identified (Vezzoli and Manzini, 2008; Manzini, 2010).

Environmental Sustainability is perhaps the most explored dimension of sustainability, defined as “the maintenance of the factors and practices that contribute to the quality of environment on a long-term basis. (BusinessDictionary, web, 2014).

Environmental viability is also defined as development that should be based on consumption of resources that lay ‘within the bounds of the ecological possible and to which all can reasonably aspire,’ and that should ‘meet the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1987).

Manzini and Vezzoli (2008) define also the principles of environmental sustainability, being:

1. promote use of low impact material and energies (non toxic, recyclable, renewable, biodegradable).
2. optimization of the product life, adopting product life cycle design approach.
3. minimize the use of natural resources within products and services
4. extend life cycle of products (product service system design for eco-efficiency)
5. facilitate assembly and disassembly.

Social Sustainability is directly related to satisfaction and well-being of the human capital. Social sustainability can be identified through some indicators, such as proper salaries,

reasonable working schedule, safe and healthy work environment, respect of human rights and prohibition of child or forced labor (Schmit, 2007).

Mc Kenzie (2004) affirms that *“social sustainability occurs when the formal and informal processes, systems, structures and relationships actively support the capacity of current and future generations to create healthy and liveable communities. Socially sustainable communities are equitable, diverse, connected and democratic and provide a good quality of life.”* (McKenzie, 2004).

McKenzie (2004) also underline the principles of a social sustainable community, being:

1. **Equity:** the community provides equitable opportunities and outcomes for all its members, particularly the poorest and most vulnerable. While equity is listed as a separate principle, it is such a fundamental component that it cannot really be separated from the other principles. Equity is a filter through which all other principles are viewed.
2. **Diversity:** the community promotes and encourages diversity.
3. **Network Structure:** the community provides processes, systems and structures that promote connections within and outside the community at the formal, informal and institutional level.
4. **Quality of life:** the community ensures that basic needs are met and fosters a good quality of life for all members at the individual, group and community level.
5. **Democracy and governance:** the community provides democratic processes and open and accountable governance structures.”

Vezzoli (2010) is used as common reference when social sustainability is applied to design practices; the author proposes equity among stakeholders, transparency, education to sustainability, proper working conditions, promotion of social cohesion and integration of weeks and marginalized as principles to enhance social sustainability.

Economic sustainability:

While traditional market-oriented economic dimension is profit and competitiveness oriented, the definitions of economic sustainability relates to human development and well-being (Sen, 2000; Furta, 2002, Levesque, 2007; Mass 2010; Veiga, 2011; Vezzoli, 2010; Daly, 2010; Sachs, 2012).

5 Principles of Design for Sustainability could be listed:

1 - Promote local economies: involve local stakeholders as much as possible, contribute in create opportunities of revenues and enhance local entrepreneurship. (Santos, 2009, 2011). Strictly connected to this principle is the idea of local development, where local could refer to districts, urban centers, metropolitan areas etc

The growing complexity of the society's issues relates with its territorial and multidimensional base, creating as a consequence a focus on local and territorial approaches (Qren, 2012).

2 - Strengthen and valorize local materials and production processes: use, whenever is possible, local resources and energies, preferably renewable (Santos, 2011). Efficient resources

management at a local context and changes in investment mechanism could enhance both the reduction of environmental impact and the democratization of both resources and energies sources. (Vezzoli, 2010; Sachs, 2012).

3 - Respect and Valorize local cultures: Santos (2011) promotes the transformation of the local culture into economic good, improving the economic performance of local actors. Local communities and their culture should be involved in the development of products and services. Empower local communities also benefits the positive aspects of cultural diversity (Vezzoli, 2010). To enhance the application of this principle, techniques such as: use of local skills and abilities, protection of local biodiversity of flora and fauna, promote local skills and cultural differences, regionalize the production, respect local models of production could be applied.

4 - Valorize reintegration of wastes and promote their reduction: promote strategies that transform waste in income sources, (Santos, 2011). The use of local, primary, traditional and renewable resources and the involvement of local actors in the extraction, production and using phase of such resources has relevant importance for both the environmental and economical dimensions of sustainability (Vezzoli and Manzini, 2008). Promote a sufficient consumption, improve or re-use useless or discarded artefacts, reintegrate domestic, urban and industrial wastes are strategy to support such principle.

5 - Promote network organization: this principle promote a reduction in product or services demand, as well as the improvement of the economic benefit to more people or groups through network organization (Santos, 2011). Vezzoli (2010) also underline the importance of the development of local-based, collaborative initiatives and activities, together with companies, to reach new sustainable solutions.

A final consideration is the future implications of nowadays choices on the sustainable development. In this terms, economic sustainability is defined as “the use of various strategies for employing existing resources optimally so that that a responsible and beneficial balance can be achieved over the longer term. Within a business context, economic sustainability involves using the assorted assets of the company efficiently to allow it to continue functioning profitability over time. (businessdictionary, web, 2014).

Almost at the same time the concept of “sustainable development” was known worldwide (first thanks to the ‘87 report “Our Common Future” and then the first Earth Summit held in Rio de Janeiro in 1992), another crucial event happened: the Internet became a public resource, giving start to the so called “Information Revolution”.

In the same way Industrial Revolution has been a turning point for the impact of humanity on the environment, the Information Revolution and its enormous potential might have been the turning point for the sustainable development.

The GCG (2013) challenged the global international community to recognize the huge impact of ICTs and internet on sustainable development, 25 years after it was defined by the Brundtland

Commission; IT and internet transformed (and continue transforming) economic, social, political and cultural behaviour and patterns within the society. (CGC, 2013).

After the Industrial revolution, the Information technologies revolutionized the way the society works, marking the biggest and fastest changes in our society in its 30 years of life, thanks to computers, wireless networks, smartphones, business applications etc.

Search engines and social networks radically transformed the way people access to information/contents, and incremented exponentially the possibility of social interaction (both offline and online).

The main output of this revolution is the Information Society, “a society in which information and access to information have become (or will become) the principal drivers of economic prosperity, social welfare and individual opportunity”².

All aspects of our lives are influenced by general purpose Information Technologies: how goods and services are produced, distributed and consumed; the way people work and spend its free time, how entertainment is made; how people interact (for the first time in the human history, this interaction can be digital); how citizens, governments and business interact;

The dark side of this rapid adoption of new technologies, however, is the ‘digital divide’ between rich and poor, that in the last years has been shifting from access *per se* to the quality of access: a significant indicator is give form what access enables people and communities to do. Technologic inclusiveness is an international crucial point: technology are changing and growing fastly, creating inevitably a continuous gap between consolidated economies and emerging or low income countries and communities.

The Manifesto also analyse how human development and actions turn possibilities of new technologies into outcomes that have social or economic value and political or cultural significance

“Society influences technology as much as technology influences society”

We entered an era of Information or Knowledge Society; measure the progress of this society is not as simple as it might appear: counts the number of internet access or devices per person is not enough. Especially in emerging context, the crucial information is: what people do with it, which new capabilities and skills are being developed and adopted thanks to services and applications.

ITs created radical new behaviours, being a connection for large-scale innovations within the society.

ICTs are nowadays a controversial element for sustainable development, that is both favored and obstructed by the rapid evolution of such technologies;

ICTs is a growing cause of pollution in the world, dued to the short life span of some digital device, and the cost of energy necessary to use them; those negative aspects can be lowered,

² <https://ictstheinternetandsustainability.wordpress.com/>

introducing sustainable production standard or introducing behaviour changes within consumers.

However, large-scale systems (energy production and consumption, transportation, agriculture etc) management became possible and it's facilitated by ICTs; some consumption goods such as music and book have largely been dematerialised; home working and home conferences allows great saving on business costs; cloud storage and cloud computing radically change the way people store and share materials.

ICTs markets is continuously growing and changing: mobile telephones are a mass consumption goods; internet is facing an incredibly fast evolution;

Design practices were also affected by the fast development of ICTs; crowdsourcing is a practice emerged from this scenario, being "a tool to gather collective intelligence for certain tasks".

Collective intelligence is based on the idea that "knowledge is the most accurate when it consists of inputs from a distributed population -,all of us together are smarter than any one of us individually." (Levi, 1997).

Crowdsourcing is a vast topic as it might be subcategorized in a large list of practices, and it involves also other concepts as open innovation (Chesbrough, 2003), open-source production, collaborative innovation, user innovation (Von Hippel, 2005).

Sen (2010), underlines the crucial importance of the introduction of sustainability in the design agenda; sustainability is a complex goal and needs a multidisciplinary approach; new project methods, models and tools needs to be developed to achieve sustainability.

Drew (2012) affirms that "while there's no single catalyst, four converging factors have made online, open-source innovation a more serious option for sustainability research and development."

The principles indicated by Drew are:

- aware that sustainability is not an optional extra, but an interlocking series of imperatives; pressure to find bigger, better solutions to challenges identified by the business.
- locating "external scouting partners": identify and create stronger interactions" with a huge community of entrepreneurs, academics, NGOs and other businesses.
- co-opt consumers into solutions to climate change and resource scarcity: customers are a big part of a business's total environmental impact.
- corporate and brand reputation: Co-creation is a powerful marketing tool, since consumers are naturally better disposed towards a company when they have been given the chance to shape its future.

Since established markets became saturated, multinationals corporations turned their attention to emerging markets (EMs) and to developing countries; the definition of emerging countries is strictly related with economy, where they are defined as economies in-between developed countries (traditionally USA, western Europe, Japan) and undeveloped ones.

Emerging countries are nations characterized by a rapid process of growth, both under social and business aspects; the first five largest growing economies are the so-called BRICS

countries - Brazil, Russia, India, China and South Africa, followed by the MIKT - Mexico, Indonesia, South Korea and Turkey.

Vercueil (2012) affirms that emerging countries are all characterized by the following features:

- Intermediate Income: pro capita PPP is between 10% and 75% of the European per capita income.
- catching-up growth - during the last decades the gap with advanced economies has been narrowed
- Institutional transformation and economic opening

Due to their rapid transformation and the poor understatement about emerging countries, entering in such markets requested the adoption of new strategies specially addressed to the EMs; traditionally, such strategies targeted only the wealthier classes, but the landscape of consumption changes fastly and recently more and more companies are trying to explore the untapped market at the base of the pyramid (BoP), since it became the largest and fastest-growing segment in the emerging world.(London and Hart 2004).

Prahalad and Hart (Prahalad; Hart, 2002; Prahalad, 2005), define as low income all the population that lives with less than \$2 per day; the UNDP (2014) considers low income all people living with less than \$8 per day.

The UNDP categorization can be extended to Brazil, where however big divergences exists in determining which social classes should be defined as “low income” (FGV, 2014). Although C, D and E are traditionally indicated as low income brazilian countries, a huge discrepancy in the income of such classes, and especially in C class and E class (above poverty line), can be identified. The IBGE classification method is the most used to identify social classes in Brasil; IBGE method is based on the number of minimum wages earned per family.

Five social classes are identified:

CLASSE	SALÁRIOS MÍNIMOS (SM)	RENDA FAMILIAR (R\$)
A	Acima 20 SM	R\$ 14.500 ou mais
B	10 a 20 SM	De R\$ 7.250,00 a R\$ 14.499,99
C	4 a 10 SM	De R\$ 2.900,00 a R\$ 7.249,99
D	2 a 4 SM	De R\$ 1.450,00 a R\$ 2.899,99
E	Até 2 SM	Até R\$ 1.449,99

Creating products and services for low-income consumers is a challenging task. Little information is available about this target group, their wants and needs, their habits and traditions, and about what really works in their particular context. It stands to reason that consumers themselves are owners of valuable knowledge when it comes to developing solutions for them. (Krämer, 2010)

Consequently, it has been widely suggested to learn “from the bottom up” by hearing and incorporating the “voices of the poor”. However, little is known about how to tap this knowledge and how to actively include this particular target group into product development processes.” Companies are willing to enter unknown, emergent low income markets with a suitable offer of product and services; nevertheless, the lack of knowledge of such context and target customers’ needs and desires generate a non-acceptation of them. (Krämer, 2014).

This thesis explore the adoption of crowdsourcing strategies and open innovation techniques in emerging, low income context and its impact on sustainability according to its 3 main dimensions: environmental, social and economic.

1.2 Research Problem.

Can crowdsourcing positively impact sustainable development in emerging and low income contexts?

1.3 Objectives

The objective of this work is a critical analysis of crowds-led strategies in the development of products and services destined to low income users in Brazil (Class C and D); to test the impact of crowdsourcing in the PDP, the research project “Sustainability Maker Brazil” has been used as a practical application to identify good practice and limitations.

An analysis of the research method and outcomes of Sustainability Maker Brazil as pilot project will be presented. The evaluation will include: the results of the crowdsourcing process; the level of innovation of the solutions; its level of replicability; possible evolution and next steps of the project (involvement of different communities and partner companies etc)

Based on this case study, a critical analysis of the sustainability effectiveness of crowdsourcing in an emerging country will be presented; the three dimensions of sustainability (environmental, social and economical) will be taken in consideration;

1.4 Hypothesis

Desse modo, Saraiva (2011) traz a inovação aberta como forma de beneficiar as organizações. Estas, independente do porte, podem investir em parcerias com instituições de pesquisa, universidades e companhias privadas, expandindo sua visão de mercado e, com isso,

gerando vantagens competitivas. Este diferencial competitivo conferido às companhias inovadoras tem no Design, no uso de redes sociais, entre outros, ferramentas para o seu estabelecimento. Assim, o modelo clássico onde se consideravam apenas estratégias internas

das companhias perde espaço para a inovação aberta, a qual atua na construção de uma nova

cultura empresarial, encorajando empresas a fazerem uso, além de suas próprias ideias, de

ideias externas para um melhor desempenho no mercado (SARAIVA, 2011).

Morgan David, divisional director at Sony, affirms that “companies are also more likely to benefit from much deeper consumer insights than any conventional market research could provide”.

According to reference literature hypothesis, this work will tackle crowdsourcing potential to enhance the innovation potential of such communities, particularly at the ideation phase (problem and brief identification).

Low Income communities and base of pyramid customers (BoP) are also defined as a “special phenomenon” (London and Hart, 2004; Prahalad 2004; Simanis and Hart, 2011); they are fundamentally different from upscaled markets and those in developed countries.

Applying standard theory to such markets is misleading and don't actually provide proper understanding of users needs and preferences at base of pyramid: building new models to target and explain the behaviour of low income customers in their specific context.

1.5 Justificative

1.5.1 Low involvement of class C in the development of product and services.

Since few decades ago, low income classes in Brazil were not considered as a market for products and services of big companies (Rocha, Silva; 2009); this paradigm slowly started to change during the 80s, when new approaches towards the material poverty of these families have been adopted. (Barros, Rocha; 2007).

Most of the academic literature on product development is anchored to empirical advanced economies and relatively affluent markets; in contrast, very little is known about product development for the base of the pyramid markets (BoP)” (Viswanathan and Shirdhadan, 2013).

Middle and high income markets have traditionally fostered attention of almost all corporate activities; however, the trend has marked an inversion in the last decade, and Brazil is no exception: the 2014 Caixa Cultural report “Voices of the medium class” shows the deep change that affected the country during the past decade, characterized by social, political and economic transformations.

Between 2004 and 2014 more than 40 million people exit the poverty line and entered in the so called new middle class, C Class (becoming the biggest social group in Brazil (113 million people, 56% of the total population) and revolutionizing the socio-economic pyramid.

C Class became a leading actor in the growing consumption goods internal market, and thanks to the access to credit is buying more and more products and services, making it the third fastest growing in the world (after India and China). Most consumers of C class, are, for the first time accessing ownership to car, house, fridge, tv sets, a cell phone, and private sector services (health care, education).

In 2015, the new middle class is expected to buy 2,5 millions new houses, 7,8 millions pieces of furniture, 6,7 millions TVs, 4,8 millions fridges, 3,9 washing machines (CEF, 2014).

The opening of a huge range of stores and services (especially in the small centers and rural areas) showed the impact of the income increase among class C and D in the last few years. Low income classes represent a promising opportunity for both national and multinational companies, but are still not explored, since they have their own internal dynamics, that companies are still trying to fully understand.

Barki (2013) affirms that *“people don't want something designed for poor people”*; the author also promote social inclusion as the key to a successful market strategy designated for low income consumers.

“For low income customer, it's important to respect some values; innovate in some channels. Companies have to physically reach the communities and create a differential relationship with them to improve vendings. Nevertheless, it must be a mutual profit, were both the company and the community eans.” (Barki, 2013)

Barki cites as good practice example the “Projeto Coletivo” promoted by the Coca Cola group; the project reaches more than 100 brazilian communities offering education and training for young people; the Nestlé group trains woman within local communities in door-to-door sales. Barki also affirms that the price is no longer the primary element of decision in purchases of C and D class; consumers of the low income class wanted to be well-served, and the customer relationship is a key differential for company working for this market: quality at a competitive price is what this customer is looking for.

The market is already trying to adapt to the emergent customer, according to Nardi (2013). In his “the new era of low income consumism”, the author shows new strategy adopted:

customized credit, adaptation of products and services, personalized customer service, delivery and post-selling systems.

Marcos Gabriel Atchabahian, president of the Construction Materials Traders Association, affirms that “low income customers buy in an emotional way; they are a bit mistrustful, insecure and immediatists. sellers must be well-trained to express safety, attention and respect; Although lower classes customers are more and more included in the selling and post-selling process, very few actions are made to involve them in the product and services ideation phase, as demonstrated in the fewer cases found in reference literature.

Von Hippel (1982, 1986; 1988) identifies users who develop new product and services on their own, in particular when current market offers do not meet their needs; Anil Gupta (Indian Institute of Management) provides further examples of what he calls “grassroots innovations”: innovative solutions developed by low income communities.

One of Sustainability Maker Brazil challenges is to evaluate crowd-based products development as a tool to include low income users in the design and ideation process.

1.5.2 Internet importance in emerging countries and growing technological inclusion of C class in Brazil.

All crowdsourcing practices have at least two feature in common: they involve a crowd and are basically realized via internet (Howe, 2006); although personal internet access is not a necessitous condition for crowdsourcing to happen, is an important tool of the process. While 80% of developed countries population is an internet user, the world's averages goes down till the 39%.

Brazil represents the seventh country for internet usage, with 75% of the total adult population accessing the internet daily (Pew Research, 2015); Brazil dominates South America in terms of numbers of internet users, with 108 million users (Statista.com, web, 2014); 48 of the Brazilian population have access to internet, third internet penetration behind Uruguay and Chile and short ahead Argentina. (PBM, 2015).

ADSL is the access technology of choice, accounting for 84% of the country's broadband market. Mobile communications are facing a huge growth in the Brazilian market and the numbers of mobile users passed the number of fixed-line users in 2003.

According to comScore (2014), consumers in Brazil spend more than 29 hours per month online against a world average of 24.7 hours.

The Brazilian internet audience is young in average, with 18% aged 18-24 and 30% aged 25-34. (comScore, 2013); however, this landscape is not completely positive but it has to face the fact that 60% of Brazilian households lacks of internet connection.³ Internet penetration in residences was measured to be 43% in urban zones and only 10% in rural areas.⁴

Also internet speed represents a problem: the average internet speed in Brazil is 3,4 Mbps, 89^o place in the world ranking and above the world average of 5 Mbps (Avellar and Duarte, 2015); also mobile internet speed is 2,5 Mbps, 82 place in the world. (Akamai, 2015).

ComScore 2013 Stats also points out another interesting fact: on the total time spent on-line, 36% of it is on social media; 79% of Brazilian internet users (78 million people) registered to some social network. Brazil already 65 million Facebook users, second only to the USA, and it's the second biggest Twitter community with 41.3 millions tweeters and counting.

The average time spent by Brazilians on Facebook is 535 minutes per month, and the impressive data is that the data increased 208% last year, while the same data decreased of 2% globally.

Youtube has also an impressive consumer base in Brazil, with an average of 83.8 video viewed per user in 2012, being the second market after the US.

23,3% of Brazilians (73 million users) access the web through their mobile phones (PBM, 2015).

Indicators that influence internet access are scholarization and income (IBGE, 2015). Although internet use and access grew in all the 5 classes, users with completed secondary grade school are the one who access the most.

Under the socio-demographic point of view, the inclusion of lowest income families in internet access is still far to be total, but in the last 10 year has considerably improved.

Thanks to higher income, formal employment, higher scholarization and easiest way to access technologies, internet is a growing presence in the life of Brazilian population and low income users are more and more digital included (Revista Exame, web, 2014).

IBGE (2015) shows how the number of internet users grew much more in the lowest income classes (population earning till two minimum wage), and in the Nord and Nord-East area of the country, although regional differences are still evidence: the south-eastern area of the country have 54% of total population connected, while in Nord and Nord-Est only one third is internet

³ Cetic.br

⁴ Brazilian Internet steering committee

users; in the northern region of the country, the lack of infrastructure and the high cost of notebooks makes mobile phones and mobile internet the predilected way to access internet (8,7% of northern residents access only via mobile).

Internet access and education are also strictly connected, with 96,8% of private schools students connected, but also a growing number of new internauts among students of public education system, with 68% of students of s or municipal, state or federal schools connected online (IBGE, 2015).

This overview shows how, however great progresses have been made, there's still a lot to do, for low income classes and rural area specifically.

Income plays a relevant role in internet access, although A and B class don't actually count the highest number of internauts, and inequality is still huge from one class to another. Within E class, only 33,6% has internet access; the percentage growth till 67,9% within C class.

Internet access and digital inclusion are crucial questions for the country, demonstrated by the creation of a Comité for Democratizing (CDI) Informatics in 1995.

The Comité was created together with the program "Informatics for Everyone", when became clear that give computers to low income users was not a relevant action without empowering them and teach them how to use it; CDI, as a social organization, promotes technology as a tool for social transformation, empowering communities, stimulating entrepreneurship, education and citizenship; CDI also promotes ICTs and internet as a tool to build a more equal and fair society, through experiences of connections, mobilization of individuals and collaborative solutions for the society.

According to CDI (2014), internet made step forward in Brazil, but the next challenge should be bringing it in all brazilians households, according to the idea that "the only people who shouldn't have internet are the ones who doesn't want to use it"

CDI (2014) also affirms the importance of the purpose internet is used for; while right now it is mostly use to entertain, it's important for entrepreneurship. education and so on.

The growth of the penetration of internet access within the population, and among low income classes in specifi, is a positive consequence of the improvement of life conditions of the populations and the decrease of social inequities but even if great progresses were made, some future goals should be established:

- Democratizing the access,
- Reduce regional differences within the connections,
- Improve and guarantee the quality of the services provided.
- Improve and promote initiatives using internet and technology as a tool to improve entrepreneurship, education, citizenship and social goals.

1.5.3 Social and Environmental impact of low income households in Brazil

Brazil is considered to be an urban country, with 84,4% of its population living in cities; the massive urbanization is although connected with creation of social inequities, caused and

expressed by the lack of access to public services and structures, precarious households and urban violence (Muggah, 2012).

The undersupply of housing stands at 7.2 million with 90% of the Brazilian housing deficit concentrated in the lower income demographic (families earning up to 2 minimum wages); 1.8 million housing units would need to be constructed annually by the year 2022 to adequately satisfy current and impending deficit levels, for a total of 23.5 million new homes (JPFundations,web,2013).

Brazil also faces the problem of self-built housing, where 1.7 million informal units are created every year; informal units are generally precariously located housing in need of replacement, inefficiently constructed self-built homes in insecure living environments, rented spaces in favelas and households that have no toilet facilities / sanitation. (DHDE, 2013).

Most of the homes in favelas or low income housing settlements are built by the residents themselves using scavenged materials, and lack of proper sewage, water system, garbage collection services; other big problem connected to spontaneous favelas is that frequently they are built so densely or in remote city areas that retrofitting them with roads, utility, services and so on is extremely difficult.

Housing development has both direct and indirect impacts on the environment and on the sustainable development of a country. Through its design, construction, and operation, housing represents a significant point of direct consumption of natural materials, water, and energy. Therefore, greenhouse gas emissions embodied in housing can be very significant. Moreover, in Brazil, civil construction is responsible for the largest percentage of solid waste volume generated in cities, resulting in additional environmental impacts (World Bank, 2011).

This housing deficit created in Brazil a real complex scenery to be faced by the federal government and local administrations.

In the 6° of its federal constitution of 1988, household has been indicated as a social right: *“São direitos sociais a educação, a saúde, o trabalho, a moradia, o lazer, a segurança, a previdência social, a proteção à maternidade e à infância, a assistência aos desamparados, na forma desta Constituição.”*

“Education, health, work, house, leisure, security, social security, protection of motherhood and childhood, and assistance to the destitute, are social rights, as set forth by this Constitution.”

Since early 90s Brazil is promoting a Public Housing Policies (Política Habitacional), carried on by Caixa Economica Federal; in 2005, the national plan for Social Interested Households (Sistema Nacional de Habitação de Interesse Social - SNHIS) has been approved, creating also the National Fund for Social Interested Households (Fundo Nacional de Habitação de Interesse Social - FNHIS).

In 2007, the second Lula government launched the Accelerating the Growth Program (Programa Aceleração do Crescimento - PAC), but it's in 2009 that the program of first Dilma Rousseff government *Minha Casa Minha Vida* (My House, My Life) revolutionizes the households sector, being the first social housing program in Brazil, aiming to reduce the household deficit, redistribution of income and social inclusion.

The program is destined to families earning till 10 minimum wages, although priority is given to E class: of the total 3 million houses built through the program, more than 1 million was destined to E class families.

Social housing sector, particularly large-scale low-cost programs (like MHML) in Brazil offers substantial opportunities to improve environmental performances, providing opportunities to minimize both local and global environmental impacts through the use of energy efficient materials, design and construction guidelines, as well as performance standards (World Bank, 2011). The households came equipped with furniture and white goods, but no references are found on how such furniture are chosen. The program “Minha casa melhor” offers discounts for people buying A energy class, national products, but often such products don’t satisfy needs of E and D classes customers; the lack of connections between low income customers and the product and services destined to such families creates a dramatic impact on sustainability, since it might reduce drastically the product life cycle: products can be discarded earlier than necessary, wasting primary resources.

Also social and economic sustainability could benefit from a sustainability-led social housing program, creating jobs in the civil construction field and promoting healthy households and collaborative communities (WorldBank, 2011).

1.5.4 Unequal Income Distribution in Brazil

Over the last two decades Brazil faced an era of economical and political transformation, being one of the world’s first 10 economies in the world; although the inequality between poor and rich decreased in 2014 (Oxfam, 2014), the country continues unequal, being the most unequal economy in the world (among the first 20 economies)and showing also the lowest income share: the 10% of the population earns 50% of the the national income, while the 34% lives among the poverty line.

Differences in human capital (education, health etc) contribute dramatically in the creation of income inequality, since such differences will have different returns on the market.

Barro and Lee (2010) datas on education in Brazil show a very unbalanced, unequal distribution of the human capital in the country.

Unequal opportunities between regions within the country, urban and rural areas within same regions, different social groups, gender and races is one of the principal reasons of earning differences in Brazil (Roemer, 2010); urban areas are traditionally more developed than the rural ones, the desartic north-east poorer than the southern region: IBGE (2013) classifies the center-east as the most unequal region of the country, while the southern is the most equal, but also the smallest one. Brazilian history valorized in the past a masculine, patriarchal elite, as well as slavery resulted in huge social and economic difference on racial base (Ticehurst, 2014).

Nevertheless, among BRICS countries, Brazil is the only country reducing its inequity index; Education played a fundamental role in the inequality reduction in the country (Oxfam, 2014), improving the quality of education (investing in professors, resources and materials), as well as policies to include marginalized sector of the population that risk to become excluded.

Further improvements are necessary, although Brazil enlarged quality education access and destined portions of funds to low income kids, generally in natives or afro-brazilian communities.

Such programs reduced the disequality of access since early 90s and doubled the years of scholarization among the poorest classes, from 4 to 8 years.

Other factor that positively influenced the decrease of inequity index are income transference program such as “Bolsa Família” (Family Wallet) and the constant increase of the minimum wage, (that augmented of almost 50% between 1995 and 2011) (AgênciaBrasil, web, 2014). Also the access to public services for health and education have been improved; Ticehurst (2014) affirms that investments on quality, free public services is the key to the social inclusion of the population. Democratize the access and provide quality are the future steps the public sector would face to promote equity between low income and rich classes.

Brazil next challenge is the creation of a solid base to support a sustainable development. (Ticehurst (2014). Cunha e Filho (2009) suggests an economic model to support the sustainable development principles, promoting cooperation instead of competition, the development of collective intelligence instead of individualism, the collective and collaborative management substituting the precarization of work conditions. Such economic approach is oriented to a different model of development, focused on democratization and respect of human diversities. The adoption of local-scale economies also positively impact the equality index, reducing unemployment, strengthen participation and citizenship among the community, offering new development perspectives and empowering the population. (Latouche, 2009).

1.5 Scope

The scope of this research project is the development of a product solving an urgent issue related to social housing via crowd design; the pilot would involve a single low income community located in Curitiba metropolitan area (municipality of Piraquara) and would include the whole crowd design process, since the definition of a relevant sustainability problem within the community, till the development of a prototype, realized by a local small-sized enterprise. To involve both the crowd and the community in the design process, the pilot relied on the sustainability oriented, open innovation platform “Innonatives”.

1.3.1 Delimitation of the research

This work wants to enlighten the implication of crowdsourcing in the brazilian low income context: where and when it might perform a relevant role, when is not resource and cost effective, as well as show the limits of such practice (other design strategies could be used, how the problem has already been solved by other people in other locations etc).

Although the crowdsourcing phase of the project has been supported by an online open innovation platform, Innonatives.com, the structure of the platform was given and couldn't be changed: no tools or digital platform was meant to be developed during this research; the research team only relied on existing social medias. The project did not aim to improve the user interface or user experience of the platform: Innonatives were launched in august 2014 and it was in Beta Testing while the project was happening, so the process was undertaken despite some limitations the platform was facing at that time.

Understand the relationship with ICTs and internet of low income users was another point of the research; the research team relied only on the resources that was already available within the community; no smartphones, tablets or notebooks were provided to the residents of the local community involved in the project.

SuM Brazil was mainly developed on a low budget, both for the research and the crowdsource phase; little resources were invested for online communications, generating sometimes a difficulty in attract participants and rise interest around the project.

1.6 Research Strategy Overview

The research strategy was structured in three steps:

1. Comparative Analysis of the Traditional Product Development Process (PDP) and crowd - led product development.
2. Action Research
3. Analysis of Implication for Sustainability of the crowd-led model.

1. The research team proposed a comparative analysis of the traditional product development process - PDP (Rozenfeld,2006) versus a crowd-based product development (Sustainability Maker Project; 2013). This analysis is carried out mixing sources of the reference literature with the insights obtained during the on-going research.

The In-context, field research followed a cyclic process, according with the scheme presented in the following table:

The crowd design process of the platform Innonatives has been adopted as a reference model; the process has been repeated for each steps of the design model;

Problem research;
Crowdvoting
Challenge
Crowdsourcing

Solutions collected

Crowdvoting (+Expert Panel Vote)

Best solution

Crowdfunding > Marketplace > Auction

Implementation

In the context of the study case of this work, the Sustainability Maker Brazil project, a low income community of the municipality of Piraquara (Paraná, Brazil), and a private company have been involved in the process.

2. The research strategy have been structured from the principles of data collection and action research (Thiollent,1985; Mello e Turrioni, 2011; Robson, 1993); this model has been adopted due to its immersive approach on the problem analyzed, and because of the active involvement of both researchers and participants.

For each step of the design process, a research protocol has been developed by the research team; before the field research of each phase of the project, a review of different sources was made: from book, scientific articles, papers, on going projects and review of best practices and relevant study cases.

All the information collected during the review were used to generate the research protocol, later tested and validated during the field research.

The adopted research method offered a great range of flexibility, crucial to the good outcome of a pilot project, and guaranteed a cyclical interaction between the different stakeholders involved in the process: low income community, sponsor company, and researchers.

3. Implications for Sustainability of the crowd-led PDP Model (Innonatives , web, 2014).

1.7 Structure of the Dissertation

According to the arguments presented, this work would present the following structure:

Chapter1: Introduction; in the introductory chapter the principles of the research are presented. the examined topic is contextualized, as well as the problem, goal and scope of the thesis are explicitated. The research context is presented and restricted; finally, a general overview of the research method used is presented.

Chapter2: Crowdsourcing for Sustainability; chapter two is the core of the theoretical wireframe in which this thesis is included. The key topics of the investigation fields are inspected: crowdsourcing (declined in its different practices); open innovation, crowd innovation, ICTs etc. Strengths and weaknesses of such practices will be presented, as well as its implications for sustainability and its relationship with emerging contexts and low income communities.

Chapter3: Research Method; in this sections is initially motivated the selection of the research method; such method is then introduced, together with the research protocols elaborated to

conduct the research. Strategy, tools and methods to collect data are illustrated; analysis and validation methods are also presented.

Chapter4: Sustainability Maker Brazil: Results and Analysis; this chapter introduces the case study and presents the results reached at each step of the research, in terms of data collected but also relevant insights. A crossed analysis of the results obtained is also presented.

Chapter5: Conclusions; the conclusive chapter of this work presents the conclusions of the research; it would propose a critical analysis of tools and methodologies used, giving suggestions for future steps and further improvements. The chapter would also offer a critical overview on impact of crowdsourcing on sustainability, according to its three dimensions.

Appendixes: presenting complementary materials useful to better understand the results of the conducted research.

Chaper2: Crowdsurcing for Sustainability.

Chapter 2 will provide an overview on how the growing importance of ICTs affected the society; open innovation and crowd-based strategies will be analyzed and both benefits and limitations would be underlined.

2.1 Defining open innovation

Traditionally, the innovation process has been managed at the firm's research and development department level; such approach, in which companies rely on internal resources to develop product and services, has been defined as closed innovation (Chesbrough, 2003).

Three main types of innovation can be identified:

- incremental: small scale improvements on an existing product or service through value-adding attributes. (Verworn and Herstatt, 2007). Improvements within a given frame of solutions - doing better what we already do. (Norman, Verganti; 2012)
- radical or disruptive: Innovation that incorporates technology that is substantially different from existing products and fulfill customers needs either significantly better than existing products or addresses different types of needs. (Bucherer and Eisert, 2012); an innovation that is change of frame - doing what we did not do before. (Norman, Verganti; 2012).

As innovation was traditionally managed by companies internal P&D departments, technologies developed outside such context were often rejected (Chesbrough, 2007).

Chesbrough defines as "knowledge islands" the contexts in which closed innovation prevails; however, along the XX century, such islands have passed through a dissolution process, open to a scenario in which both inflows and outflows of knowledge are used to improve internal

innovation and expand the markets for external exploitation of innovation (Cheng, Huizingh; 2014).

Open Innovation is therefore defined as “ a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology” (Chesbrough, 2003); the online, open innovation platform 100%open describes it as a process of "innovating with partners by sharing risks and sharing rewards."

Durmaz (2013) presents her definition, where “open innovation is about building a system where ideas flow openly from your customers, employees, and other stakeholders such as partners & suppliers. This system allows you to capture and flesh out ideas collaboratively, leading to sustained innovation.”

The rapid diffusion of ICTs made the society enter an era of shared knowledge; in such context, no company should rely only on their internal staff. Firms benefits from easy innovation transfer: internal inventions not being used, should be taken outside the company (through licensing, joint ventures or spin-offs), as well as companies should buy or license processes or inventions (patents) from other companies. (Chesbrough, 2003).

In today’s business environment business increasingly need ideas about better ways to develop services and products, present brands, or interact with users (Horn, 2011); external source of innovations are multiple: customers, rival companies, academic institutions etc, creating different sub-topics connected to the general concept of open innovation: user innovation, cumulative innovation, know-how trading, mass innovation and distributed innovation.

Durmaz (2013) also lists benefits of the adoption of an open innovation strategy, being:

- profitability and cost-effectiveness; open innovation reduces costs, speed up time to market, create differential and revenue streams.
- competitive advantage;
- minimize innovation risks; expand opportunities and know-how while minimizing the technical and market risks associated with innovation;
- evolution of business model;

Ethical question related to open innovation.

Horn (2011) affirms that open innovation, along with differentiation and growth is also generating trust problems for companies, and defines some strategies to a trust-based, “open protection”.

Ethical decision-making is crucial in an open innovation environment, where companies uses other people’s commercial concepts, ideas or propositions. Professionals are being asked to participate with the crowd for work, generating the necessity of a ethical, trust and permission based trading around professionally produced ideas (Horn, 2011).

Some brand owners are attempting to use open innovation activities such as crowdsourcing as a means to solicit solution-led creativity for their brand, packaging, digital and new product portfolio. As such, some stand accused by the professional creative industries of exploitation.

(find more materiaaaaaal).

2.2 Open Innovation Strategies

Cooper and Edgett (2008) investigated six methods to gather external source of innovation:

- External Ideas from Partner and vendors; it's a tried-and-proven method that can be undertaken both online and offline.
- soliciting the external scientific technical community; this methods is generally enhanced by an online innovation platform (Innocentive, NineSigma, Yet2com etc); this methodology tends to seek for new technology or applications than for new products or services.
- scanning small business and business start-ups;
- invite stakeholders to submit external finished designs;
- external submission of ideas;
- idea contests or idea competitions: system that encourages competitiveness among contributors by rewarding successful submissions. This method provides organizations with inexpensive access to a large quantity of innovative ideas, while also providing a deeper insight into the needs of their customers and contributors (Schutte, Corne; Marais, Stephan; 2010)

Other models of open innovation include:

- Product Platforming: develop and introduce a partially completed product, for the purpose of providing a framework or tool-kit for contributors to access, customize, and exploit. The goal is for the contributors to extend the platform product's functionality while increasing the overall value of the product for everyone involved; This approach is common in markets with strong network effects where demand for the product implementing the framework (such as a mobile phone, or an online application) increases with the number of developers that are attracted to use the platform tool-kit. The high scalability of platforming often results in an increased complexity of administration and quality assurance. ((Schutte, Corne; Marais, Stephan; 2010)
- Customer Immersion: technique involves extensive customer interaction through employees of the host organization. Companies are thus able to accurately incorporate customer input, while also allowing them to be more closely involved in the design process and product management cycle.

2.3 Sustainable Open Innovation

Sustainable Open Innovation is a concept based on "the belief that the best way to stimulate sustainable innovation is through open innovation" (Tapscott 2010).

Sustainable Open Innovation provides to consumers information they have previously never been exposed to, creating a basis for more long term relationships with companies; the adoption of sustainability innovation is outlined as a strategy to achieve both competitive advantage and differentiation; Porter and van der Linde (2010) identified some general patterns for improve a company's competitiveness through the adoption of green innovations:

While open innovation methods are already a largely diffuse practice, sustainable open innovation is still not so explored.

Sustainable marketing campaigns are an initial field of application of such principles. According to Belz, Frank-Martin; Ken Peattie (2010), in successful sustainable marketing campaign "build and maintain sustainable relationships with customers, the social environment and the natural environment."

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2.4 Sustainability Oriented Open Innovation: some good practices:

2.4.1 MIT Climate CoLab.

Malone (2014), affirms that *"It's now possible to harness the collective intelligence of thousands of people all over the world at a scale and with a degree of collaboration that was never possible before."* Starting from this concept was launched "MIT Climate Colab", a collaborative online community centered around a series of annual contests that seek out promising ideas for fighting climate change.

Climate change is a vast problem, which solutions seems sometimes to be out of range; to encourage users in the development of solutions, MIT broke the issue into a series of "subproblems" that are "small enough for groups of individuals to tackle" (MIT Climate CoLab, web, 2014); the colab hosts a series of contests that solicits proposals in a number of areas related to climate change, push some selected semi-finalists in refining their proposals and finally connects the winners with resources, people and organizations that can help them put their ideas into action.

"Inspired by systems like Wikipedia and Linux, the Massachusetts Institute of Technology Center for Collective Intelligence has developed this crowdsourcing platform where citizens work with experts and each other to create, analyze and select detailed proposals for what to do about climate change."

Insights from the study case: split big, "scaring", issues in smaller problems.

Non experts working together with experts.

Use of scientific-related projection and tools to show how effective the innovation would be in real world.

2.4.2 Nike Green Experience

GX is a 2010-launched web-based marketplace for intellectual property (IP), promoted by Nike and other 9 companies (Yahoo!, Best Buy, Creative Commons, IDEO, Mountain Equipment Co-op, nGenera, Outdoor Industry Association, salesforce.com, and 2degrees); GX was first conceived in 2009, when some of its founders realised that sustainability was becoming a more fundamental issue to businesses and discussed the introduction of an interactive platform to promote open exchange of best practices on issues related to sustainability. The GX formula “was a system in which tested solutions – existing patents related to sustainability held by corporations and universities – could be shared using the open source community model for licensing pioneered by Creative Commons” (GX Consultant, 2012).

The platform was introduced in 2010 at the World Economic Forum (WEF) in Davos, to support the recent born platform’s development, Nike President and CEO Mark Porter placed more than 400 of the company’s patents on GX (Tapscott 2010).

“the exchange is a web-based marketplace where companies can collaborate and share intellectual property, which can lead to new sustainability business models and innovation” (Tapscott 2010)

GX was presented an innovative new approach to knowledge sharing, promoting more sustainable business practices. Two years after its launch, it seems that the GX has not lived up entirely to its original expectations. Other than Nike, only one other company – Best Buy – has agreed to place its IP assets on the GX, and the vast majority of the posted IP cannot be used in the creation of commercial products. (Ghafele, O’Brien; 2012).

Insights: strength of traditional market and process paradigms;
patents are not necessarily the most integral part of open innovation-inspired attempts to promote sustainability business models;
several resources should be invested to scale the project.

2.4.3 EarthHack Initiative

Marblar is an open innovation platform that showcases existing, and often dormant, technologies and asks users to come up with new applications; the reason behind Marblar is that 99 per cent of technologies from universities never get commercialised, and it's difficult to see what their use could be. Rather than developing new inventions, Marblar platform posts technical details of many of these technologies and, as motivation, offer prizes and rewards (typically around \$5,000 for the winner and smaller prizes for people who significantly contribute) for users who propose a practical use for them.

Launched in the platform in May, 2013, the principle behind the inaugural EarthHack was revolutionize energy consumption and waste management within the home, saving tonnes of CO2. Household are a urgent sustainability issue indeed: 16% of all waste generated by the global society, 31% of all energy consumed and 10% of all freshwater used, is consumed in and around residential buildings.

The EarthHack offered a \$25,000 reward for re-adapting existing technologies and products "to create tomorrow's practical and scalable low-carbon solutions for the home" that lower energy bills and decrease carbon emissions.

Beyond this monetary reward, winners of the contest were unveiled at Climate Week New York in September 2013 and worked with IKEA and Philips to commercialise their ideas.

The competition had 952 enters from over 80 countries; 249 ideas started during the first Brainstorm session, while 25 were taken forward to the second stage.

The winner idea for the first edition of the contest was RadFan: a UK based startup that came up with a very simple but powerful idea. RadFan is a low power fan unit; it attaches to any standard central heating radiator and redirects the warm air straight out into the room, making the room warmer and more comfortable as it stops the warm air collecting at the ceiling or escaping out of the window.

"Testing has shown that the Radfan can increase the temperature at sofa height by up to 2 degrees C without having to turn the thermostat up. The Radfan costs about US\$3 per year to run and could save up to 20% on the average domestic heating bill by putting the warmth where the homeowner wants it."

"The winning entry is a great piece of innovation and really achieves the objectives of significant carbon impact combined with rapid scalability."

Robert Trezona, EarthHack judge, cleantech venture capitalist

"One of the very special things about this competition is the way that the Marblar community comes around to support and build upon each other's ideas. This is great: no one will ever have all the bright ideas and answers all by themselves, so if we are tackle the big problems of our age like climate change, it's got to be through everyone working together, like with the Marblar process," *Dave Raval, EarthHack judge, Cleantech entrepreneur, and former Head of the UK Government cleantech incubation service at Carbon Trust.*

Insights: Open Innovation can be cost and resource effective when it match existing, doment technologies to possible applications.

Technical Informations and patents are made available for the community to suggest applications.

- **FIND MORE INSIGHTFUL PROJECT**

2.5 Open Innovation in emerging countries

Scrivere qualcosa su emerging countries e Open Innovations.

2.5.2 Open Innovation in Brazil

Leonhard (2011) affirms that crowd Design and co-creation found a rich soil in Brazil because they have the characteristic of deeply connect with local culture, with the well-known brazilian sharing spirit.

“Brazil is fast. It has the sharing spirit. It wants to move forward - not stay stuck. And it cares about the future” (Leonhard, 2011),

In september 2011 São Paulo hosted the first *Conference on Crowdsourcing, Communities and Co-Creation*; the conference offered a great insight on the growing importance of this topics in the brazilian design scene and economy.

Since this first conference, thousand of initiatives have flourished and canalized the world attention on the country: lots of companies have recently created a version of their websites in portuguese or are opening sections in Brazil; but not only international companies show interest in this growing business: every day more and more brazilian companies are opening to this trend, and the ambition is integrate co-creation and crowdsourcing in their business.

São Paulo based colaboratorie Mutopo core business is social production; their job is to help clients connecting with the crowdsourcing world, showing them the right tools to efficiently solve their problems; they also organize conferences and workshops on crowdsourcing methods.

Catarse has been the first brazilian platform for crowdfunding; thanks to the website, a small band from Curitiba (southern Brazil), called *A banda mais bonita da cidade*, became a worldwide sensation, and their crowdfunded video *“oração”* has more than 7 millions views on youtube.

Following the eco of the success of Catarse, many others crowdfunding platforms surged in the web; some platforms are especially focused on open innovation and local projects, such as the Rio de Janeiro based Benfeitoria.

Incentivator, Movere.me, Incomum, DekDu, completes the overview.

A really cultural based project is the website Vakinha, created and based in Porto Alegre. When friends put money together to buy presents for birthdays, weddings and other special occasions, brazilian people call it *“fazer uma vaquinha”*; from this simple concept Vakinha is surged, aiming to become the first website for *“friendsfunding”*, integrated with the on-line payment system PagSeguro.

Funded in Belo Horizonte in 2012, Mobilize is a web-based project using facebook to crowdfund, being a sort of connection point between crowdfunding and crowdvoting. The idea behind the project is simple: although not everybody is confident with the concept of crowdfunding, it's impossible to find somebody who doesn't use social networks, and facebook particularly. Mobilize uses the great power of facebook, more and more diffused in Brazil after Orkut was shutted down.

A crowdvoting interesting project based on digital cinema is Mobz. Mobz follows, in a certain point of view the Threadless.com model: only what the customer demands it's produced, or in the case of Mobz, is broadcasted.

Only when enough people demonstrate interest in see a movie, Mobz organize a session; the great challenge is motivate people and find public to niche productions, opera concerts, indie movies etc.

The same model of Mobz is performed by Queremos project (brazilian for We Want), but for live shows. Queremos aim is to bring people within the platform favorite bands in Rio de Janeiro.

But the brazilian crowdsourcing scene is not only limited to crowdfunding or crowdvoting. Some microtasks project are actually ongoing, and the 2010 Belo Horizonte based CrowdTest is an example of it. Crowdttest's aim is to help people who recently launched an app or a web page to identify bugs; it's a great example on how companies may solve a complex problem as a reasonable price: the site simply offers money or other type of rewards to online users who help detecting bugs in apps and pages. since 2010 the sites has constantly growing and it's already counting on big clients.

The startup We do Logos goal is to bring crowdcontests to Brazil, with a business model based on competition between designers; the project Camiseteria would sounds already known: the site works exactly like Threadless, allowing anyone to submit t-shirts designs and giving users the opportunity to vote their favorites. the most successful designs are then produced and winners earn a cash reward.

Tecnisa Ideias and Fiat Mio are great examples of successful crowdsourcing initiatives within companies. Fiat Mio project, launched in 2009, hit more than 2.000.000 single visitors that submitted approximately 10.600 ideas.

As crowdsourcing is mainly about participation, it can easily become a tool to promote social project and engage citizens and local communities, and Brazil is no exception.

Differents projects have been created with this aim.

The Porto Alegre based platform Múrmura is a great example of it. Múrmura proposes *microrevoluções urbanas* (urban micro revolutions) and its goal is use collective intelligence to build better cities.

The project CidadeDemocrática (Democratic City) is a website addressed to citizen, companies and NGOs. anyone can report a city problem and at the same time propose a possible solution. The website it'sNoon describe itself as a creative net, where people all over Brazil can express their creative ideas; though its open calls system, it'sNoon offers companies the opportunity to generate creative content online but also allow the users to rank and vote submissions.

Also the crowdcreation is interesting Brazil, with people sharing their knowledge online with the community. LedFace and UmaMao are essentially a Q&A platforms, but if LedFace is open to all users, the Campinas based UmaMao only accepts submission from students or professors.

Talking about open innovation, shared economy is booming in Brazil. In the past few months lots of events were organized in the country, such as the conference called ColaboraRio, 3 days about collaboration, open source and shared methodologies. Startups and entrepreneurs

looking for mentorship have different opportunities in the country, especially for those focused on specific niche.

Aceledadora started in 2010 supporting start-ups managing their seed funding; 21 is Rio area code, 212 is New York. 21212 is an accelerator aiming to bring a bridge between this two cities, founded by group of entrepreneurs and developers working for accelerating digital start-ups within the brazilian market. Although the company is american, Brazil was chosen in function of its great potentials in terms of digital business and thanks to a set of challenges already mapped.

Wayra is is an ambitious project of Telefonica launched across Latin America and Spain, including Brazil. During the 2013 edition, each of the five startups selected will receive US\$50,000 (R\$100,000) from Wayra as well as workspace, infrastructure, management, mentoring and other support, plus they will spend 10 months at Wayra Academy São Paulo.

Pipa (kite in portuguese) is an accelerator that helps sustainable start-ups to successfully take off;: they support entrepreneurs committed to creating high-impact businesses that generate financial, social and environmental value through education and acceleration.

Tree labs is a São Paulo based 6 months program for start ups providing seed funding but also consulting on marketing, accounting and technology.

To conclude, as confirmed by all the examples provided, the brazilian scene seems to be a fertile ground for crowdsourcing, open innovation and co-creation. Most of the initiatives are however based in São Paulo, Rio de Janeiro, Belo Horizonte ou Porto Alegre.

Best practices: successful crowdsourcing initiatives in Brazil

Fiat Mio

The Automotive world is one of the most competitive sector, always designing new concepts to satisfy the changing needs of consumers.

The FIAT Group felt the necessity of create a collaborative project, called FiatMio. It's not a brand new cart and is going to be launched on the market, it's an open innovation project that open the development of the car to everyone. The participation is really simple: the users just need to access the site and describe how they wanted the car of the future to be.

The Project was a huge success and collected more than 17.000 participants and 11.000 ideas. The concept of the car, presented at the Salão da Automovel 2010, is one of brazilian best projects of 2010.

2.6 Crowdsourcing

2.6.1 genesis of crowd-led strategies and definitions.

Crowdsourcing is a neologism coined by Jeff Howe and first used in his article published on Wired Magazine in 2006 "the rise of crowdsourcing", where Howe points out the emerging and successful habit of outsourcing contents or ideas to a larger, undefined online community, the so-called crowd; the term surged after a discussion on how to manage user-generated contents and how companies were dealing with this new trend.

As the neologism refers to outsourcing jobs to the crowd, it may apply to a really wide range of activity and include different practises, it generated hundreds of different definitions.

Estellés-Arolas and González-Ladrón-de-Guevara (2012) define crowdsourcing as *“a type of participative online activity in which an individual, an institution, a non-profit organization, or company composed to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The undertaking of a task, of variable complexity and modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit. The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills, while the crowdsourcer will obtain and utilize to their advantage that what the user has brought to the venture, whose form will depend on the type of activity undertaken.”*

The huge variety of what can be defined crowdsourcing makes it a flexible and powerful practise but may occur in difficulties while trying to define and categorize the practices.

Some common essential elements may however be found in every crowdsourcing work. (Estellés-Arolas and González-Ladrón-de-Guevara 2012)It's necessary to have:

- a crowd
- a crowdsourcer
- a process (performed on an online platform).

Howe (2006) also provides some characteristics to define the crowd:

1 is dispersed: while in traditional forms of outsourcing companies had to look for cheap or high-experienced local workforce to send their jobs, thanks to the power of internet and the new networked world, companies can reach almost anyone using internet access, no matter where they are.

Internet allow a huge range of activity, but it's necessary to allow and plan remote design strategies. (Howe, 2006).

2. has a short attention span

The crowd combines the efforts of self-identified volunteers or part-time workers that can undertake the tasks on weekends, at night after work; it's a leisure activity, something people do during free time. This means a special attention on the amount of time a task takes to complete it, and a great effort to maintain the crowd's interest over time.

3.is full of specialists, and pick the right crowds is essential.

4.produces mostly crap: companies should be aware that for each open call for innovation, the majority of the submitted works is going to have a really low quality standard. From 100 solutions, only 1% is useful and must be highly encouraged. Crowdsourcing is not aimed to create talents but to find the few quality results amount the useless ones. (Howe, 2006).

Some kind of filters are therefore necessities to separate the works. The crowd's strength lies in its composite or aggregate of ideas, rather than in a collaboration of ideas. This 'wisdom of crowds' is derived not from averaging solutions, but from aggregating them (Brabham; 2010)

5.finds the best stuff: while networked community might be not really productive with quality work production, they are effective for errors detection and to find the best material on the web and declare what's going to became viral (ex. Wikipedia quick fix and Youtube viral videos.)

Who is in the crowd.

The term crowd refers to *“a group of individuals whose characteristics of number, heterogeneity, and knowledge will be determined by the requirements of the crowdsourcing initiative.”*

(Estellés-Arolas and González-Ladrón-de-Guevara 2012)

The crowd might be the generic mass of internet users, the clients or users of a specific firm, consumers or customers, voluntary users, internet-based community; generally the number of people within the crowd is undefined and each company should define it according to its expectations and expected output: when the crowd deal with confidential informations the size could be limited, or may be controlled the way people access to those informations.

People within the crowd don't usually know each other; with the exception of closed, internet-based communities that are encouraged to collaborate and share materials with other members. (Estellés-Arolas and González-Ladrón-de-Guevara 2012)

The characteristics of people in the crowd is largely determined by the type of crowdsourcing itself; for one brand crowdsourcing, such as Starbucks Beta Cup or Lego Ideas, the crowd is mostly composed by users and customers, people who know the brand and use its products. In open innovation processes the crowd might be composed by amateurs, students, young professionals etc; for some kind of tasks, web workers forms the crowd; for some challenges, it might important to create a diverse and heterogeneous crowd, attract participation from a broad group and sustain it over time.

Sometimes the challenges need a trained crowd of smart individuals: it's important to pick the right ones. a company can not simply imagine to get useful results just throwing a challenge in the web. the crowd must be sustained, stewarded and cultivated. the more people participate and get involved in the crowdsourcing process the better possibilities to get meaningful results from their work and participation.

Therefore, every single process should assume people having certain skills. When the challenge need a specific knowledge to be done, it automatically reduces the number of people who can undertake the challenge.

What the crowd do:

Estellés-Arolas and González-Ladrón-de-Guevara (2012) affirms that *“the crowd will need to carry out the resolution of a problem through the undertaking of a task of variable complexity and modularity that will imply the voluntary contribution of their work, money (in the case of crowdfunding), knowledge, and/or experience. It is considered that a problem is comprised of any given situation of need held by the initiator of the crowdsourcing activity, e.g., the translation of a fragment of text or opinions about products.”*

Categorize what the crowd could do is not easy, therefore is possible to identify two major trends: in first, the crowd have to undertake a task or different tasks, the second is related to some kind of problem-solving act (Estellés-Arolas and González-Ladrón-de-Guevara; 2012) If related to tasks, the crowdsourcing brief must be really specific, detailing size of each task and time necessary to undertake it; most of them are human intelligence tasks. Time and

difficulty factor play an important role, related to the crowd's attention span. Tasks are generally not complex and they can be divided in smaller actions, where which one can be easily accomplished by a single individue in the crowd without being connected.

In the second case, when the crowd is asked to solve some kind of problem, the amount of work required is variable: people might be asked to design a new product such as give a comment or a review to a given one.

In the first tendence, no specific skills are necessities, since tasks are generally routine actions or quantity web work, while in the second option a more educated or trained crowd might offer better results, related to more creative work and to innovation generation.

Motivation: what the crowd gets in return? “know your crowd and its expectation”

Users will obtain satisfaction of a given necessity, whether it be economic, social recognition, self-esteem or the development of individual skills. (Estellés-Arolas and González-Ladrón-de-Guevara; 2012).

What push people to take part in a crowdsourcing action, and use their skills or time to accomplish the job? motivate the crowd is a very delicate topic that requires a great effort.

In the majority of the cases, the motivation is determined by the initiator of the crowdsourcing process; crowdsourcers can combine more different kind of motivation in order to get better results: economic rewards can be combined with social recognition etc.

In the simplest option, people in the crowd are acting voluntarily, for fun or hobby and passion and competition are motivation.

When the crowds is not composed by volunteers, people should be motivated; some of the most common forms of rewards are: financial, personal motivation, share knowledge, gain some new skills, fun etc. When it comes to professional work, motivation can be also get a freelance job, create a network of contacts, share your own work with experts and people you won't probably be able to work with.

Time and effort people should invest into the project should be determined in order to give it proper value and motivation.

2.6.2 The Crowdsourcer.

The crowdsourcer can be any given entity that has the means to carry out the initiative considered, whether it is a company, institution, non-profit organization or an individual. (Estellés-Arolas and González-Ladrón-de-Guevara; 2012).

The term crowdsourcer refers to the entity who initiates the crowdsourcing process, and in the majority of the cases, the initiator is “a company that has used crowdsourcing as a strategy to develop open innovation (Djelassi, Decoopma, 2013); a project can be outsourced to the crowd also from institutions, non-profit organizations, and in general anyone can start a its own process: it may be an individual, a writer, a young professional etc.

The following table shows an example of crowdsourcing process undertaken by different crowdsourcers.

<p>Companies</p> <p>Ben & Jerry's "do the world a Flavor" Icecream producer Ben & Jerry's is a great example on how crowdsourcing can be part of a company's business model. Ben & Jerry's knows the importance of customers feedbacks and during the years some of their best selling products were born from user's suggestions. Following this idea, back in spring 2009 the company leveled up launching the 90-days "Do the world a Flavour" competition. Customers were allowed to create their personal flavour using an online platform called "Creation Station". Challenging fan's passion and creativity, the company received more than 10.000 new flavours suggestions only in the US and more than 70.000 entries in Europe.</p> <p>The challenge: Create Ben & Jerry's first global fair trade flavour.</p> <p>Users Motivation: winning flavour was going to be officially produced in 2010 and sold around the world, plus the creators would win a trip in Dominican Republic to visit Ben & Jerry's fair trade cocoa farm. Participate as a form of belonging to the company and funny experience.</p> <p>Ben & Jerry's Motivation: raise awareness around its fair trade ingredients, talk about their fair trade model, engage their audience, build customers loyalty, connect with their customers in a funny way.</p> <p>Touchpoints: FB page with TIPS and Flavour Gurus Videos. Website Creation Station</p>	<p>Public Institutions</p> <p>Finland Open Ministry -Avoim Ministerio</p> <p>Open Ministry is a non-profit, non-aligned organisation based in Helsinki, Finland. The Ministry is about crowdsourcing legislation, deliberative and participatory democracy and citizens initiatives.</p> <p>The Open Ministry started in 2012 from the unusual collaboration of the finnish parliament and a group of tech entrepreneurs and its aim is to bring citizen's proposal straight to the parliament vote.</p> <p>The idea began after the "Citizens' Initiative Act", stating that every legislative proposal gathering 50,000 signatures (within six months will) go to Parliament for a vote.</p> <p>In response to this act, the Open Ministry came to life. It's, an open-source platform for citizens to discuss proposals and collect the necessary signatures online (after verifying citizen identities).</p> <p>Thanks to its huge internet penetration of 89.3% Finland is an extraordinary wired country and several proposals (a ban on fur farming, a requirement for all public software procurement to take into account open data and APIs, a ban on energy drinks for under-16s, and a referendum on Finland's restrictive alcohol laws) were listed and signature collected through the website.</p>
<p>Intermediary Platforms</p> <p>Formabilio</p> <p>Formabilio is an italian open innovation platform and shop online. Its philosophy is easy: Formabilio gives designer's ideas shape thanks to the know-how of small Italian manufacturing companies.</p>	<p>A single user</p> <p>"AVICIIXYOU" - Avicii</p> <p>Music was one of the first industries transformed by networks, collaboration and new technologies so it was almost impossible crowdsourcing didn't affect it.: in early 2013 dj and producer Avicii teamed up with Ericsson, Universal Music Sweden and At</p>

<p>They believe crowdsourcing is the future of Made in Italy: products that can tell the story of a land, the passion of the artisans, their commitment and responsibility. The quality and beauty of the products are the proof that this process works.</p> <p>The Challenges: The platform catches ideas thanks to design contests. Challenges are posted by Formabilio staff that creates a short design Brief.</p> <p>How it Works Once an idea has been submitted, it's officially part of the contest. The crowd votes the best ideas, but also a technical Jury can express their preferences. The 10 ideas the crowd like the most and the choice of Formabilio experts are finally evaluated. Winning ideas are going to be produced by a small italian manufacturing company and sold in Formabilio on-line shop.</p> <p>Designers Motivation For designers, that can also participate as a group, Formabilio is a great opportunity to see one of their project produced and earn the 7% of royalties on on-line selling.</p> <p>Formabilio Motivation Formabilio contests guarantee the exclusivity of their projects. The items within their online shop are produced just for Formabilio. The unique design comes together with high quality in the production.</p>	<p>night Management to create the first crowdsourced hit song.</p> <p>The open call addressed to Avicii's fan or worldwide electronic music producers: everyone was asked to submit his own suggestion for melody, bass line, rhythm, break and effects. The Swedish DJ acted as executive producer curating the final result.</p> <p>The project obtained more than 13.000 submission from 140 different countries and over 4.100 producers. Every week semi-finalist were selected and their tracks voted from online users. The final hit was then distributed in online platforms such as Spotify, iTunes and Vevo, and all the profits donated for charity.</p> <p>The open call aimed to show benefits of network society in music innovation and business transformations; the project represents an example on how industries could reinvent and collaborate through time and borders.</p>
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What can be crowdsourced? categorize the practices.

Since Howe's definition in 2006, new crowdsourcing start-ups, applications and business models proliferated and it has become quite challenging to clearly define what crowdsourcing really is and what its true boundaries are. (Soresina, web, 2013).

Dawson and ByngHall (2011) created a crowdsourcing landscape map (figura).

While there isn't probably one right way to categorise the crowdsourcing landscape, the most popular classifications define crowdsourcing practices according to the following 4 variables (Soresina, 2013):

- Based on the type of labor performed (Carr; 2010) - allows to understand the different abilities crowds possess and the many ways they can work together or in isolation to perform a task.

- Based on the motivation to participate (Martineau; 2012) - focuses more on the crowd members rather than the problems that crowdsourcing may solve; is also based on the motivation that drives crowds to participate in crowdsourcing applications.
- Based on how applications function (Howe, 2008; Grier, 2013) Howe's approach is to categorise crowdsourcing based on how various applications function.
- Based on the problems that crowdsourcing is trying to solve (Dawson; 2010) - it's a problem-centric segmentation is in fact based on the type of tangible problems that crowdsourcing is best suited to solve.

For this work, a combination of the classification of Howe (2008) and Grier (2013) is used to analyse the different practices.

2.6.2 crowdcontest (also known as crowdsourced problem solving)

2.6.3 Crowdwisdom

2.6.4 crowdcreation (also known as self organized crowd)

2.6.5 microtasks

2.6.6 macrotasks

2.6.7 crowdvoting

2.6.8 crowdfunding

2.6.2 Crowdcreation or crowdsourced problem solving or crowdcontests.

Crowdcreation is one of the most used type of crowdsourcing as a tool to innovate including customers in the creation phase. It's related to "creation" activities, where individuals, companies, NGOs and organizations outsource problems or part of them to voluntary crowds that is asked to submit a solution. Solutions could have different forms: it might be an end project, intellectual or physical, something with a tangible value for the crowdsourcer.

Crowdcontests are best performed in web based communities, where users become co-creators of innovations by giving inputs to improve a product or service.

Crowdcontests are *"a strategic model to attract interested, motivated crowd of individuals capable of providing solutions superior in quality and quantity to those that even traditional forms of business can"* (Brabham; 2010)

Crowdcreation works at best for the realization of new product ideas or designs, where tasks have a certain degree of complexity.

It's possible to define at least two main type of crowdcreation:

- integrative: complementary knowledge from a vast number of individuals (web based crowd) is pooled together
- selective: ideas from different individual within the online crowd are competing and are selected to give innovation inputs. selective process usually are expressed in form of contests, in which best ideas are selected and rewarded, either with material prizes or with a certain form of recognition.

Both models work with voluntary crowds, it's important to steward users motivations and stimulate their participation in the crowdsourcing activities. for this reason is important to follow some tips and step, the tasks should be:

- *stimulating*. given tasks should be appropriately designed to feed users curiosity and desire of acquiring new knowledges and personal learnings. studies show the high importance of the pleasure people within the crowd feel when they solve a given task. this include also the pleasure of sharing with other people their own ideas, help developing a new solution, pleasure of undertake a challenge and so on.
- *have frequent feedbacks*: feedbacks, above all the one who comes directly from the crowdsourcer are one of the highest form of users participation and motivation. crowds who often receive feedbacks are more likely to produce and contribute, and their productivity is influenced also by the nature of the feedback; positive feedbacks drive to higher quality results if compared to the ones users who receive negative ones. the frequency of feedbacks is an important factor, that might impact over people participation over time.
- *facilitate interaction* - interaction is an important factor on how users in crowds engage in problem solving activities posted in online communities. in important to consider both user-to-user interaction and user-to-company ones. Ideas generation is encouraged when interaction among user is easy and its frequent; when people discuss often and about different topics the generation of innovative ideas is more likely to occur.
- *motivate the crowd* is also crucial to any crowdsourcing activity. while in cases when the crowd volunteer in giving inputs and stimulate the innovation process the motivation is implicit and might be just the mere enjoyment of solving a given problem, crowd contests are definitely more complex to handle. the users might use the reward as a criteria of choice of taking part in the process, so it has to be well defined and structured. for the crowdsourcer, this means be conscious on what push people to engage in a web-based contest.
- *build collaboration elements*. this elements relates to sense of belonging to a community and feel part of a social collective. encourage this feeling to grow is hard but technological expedients may help it: live session while creating ideas; users should feel at the same table even if in different corners of the world. best contributions and more active users should be valorized and their actions be more visible within the crowd. others expedients are the introduction of company employee as visible and active members of the community: this makes communications users-to-company easy and fast, and increase the feeling of being part of a professional environment where ideas make the difference; at the same time, the crowdsourcer should avoid over-control on users actions, encourage user-driven innovation.
- *communication technologies*. participation is encouraged by easy interaction tools; insights and ideas should be easy to express and share within the community and with the company. it's important to allow users to express themselves through various types forms: posting textual or multimedia content (images, videos, comments, votes, reviews and so on).

“the means to facilitate user motivation are stimulating tasks, giving feedback on a timely basis, encouraging interaction, rewarding appropriately, building sense of community, and selecting the right communication technologies” (Braham; 2008).

Tasks directly related to user experience are the easiest for users to give meaningful impacts and ideas. Solving complex problems might create different situation. is proved that for solving complex problems, heterogeneous capabilities are necessaries. in a certain way, the crowdsourcer is obliged to understand the level of knowledge of the crowd, for example identifying the lead users using processes based on netnography (a branch of ethnography that analyses the free behaviour of individuals on the internet), participation in social networks and patterns in replies can help.

examples of crowdcontests and crowdcontests platforms:

- Innocentive.com
- Lego Ideas
- Nokia's Ideas Project

2.6.3 Crowd Wisdom

Crowd wisdom or Wisdom of the Crowds (WOC) is a theory based on the belief that masses can make accurate decisions and give a better judgement than expert single individuals; large groups of people are smarter than an elite few, no matter how brilliant. Crowds are better at solving problems, fostering innovation, coming to wise decisions, even predicting the future (Surowiecki; 2005).

Crowdwisdom is essentially a massive call for ideas when it comes to ask human opinion; key factor to crowd wisdom success is the diversity of the crowd: in decision making, a diverse group of problem-solvers made a better collective guess than a group of best performing problem-solvers. (Surowiecki. 2005).

Crowdwisdom can be considered as a type of crowdsourcing since it involves a crowd working through the web, turning customers in active producers and allow people to work also anonymously, aggregating individual knowledge. (Bihr; 2010)

According to Surowiecki (2005), 4 conditions are necessary to enhance crowdwisdom.

- diversity of opinion - the practise is effective when, within the crowd, the judgement or decisions are independent one from another.
- independence - when individuals get influenced by other member's opinion, the value of crowd wisdom is less effective.
- decentralization - people is enabled specialize and draw on local knowledge
- aggregation - there's a mechanism allowing to turn individual judgement into effective collective decisions.

People in crowds are not smarter, but presented with the right challenge and the right interface, can be wise. Powazek (2009) defines some criteria to enhance the crowd wisdom process.

- Simplicity - the interface, as well as the tasks the single individual must accomplish, should be easy to undertake; even in the collective project is complex, before being submitted to the crowd it must be break down into really simple components. The more complex the interface, the less participation you should expect. also time is an important factor. (Powezek; 2009).
- Participation and aggregation - one simple rule about WOC is that the more people gets involved in the crowd the better it works.
- Scores - gamification is an high form of motivation, and keeping scores is one of the simplest way to play games. Some websites like OpenIdeo assign a "score" to their participants based on their participation in the crowd; the score determined certain features the users can do inside the crowd, such as comment, be moderator, give other users a score etc) (Powezek; 2009).

- Leaderboards - it needs a well organized WOC system to generate useful leaderboards, such as Google results. But in the majority of cases, showing the list can destroy the wisdom of crowds encouraging groupthink: the firsts results got higher and higher scores, the lasts are ignored from the crowd. When the crowd is influenced its accuracy is almost destroyed. there are some expedients to avoid the creation of bad leaderboards, such as: show results only after a period of secret voting phase, show a random list of the most voted items instead of the real rank, show the results only after the vote has been expressed to avoid influence from the other users. (Powezeck; 2009).
- explicit vs implicit feedback - implicit feedbacks refers to user behaviour (comments, page views, time spent on a page and any other recordable date), while explicit feedbacks is something directly asked, such as express a vote or rank something. Using implicit or explicit feedbacks systems influence how the whole WOC is managed and sometimes using just one of them is not enough: while implicit actions are more spontaneous and honest, but could be dispersive and disorganized. mixing the two options is a wise choice: asking for votes but before going on compare them with implicit data results etc.
- voting - it's important to give the right weight to vote in a WOC system: votes can help discover controversial items. although it may sounds not democratic, not all the votes are meant to have the same importance in the crowd: individuals with higher score might deserve higher consideration,

Some critical aspects about crowd wisdom are related to quality control: it may occur episodes of "vandalism", ownership of the ideas and authority within the crowd. (Surowiecki; 2005).

Some Crowdwisdom examples are: Yahoo Answers; Wikipedia; "who want's to be a millionaire" audience pool; google search ranking algorithm - the more sites that link to a certain URL with a certain phrase, the higher the rating.

2.6.4 Crowd Creation

Probably crowdcreation was the first and most known type of crowdsourcing, where the crowd is asked to create content, do a creation activity.

it's possible to define two main forms of crowd creation: the first one known as "warehousing mechanism", the second is the collective project form; in the first case, an entity (both an individual or a company), submit a request on the internet asking for content. the materials posted by the users should follow a list of conditions and submission requirements imposed by the platform or the website, but apart from this, there are no limitations to what can be posted.

- iStockPhotos - amateur photographers contribute high quality stock photography images
- CafePress

The second form of crowd creation is the collective project, in which the main difference lays in the final output, where the content generated by users is only a small part of a bigger project; the main areas are creation of intellectual material, programming codes, open source initiatives etc

Examples of CrowdCreation collective projects are:

- Linux - open-source operating system developed by a community of programmers.
- wikipedia - the free online encyclopedia where the content is generated and fixed by users
- the Huffington's post - online journal where post are mainly written by readers
- WordPress
- Android

2.6.5 Microtasks

Microtasking is a practice that consists in breaking a larger, complex job in small, well defined tasks and asking for a big crowd of workers to complete them individually.

Microtasking is an effective practice for large projects that need human intelligence to get done, such as: data validation; web research; research and organization of contact information; writing descriptions; digitalize or scanning paper works; transcribing audio files; tag, sort and labeling photos and images; translation.

Microtasking is often compared to a digital assembling line: tasks have to be small and repetitive (but not so simple that they can be automated), they can be done independently by online workers; the larger project is undefined and generally the worker doesn't know it. (Janah; 2010).

As microtasks counts on que quantity of workers, numbers are importants. workers are generally young educated adults. they allow workers to do their tasks from home, allover the world and receive payments for their jobs directly from the internet. they work primarily on a voluntary base: they browse the tasks and decide which tasks they wanna do and then they complete them. (Ross, Irani, Silberman, Zaldivar, Tomlinson; 2010).

Microtasks need platforms to quickly post their tasks online and connect with a wide range of worldwide workers. they have the opportunity to receive results from a high number of workers at the same time. since tasks are generally easy and quick to fulfill, workers doesn't need to be fully trained, and doesn't need to have a complete knowledge of the end project to complete them.

Some examples of microtasks platforms are: Amazon Mechanical Turk; pyBossa; Microtask.com: Clickworker; Lingotek; Duolingo (the translation feature).

Advantages and Criticism.

One of the first advantages for business is the flexibility: companies will have access to an on-demand, worldwide, 24x7 workforce that could be easily scaled up and down according to their needs; speed is also a plus: as platforms easily connect and spread the tasks, they will have thousands of tasks completed in few minutes, with high quality and cost effective results. (Lynch; 2012).

Despite its advantages, microtasking is the most criticized type of crowdsourcing due principally on workers treatment. several platforms have been criticized and called "digital sweatshops": they don't provide any benefits or minimum wage and could avoid laws against child labour and

labor rights. In addition, as workers are only paid for their tasks, they have very little idea for what their work is used for (Zittrain, 2009).

Majority of the services pay very little (few pennies) for each task; people earn money depending on the speed and on the per-piece price; in average, an unskilled worker on the most known platform for microtasking service, Amazon Mechanical Turk, earns more or less \$2 per hour, below the minimum range in the US, while in India is way more than the minimum for most cities. (Ross, Irani, Silberman, Zaldivar, Tomlinson; 2010).

To avoid this association with modern slavery, companies often decide to outsource to poor countries to facilitate and stimulate the development of local economy, sometimes collaborating with non-profits, local organisations; some platforms also defends their operate, affirming that digital micro-tasking is a better job than being unemployed or compared to real mechanic sweatshop. (Harris, 2008; Cushing, 2012).

2.6.6 Macrotasks

In Macrotasking, a big problem is presented to the crowd, who is then asked to get involved and propose solution to the part they have specific knowledge. It also enable crowdsourcer to get specific skills for a job or project and hide worker to do just a single task.

Macrotasks could be part of a complex, larger and visible project; crowdworkers get involved in wherever they have the required skills; to accomplish the goals, online organisation and communication are crucial to empower crowdworkers. (Grier, 2013; Perry, 2012).

Macrotasking is generally following these characteristics:

- can be done independently
- generally takes only a determined amount of time.
- require pre-owned skills

Practice that can be effectively macrotasked are: research and development projects; socially motivated projects; medical solutions and innovations; general business work; web or graphic design, software development; assistance with writing or editing, application development and web design in general (Grier; 2013).

Major platforms involved in macrotasking activities are: Quirky; Innocentive; Chaordix.

2.6.7 Crowdvoting

Crowdvoting give users the power to vote basically anything in the web, and it also leverage a community global judgement to create ranks and organize contents (for example submission from other users etc).

crowd voting is a call for users to organize informations. the crowd is asked to organize, filter or rank contents such as movies, music, new products, articles.

It's a very popular form of crowdsourcing and it can be easily integrated with other processes; it's highly used because it might generate high levels of participation among users.

The web is an essential tool to crowd voting: it give access to hundreds of differents methods to perform voting: from simple tools like number of likes or shares on facebook to complex algorithm that can calculate popularity through page access or number of views.

When related to the creation of a new product, crowd voting allow the crowdsourcer to anticipate end-consumer demand and investigate user taste before make big investments, produce something new or simply making strategic decisions: this is doubtless crowd voting best quality, especially in hit-driven industries.

Examples of crowdvoting can be:

- reality TV shows such as American Idol or X-factor - understand audience favorites in the show and choose the most loved one.
- Threadless - ask the user of the platform to vote their favorite t-shirt design, rank them and produce the most loved ones.
- Pepsi Refresh Fund - Pepsi asked its customers to vote for which cause they would like Pepsi was funding
- Google or Youtube research rank - content on google or youtube is displaced according to a ranking, organized from users votes and visits.

Crowdvoting is often used to gauge the possible response of potential customers. It is a way to predict if what is crowdvoted will have a market and have a successful launch. it helps organizing informations such as what is going to be potentially profitable.

2.6.8 Crowdfunding

Crowdfunding is a form of collective funding for projects, where small amounts of money in forms of donations from a large number of different individuals are solicited and collected through the web (Oxford Dictionary, web, 2013).

The goal of crowd funding processes is generate a internet-based campaign aiming to generate hundreds of small individual donations to achieve a financial goal, even ambitious.

The effectiveness of a crowdfunding campaign depends on people and on how much they believe in the idea that is being crowdfunded.

Crowdfunding is particularly effective to fund: disaster relieves, artistic support, startups, market researchers or project fundraising (dailyCrowdsourcer, 2013).

It needs at least 3 elements to start a crowdfunding process:

- an initiator: anywho has a project or a great idea but needs resources to produce and realize it. the ideator own the project and when is the crowdfunding is successful, at the end of the process he own the whole budget.
- a crowdfunding platform: a website showing the project and giving the visibility on the web supporting the collective cooperation. it also safely collect fundings following precise rules, guarantee the contributors. they generally earn a percentage on every donation made thanks to the site.
- supporters: any users entering the platform and contribute with its own money, in form of donations, to a project realisation. they generally earn something in exchange for their donation, usually is something intangible but according to the quantity of money donated it might be a tangible reward: a gadget or even a prototype.

The success of a crowdfunding campaign is strictly connected to supporters motivations to donate.

Examples of crowdfunding projects or platforms: the campaign might have a greater purpose they feel connected to, they connect to the tangible aspect of donate (such as the reward), they connect to the creativity of the idea and its display (passions, affinity etc) (Prive, 2012).

A crowdfunded campaign produces also the so called presumers, customers who wants a product before it's produced; they might generate pre-orders and generally are great donors, contributing with high amount of money to have the first previews.

Crowdfunding platforms are not online shops, every donations is a challenge and involves a certain amount of risk. To avoid failures and build customers trust, a campaign should follow three main steps:

- pre-phase: preparing the campaign with the appropriate strategy. each campaign should create its own list of rules according to the platform they are posting the idea. it's important to build credibility to encourage people to invest their own money on the projects. it's also necessary to establish timeframe, perks and rewards.
- push: running the campaign promoting it, the interest of the crowd should be maintained.
- post campaign: delivering on the promises.

A crowdfunding process is generally supported by a campaign, contains a video, an introduction of the project, a list of perks and rewards for each donation.

Examples of Crowdfunding platforms: Eppela; Barack Obama's crowdfunded campaign; Louvre museum in Paris crowdfunded the purchase of Cranach's "le tre grazie"; Kickstarter; Indiegogo; Ulule; Kapipal; Quirky; School Raising - crowdfund public education in Italy; Catarse.

2.7 The process of Crowdsourcing

First of all it's important to define which type of process crowdsourcing can address; some authors refers to it as an outsourcing process, and we can clearly see it in some examples already provided such as the Amazon Mechanical Turk.

But crowdsourcing may be also a problem solving process, an open source or a distributed online process. Using the example of Threadless.com, crowdsourcing can also be defined as a brand new production model; in some cases, crowdsourcing is a term strictly related to business area, defined as a new type of business or strategic model or a way to integrate clients.

All the definitions have some common features: the process has to be internet-based and it always involves a large group of people, the so called crowd.

The structure of the crowdsourcing process, except from its online nature and its involvement with crowds, largely depends on the type of tasks that is going to be outsourced.

Most of the initiatives, however, use open calls to propose tasks to the crowd; generally crowdsourcers want to hit as many individuals as possible, without restrict only to professionals, pre-selected candidates or experts in the area.

open calls goals are bringing together the highest number of participants and being non-discriminatory.

Anyone can answer to the open call: can be a group of people, a single person, a firm, a non profit organization, a professional in the area, an amateur, a student and so on.

To be highly effective, in the time different types of open calls appeared.

1 - the first one is the truly open call, where anyone interested in the topic can voluntarily take part in the process.

2 - the second is an open called limited to a certain community. anyone within the community can participate but to be part of it, users need to have some kind of specific knowledge or skills.

3 - there's finally a third one, a flexible combination of the first two forms of open call; the call is opened to anybody but the ones who can actually take part in the initiative are restricted and controlled.

Grier (2013) lists a series of six steps that prepare the job, get the job to the crowd and collect the final work product; many of these steps are supported by crowdsourcing platforms – web services that support crowdsourcers through these steps. Most platforms provides an easy connection to crowds and handle all the details of compensating contributors.

The steps of a crowdsourcing process are>

1. Design the job and divide the labour.
2. Write clear instructions.
3. Choose a web platform to serve as crowdmarket.
4. Release the job and recruit the crowd.
5. Listen to the crowd and manage the job.
6. Assemble the work of the crowd and create the final product.

Expected outputs are very influenced by the initiatives itself and by the task that has been outsourced. (Grier, 2013).

2.8 Adoption of a Crowdsourcing strategy: advantage and limitations.

Outsourcing to crowds can bring the power of collective human intelligence to various forms of work, for example bringing a specific skill to a job at just the moment when that skill is needed. They are also very good at coordinating a lot of different skills on large and complicated jobs such as making judgements, reading handwriting, interpreting images, finding information etc. (Grier, 2013).

Some largely recognized benefits of crowdsourcing strategies are:

-Cost: although the cost of crowdsource a task might vary considerably according to the type of crowdsourcing, a major advantage is having the job or task done for a relatively low cost, or a competitive cost if compared to the price for hiring a dedicated professional. (Stevens, 2011; Schenk and Guittard; 2011). Although professionals are not completely excluded in a crowdsourcing process, they are more likely to take part in traditional outsource processes. (Schenk and Guittard; 2011).

- Quality: quality of the results mainly depends on the type of Crowdsourcing. In Crowdsourcing of simple tasks (microtasking, crowdvoting etc), quality refers to the amount of tasks that are achieved. Concerning complex tasks (Macrotasking, Crowdcontests), quality refers to the characteristics of a problem's solution; referring to creative tasks, quality is the originality of the

solutions proposed and to the way they match user tastes and expectations (Schenk and Guittard; 2011).

- Network Externalities: Network externalities may be direct, as for instance for communication devices or social networks, or indirect, when the value of a network depends on the availability of complementary components. Crowdsourcing is a way to foster network externalities, potentially generate self-enforcing mechanisms and support the adoption of new technologies. For instance, the value of OpenStreetMap (OSM) essentially depends on the richness of the geographical content and the possibilities to use OSM data with GPS devices. These contributions mainly stem from individuals, and make the further contribution of the crowd even more likely. Nokia's Ovi Store functions according to the same mechanism: the Calling all Innovators program generates a permanent flow of new applications, which contribute to the value of Nokia's smartphones (Schenk and Guittard; 2011).

- Flexibility: crowdsourcing gives access to global, on-demand, 24-7 and highly scalable workforce (Amazon Mechanical Turk, web, 2015).

- Motivations and incentives: crowdsourcing could provide both extrinsic and intrinsic motivations to users. (Schenk and Guittard; 2011). Extrinsic motivation relates to activities which are not an end per se but which through the associated incomes, serve to satisfy general needs, while intrinsic motivation is based on the satisfaction associated with the activity itself (enjoyment-based motivation) or its social dimension (pro-social motivation).

Creative tasks and problem solving typically fall within the knowledge work category. They require skills of the participants and, to various extents, significant time investments. Therefore the issue of motivation and incentives is particularly relevant for creative or complex tasks. As crowdsourcing implies voluntary participation of individuals, with no hierarchy or contract-related constraint, as well as a high degree of autonomy in the achievement of tasks, such elements are very likely to foster the motivation of experts and creative individuals. (Schenk and Guittard; 2011)

Nevertheless, the effectiveness of companies' usage of collaborative models highly depends on their business strategy (Gavino, 2014). In the same way open up the creativity process to the crowd can benefit a company, it is often a problematic practice.

Some major recognized disadvantages are:

- Lack of Contributors: it might happen that the crowdsourcer fails to attract sufficient contributors to its crowdsourced project. As crowdsourcing relies on voluntary participation, reaching a relevant number of contributions (or the right crowd) could not be guaranteed (Schenk and Guittard; 2011).

The crowdsourcer could have relied on the wrong motivation or rewards; incentives such as monetary rewards could be promoted to avoid this disadvantage, however reducing the cost advantage of the process (Schenk and Guittard; 2011).

- Crowdsourcing the wrong task: Problem statement formulation is known as a crucial step in problem solving processes (Albano, Suh, 1992; Pahl, Beitz, 1996), and the argument is more and more valid when it comes to crowdsourcing. (Schenk and Guittard; 2011). Outsourcing a task to an undefined crowd, crowdsourcers must supply proper information to obtain solutions to

their problem. If the open challenge, brief or submission request is poorly defined, the process is very likely to lead to non-satisfactory contributions.

Feedbacks loops are not so easy to create, mainly because potential solvers are numerous and dispersed. Therefore problem and request definitions should be major concerns for firms engaging in Crowdsourcing processes (Schenk and Guittard; 2011).

Fuller (2012) affirms that poor results increase “when managers fail to address the crowds’ expectations”; the author also lists some elements annoying crowdsourcing projects community members that could results in crowd-resistance:

- unclear communication or unfair treatment of participants.
- distrust
- manipulation

2.9 Crowdsourcing Initiatives: a comparative analysis.

The process of the comparative analysis is structured in three phases:

- Selection of Platforms
- Setting of comparison principles
- Insights

The goal of a benchmarked is define a standard, or a set of it, used as a point of reference for evaluation performance and level of quality.

42 crowdsourcing projects, websites and platforms were analysed (see appendix 1: list of analysed platforms).

Starting from this list of 42 sites, 10 initiatives were deeply analyzed. The selection criteria were:

- Project developed as open innovation strategy of a single company (such as CoCriando Natura; Lego Ideas etc)were excluded;
- Only intermediary platforms were accepted.
- Focus was given to platforms that allow different type of tasks (crowdvoting, crowdfunding, ideas contests etc)
- The platform should promote principles of social innovations
- For platforms with focus on a specific task, such as crowdfunding or idea contests), the brazilian practices were preferred: Catarse was analyzed instead of KickStrater, for example

The list final 10 practices analysed included:

- 1 OpenIdeo
- 2 Good Maker
- 3 Múrmura
- 4 Benfeitoria
- 5 Innovation Exchange
- 6 Catarse
- 7 ItsNoon
- 8 Jovoto

9 MyKindaCrowd

10 Cidade Democrática

Such initiatives were then compared to Innonatives; The comparison principles established were:

- greater good
- individual benefit
- proactive communication
- stimulates for collaboration
- transparency
- strong visual language
- make users feel part of the crowd
- good design assurance
- inclusiveness participation
- user's evolution / gamification
- infrastructure
- developer as marketing agent
- voluntary participation

Also the structure of the crowdfund process was included in the comparison;

- Sustainable demand
- Research Phase (Crowdlearning)
- sending ideas
- sending concepts
- sending solutions
- comments and feedbacks (crowdvoting)
- crowdfunding/ implementation
- support

2.9.1 Open Ideo - *where people design better, together*

OpenIdeo it's an open innovation platform developed by the worldwide design and innovation consultancy IDEO. OpenIdeo is a way to include a wide range of people within the design process, and create a great impact on some of the major challenges the world is facing today. OpenIdeo pushes people to share their perspectives, ideas, inspirations and insights with the online community to create better solutions.

Guideline principles of the platforms are: optimism, because they aim to provide a positive change in the world; inclusion, because enable all levels of participation from different collaborators; collaboration, because it favors collaboration over competition; it's human centered, because encourage considerations from possible end users to design with people, not for them; it's always in Beta testing, based on the principle that design is continuous improvement.

How does it work - Every 12 week OpenIdeo staff launches a new challenge, following the same phased process; everything starts asking a big question (“how might we...”) about socio-environmental big issues. Challenges includes a brief introducing sponsors, issues and goals.

The Inspiration phase is important to explore the challenge topic, share knowledge e posting inspiring project. Some tools might be provided during this phase to support interviews or learning activities.

Concepting is the following step, where ideas are generated. During this phase in-person, off-line activities or brainstorm could support the ideas generation. The crowd vote is called “applause phase” and helps gathering feedbacks and choose which concepts moves on to Refinement phase.

Almost 20 concepts, the one the community and the sponsors think best answer the challenge, arrive to this phase, where concepts are refined, edited, iterated or tested. Also prototype is well accepted.

During Evaluation concepts are reviewed and the staff and the crowd provide feedbacks on them. At the end of each challenge a list of winning concepts is announced.

The final phase is realisation of the winning ideas, thanks to the collaboration of sponsors and community members. Stories on how the community plan to pilot or implement the ideas are shared.

Challenges - challenges are structured as open calls posted by the OpenIdeo team, generally structured as a simple question related to social issues. Users, companies or organizations can post an open call.

Rewards - winning ideas are established by the OpenIdeo team; the solutions are then shared in creative commons, to anyone access them and realize the projects.

Brief - the design brief is generally a text, combined with a video (generally not more than 2.5 minutes) explaining the core idea behind the challenge. Each challenge is completed by a list of guideline principles and an index of contents.

Tools - each challenge comes together with a research made and some tools to help people contribute with the solution.

Visual language - simple and easy to browse; the platform particularly use crowdstorming, where people post proposals of solutions and other user can comment, vote and interact.

Duration - the time of each challenge is not fixed and it’s established from the organizer;

Motivation - users are encouraged to post to get their ideas realized, but the first motivation is actually create a positive worldwide impact through collaboration. Ideas are in fact mixed and integrated in order to reach the best impact possible.

2.9.2 Good Maker - *build your world of good*

Good Maker is an American based platform promoted by the web magazine Good - *Solutions for Living Well + Doing Good*. Good's mission is to connect, inform and empower anyone to make a change, promoting a place where sharing creative solutions.

How does it work - Good Maker has a really simple process: people, institutions, organizations could post a brief on the platform; anyone within the platforms could participate and propose solutions. Ideas pass through a selection and are then voted.

Challenges - Challenges are posted from the GOOD Crew plus a partner or a sponsor. Both companies and NGOs can submit a challenge, the only criteria is that they have to drive some kind of meaningful impact.

Rewards - rewards for winners are clearly visible on the challenge's page. Awards are generally money, but also donations, collaborations with GOOD Platforms, trips etc.

Brief - Brief is clearly exposed when you enter the challenge; GOOD Maker provides the specifics of each brief, rules and regulations. Good also provides some submission tips

Tools - sometimes they provide a format to follow and upload or contacts of people you can write to have more information.

Visual Language - it's informal but a bit confusing, with lots of information condensed. Not so easy to browse.

Duration - not fixed, established for each challenge.

Motivation - Generally challenges are rewarded with money, so users are motivated to participate to win the reward but also to generate positive solution and to "make good".

2.9.3 Múrmura - *microrevoluções urbanas*

Múrmura is a Brazilian collaborative platform, proposing projects related to cities and about urban landscapes; the goal of the site is to connect people with great, creative ideas with people ready to engage to improve their city and create new connections between people and urban environment.

Their strong belief is collaboration is the key factor for transformations to happen, and that is why Múrmura is not just online: they are based in Porto Alegre, where they try to engage more and more people in the community organizing events about co-creation and creative reunions. The online platform is used as a tool to potentiate the collective intelligence and create, prototype and execute hundreds of projects in a fast way.

Process - Sponsors, together with Múrmura staff can post challenges and establish the budget for rewards. Anyone can contribute proposing ideas and possible solutions. Sponsors choose which idea deserves to be rewarded and developed till became a complete project; the platforms promotes than a crowdfunding activity, and if 80% of funds are reached, Múrmura provides the remaining 20%. The last part of the process is called “street action”, when the winning project comes to life thanks to the collaborative work of sponsors, creators, local community and Múrmura Staff.

It's possible to join the community in three different ways:

Creadores (Creators) - anyone can be a creator, reporting a problem, sharing an idea or providing a solution to the challenges posted in the platform.

Patronos (Sponsors) - sponsors are crucial, they have a really important role: they have the power to choose the challenges, the idea that deserves to be rewarded and how winning ideas will be executed. everybody can become a sponsor thanks to crowdfunding: anyone can donate money, using a a brazilian crowdfunding tool called Patreon, and every contribution is rewarded.

Fazedores (Makers) - Makers are people who volunteer during the street actions (and are mostly regular citizens interested in the initiative); everybody bring his skill into the project to make it come to life.

Challenges - Challenges are structured in forms of open calls with simple, catchy questions like “how you leave streets cleaner, tell us what you will do or what you already do”.

Rewards - the creators of the best ideas are rewarded with money, usually around 1500-2000 brazilian reais (600-800 US dollars); the winner became also the project leader to develop his idea till became a complete project, and wins also mentoring during this phase: they help in finding suppliers, engage the local community etc.

winning ideas are chosen according to the following criteria: simplicity, statement of the idea (actions are most likely to be chosen rather than paper project), replicability, fun, strength of the impact, creativity, aesthetic and visual development.

Brief - As the brief is an open call, only few general informations are provided, generally a short abstract related to the problem that is going to be solved.

Tools - To Manage actions, Múrmura uses a tool called Trello, to organize what has to be done, share ideas and references. Other tools provided by the platforms are concentrated during the prototyping phase and the street action.

Visual Language - Múrmura has a strong visual and brand identity and all informations are clearly exposed inside the platform, using a relaxed informal language.

Duration - the challenge proposes a challenge per month, each one lasts one month.

Motivation - create a positive impact, exercise the brain, self-promotion as problem solver, earn money rewards, see actual transformation happening in cities and be a part of it.

2.9.4 Benfeitoria

Benfeitoria is a social business born to encourage and promote human and collaborative culture in Brazil. They define themselves both as a laboratory of collaborative experiments, incubator of transforming projects, platform of mobilization of impact solutions.

Benfeitoria develops contents and tools to stimulate people and institutions to be part in transforming projects in a simple and fun way.

Their activities are both online and offline, organizing private classes and mentoring actions.

The platform tries to unify crowdsourcing with crowdfunding, without charging any commission, one of the first model in the world.

How does it work - people with innovative ideas or solutions contact Benfeitoria staff to show them their projects and gain a free consultancy. once project have been approved they are showed in Benfeitoria main page, where people and members of the community can visualize, discuss and also contribute in forms of ideas or money.

Challenges - whatever kind of challenges are accepted, the only limitation is that they must promote the common good. both users, entrepreneurs, start-ups or organizations can post.

Rewards - Ideas accepted in Benfeitoria are rewarded with mentoring and online promotion and visibility, plus they have the opportunity to be crowdfunded.

Visual Language - Benfeitoria uses an informal language, and visually is simple and well organized.

Duration - from 1 to 3 months

Motivation - primary motivation of people is see their idea realized, create positive impact.

2.9.5 Innovation Exchange

Innovation Exchange business model could be defined pay per performance, providing high innovation level at minimum risk.

The Platform can be accessed both as a Innovation Exchange (IX) Sponsor or as IX Innovator. IX Sponsors are generally companies or ONGs who want to improve their innovation capacity using a collaborative marketplace. IX Innovators are thousands of professionals from different areas all over the world. IX Staff offers a service to help company building the brief.

How does it work: IX Staff, together with companies, formulates the brief and share within the platform, Innovators voluntarily decides if take part in a challenge or not; Innovators can search

for collaborators inside the IX Network or work alone. End projects are presented to Sponsor companies, who decides the best one and rewards it.

Challenges - the Platform can be accessed both as a IX Sponsor or as IX Innovator. IX Sponsors are generally companies or ONGs who want to improve their innovation capacity using a collaborative marketplace. IX Staff offers a service to help company building the brief.

Rewards - Rewards are always offered by the sponsor who publish the challenge. They generally consist in amount of moneys or royalties for some years on sellings of the products resulting of the challenge. Sometimes the rewards can be negotiated according to the value of the ideas proposed.

Brief - Briefing in the platform is called "challenge details". Each challenge starts with a statement and an Innovation Abstract; the brief is then structured in paragraphs, generally following this scheme: a short background of the sponsor company, the description of the challenge, what company is interested or not interested in. the Brief generally ends with requirements of the solution and submission criteria.

Tools - as the brief should be specific, Innovation Exchange assists companies while creating it.

Visual Language - Language in the platform is formal and the visual image is not so effective; lot of informations provided not so clearly.

Duration - change according to each challenge.

Motivation - winning ideas are rewarded with money or royalties.

2.9.6 Catarse

Catarse is the first and biggest brazilian platform for crowdfunding. Artists, designers, gamers, entrepreneurs, activists can use Catarse as a tool to make their project financially available. The platforms promote such project and help find people interested in sponsor the realization of such ideas.

People who send their innovative projects to Catarse, called Makers, present videos and create rewards for people who are going to financially support them (the Sponsors). According to the quality of the ideas submitted, Catarse makes a selection and publish the most promising ideas. Catarse follows the "*tudo ou nada*" (All or Nothing) philosophy: if the project reached the goal, the Maker takes it all. If after two months the money is still not enough, all the donations are going to be returned.

How does it work - everybody can post his project, each one has a deadline of 2 months to reach fundings; if users like the project and decide to participate, they can raise funds to make them became true.

Challenges - As Catarse is not a crowdcontests platform, challenges here are related to crowdfunding. Challenges are accomplished if the Maker reach the money they need to bring his idea to life. Makers should provide informations about how much money they need (the goal) and in for how long the process is going to be open.

Rewards - Makers can establish a list of "rewards" for people who donate money to encourage them in supporting their projects. To thank investors both tangible or non-tangible rewards are possible: t-shirts, pins, photos, but also digital versions of films, books etc

Brief - The brief should include a video presentation, the financial goal and a catchy description of the idea that is going to be realized if the campaign would have a good exit.

Visual Language - Catarse uses an informal language and visual material is well organized, easy to browse.

Motivation - Users that decide to invest in a project are usually interested in the idea, so their primary motivation is the desire of buying such product or service. Also the rewards, when they are well designed by the makers, are a good form of motivation

2.9.7 It's Noon

It'sNoon is a brazilian open innovation platform. Everybody can participate, express his idea, create and share knowledge and contents and get paid for this.

How it works - Companies ask users to generate some contents: photos, images, texts, music etc. Users that want to participate have to fill an upload format and submit their creations. Users are encouraged to interact also with other users within the same challenges, giving feedbacks about the ideas and voting.

Once an idea is posted, other users can express their opinion thanks to the "R\$1" button, a sort of intangible support for ides. If an idea receive one like, the creator earns 1 dollar; also voting and commenting is possible to earn.

Challenges - Challenges can be posted both from companies or from It'sNoon staff. It'sNoon propose a new relationship between companies and users, more than just consumers or fans. Challenges are called "*chamadas criativas*", creative calls. Calls are the way people is asked to produce contents and knowledge and be rewarded for it.

Rewards - Rewards are generally expressed through the “1 real button”. the more likes an idea gets, more money the creator earns. Some challenges have a fixed amount of money, and multiple solutions are rewarded.

Brief - Companies create the brief. The brief has no specific guidelines, it's created according to the expected result of each challenge, but a list of requirements is generally provided. Also images, videos or links where it's possible to find further informations are posted.

Tools - some challenges might have some attachments to support the collaborative creation: upload formats or guidelines.

Visual Language - The homepage offers an immediate content selection: for designers, for challenge promoters, for simple contributors. The platform is well organized and has a simple and funny language.

Motivation - people are motivated to participate because the more they answer to open calls, vote and comment the more they earn. The platform encourages the collaborative creation of ideas.

2.9.8 Jovoto

Jovoto is a German, Berlin based platform. Since 2007 its aim is to create a huge network of creative people and connect them with companies and clients.

Jovoto sees crowdsourcing as the future of work, and they believe their platform is the perfect tool to connect brands and designers and collaborate in the creation of exciting projects.

Jovoto targets large brands and enables them to brainstorm, scale and solve product design or innovation challenges with more than 60.000 creative professionals globally.

To solve modern complex problems Jovoto supports an interdisciplinary approach, deeper insights, broader inspiration.

To encourage creative participation, a sort of gamification scheme is used: Jovoto recognizes and rewards great community members with more access, responsibility, and credentials.

Their importance within the community can grow and they can reach different roles: Jury Member, Invited Creative, Outstanding Community Guide, Outstanding Visual Designer, Outstanding Illustrator and so on.

How it works - Jovoto runs huge brainstorms, or “crowdstorms” as they call them, where they manage content creations from hundreds of creatives.

Challenges - Jovoto offers two types of challenges: Public and Private Projects. In public ones, anyone can submit an idea and get a chance to win a cash prize. Creatives having great results in public challenges are invited to take part in private one, a professional environment of experts.

Rewards - winning solutions are rewarded with money, established from the client.

Brief - Clients shape the brief according to their necessities, and choosing if they want to use Jovoto.Public or Jovoto.Private

Tools - Jovoto offers a series of add-ons to support Clients through their open innovation process: further documentation, widgets, facebook integration and jury feature are the main ones.

Visual Language - Jovoto is really well structured and organized. Immediately from the homepage the content is divided for the two main categories of users: Creatives and Clients. The site is easy to access and also the graphic is catchy and pleasant.

Motivation: for designers and creatives, Jovoto is a tool to connect and work with big brands. It's an opportunity to improve a portfolio, to learn from collaboration and to earn money for their ideas. For companies, it's a huge opportunity to get a fresh, global perspective for innovate their portfolios.

2.9.9 MykindaCrowd

MyKindaCrowd is an UK based open innovation platforms that aims to connect young people and students with the world of work.

The platforms has three main target users: students, teachers, companies.

How it works - Everytime students participate in a challenge with a contribution, they win some points. Also suggesting the site to friends make students earn points.

Challenges - Challenges are posted by big UK companies.

Rewards - rewards for students can be both money prized or job experience opportunities: internships, stages etc.Their prices are established according to the points they have on their account. Some kind of rewards can be:

500 points = Attend a MyKindaCrowd breakfast briefing

1,000 points = Presentation skills workshops

1,000 points = Career Clinic

1,500 points = CV review

1,500 points = Telephone interview skills

2,000 points = Face-to-face interview skills

2,500 points = Meet with an employer

3,500 points = Personal statement mentoring

Brief - brief are posted by Challenge Setters. They generally provide an Abstract, background informations and rewards. Also some suggestions about the format of upload are provided.

Tools - Tools are mainly designed for Teachers: they consist in pre-formatted lessons or presentation to run one of MyKindaCrowd challenges within their school or class.

Visual Language - although the brand image is not strong, contents are well organized and divided for Students, Teachers or Companies.

Motivation - Students can get rewarded for their ideas. They can be noticed by the biggest UK companies, improve their CVs, win prizes or job opportunities. For Teachers, it's an opportunity to support their students and connect them with the work market.

For companies, MKC offers the opportunity to connect with students across the all country and all backgrounds and engage them in contests. It's an opportunity to get fresh ideas and engage young people within their brands. It's an opportunity to became part of the educational studies in their local region or area.

2.9.10 Cidade Democratica

Cidade Democratica is the portuguese for "democratic city". It's a brazilian platform for political participation and its goal is create innovative, creative solutions starting from collective intelligence.

CD is the main initiative of Seva Institute, NGOs leaded and managed by experts in youth, new sustainable models, health, culture, environmental issues and social entrepreneurship.

The project started in 2009 and right now is one of the main actors in the transition of medias and its relationship with citizens, social society and political power.

The aim of CD is became more and more and effective tool for communication and mobilization to improve the urban fabric.

How it works - Inside Cidade Democratica two main actions are possible: point out a problem or create a proposal to solve it. Once a problem or issue is posted, it passes through different phases: Inspiration, Proposals, Applause, Unification, Winners

Inspiration phase is a collaborative collection of references and inspiring ideas. Anyone can share images, links or videos to inspire the contest participants.

The contest starts with the Proposals, where users share their own ideas, concepts or solutions to solve the challenge. users are encouraged to post, share, comments, give feedbacks.

During the applause phase, users can select the ideas they think have the strongest impact and support them. If similar ideas or concepts are submitted, they can pass through an "unification" phase, where they are unified. Also their votes and support gain importance.

Finally, winner ideas are selected.

Challenges - Challenges are open calls to solve urgent socio-environmental problems related to the urban fabric. they are structured as a question: "how would you..."

As the target are citizens and institution of a determined city or area, no description of the context or situation are provided.

Rewards - the platform offers no reward: it's just a tool to connect the different social actors.

Visual Language: the platform has no strong visual impact, but the contents are well displayed and it's easy to contribute. As the topic is politics-related, the language used is pretty formal.

Duration: contests have no fixed duration, the time of each phase is determined individually.

Motivation: for citizens the biggest motivation is improve their own urban fabric, creating more services, events etc. Making Institutions hear their voice is important and push people in participate.

2.9.11 Innonatives

Innonatives aims to connect different actors who have identified some kind of sustainability-related problem with a crowd of potential solvers. (Innonatives , web, 2015). The platform also provide support to crowdfund, implement or commercialize sustainable solutions developed within the platform. Innonatives counts on a large international network of universities, sustainability experts and organizations to sustain its online community of solvers. The homepage is organized to give the main importance to three main topics:

- How the platform works
- The possibility to post and start its own challenge
- Register to Innonatives and its community

Innonatives offers five main functions: Challenges, Solutions, Crowdfunding, Implementation and Shop.

Challenges: browse the challenges open and contribute

Solutions: check the solutions developed within the previous challenges. At the moment, since the platform has been just released, this section results empty.

Crowdfunding: crowdfunding sections aim to bring the developed solutions in the real world.

As the solution section, it has not been activated yet.

Implementation

Shop: online shop where people can shop the items developed within the platform.

Observing the homepage, appears that its aim is communicate Innonative's values and explain its crowd design process.

It shows the two different ways users can contribute: for promoters, it offers the possibility to post their own challenge; for users, it invite to register to the platform and engage in one of the challenges.

Everyone can get involved in Innonatives. Different user profiles are identified:

- Seeker: seekers identify sustainability related problems.
- Solver: solvers are the contributors to open innovation challenges, proposing solutions to the problems crowdsourced on Innonatives. Solvers can submit ideas both individually or as a group.

- Expert: expert users have strong skills on sustainability and open innovation; they support the product development or the implementation of solutions.
- Voter: voters express their opinion on most relevant challenges and express their preference on submitted ideas, concepts and solutions.
- Funder: funders can donate or invest in solutions presented within the platform.
- Trader: users who sells, or buy, sustainability solutions within the marketplace.

How it Works: Challenge owner (can be companies, universities, companies etc) create a crowdsourcing brief and post it within the platform. Solvers can join challenges and contribute with ideas that satisfy the challenge requirements. The time schedule and deadlines are established from the crowdsourcer. Once the submission time ends, the online community, the expert panel and the crowdsourcers votes the best solution(s). The winning solutions earns the rewards previously established by the challenge owners and explicitated within the brief. Solutions developed within Innonatives could then be crowdfunded, implemented or sold in the marketplace.

Challenges: Challenges posted on Innonatives can be open or closed; challenges can have up to three phases: ideas, concepts and solutions. The duration and submission requirements are established from single crowdsourcers.

Challenges are “Open” when there is no copyright restrictions; open challenges uses by default the Creative Commons License “Attribution-NonCommercial-ShareAlike 3.0 Unported (CC BY-NC-SA 3.0)”, which means you are free to share (to copy, distribute and transmit the work) and to remix – to adapt the work under the following conditions: You must attribute the work in the manner specified by the author or licensor, i.e. mention who owns the copyrights (but not in any way that suggests that they endorse you or your use of the work). You may not use this work for commercial purposes. If you alter, transform, or build upon this work, you may distribute the resulting work only under the same or similar license to this one. The basic idea behind open challenges is that everybody around the world shall be able to use the solutions for free and develop them further. If the challenge is close, the crowdsourcer want to keep the copyright of the developed solution, creating a protected innovation space. (Innonatives , FAQ, 2015).

Rewards: rewards are established by the crowdsourcer, and can generally be a cash reward, an honorary, a license contract etc.

Visual Language - The visual identity is not really strong. From the logo til single general graphic elements (use of colors, fonts, icons etc), there is no heterogeneity and is not easy-recognizable.

The communication strategy has to be re-thought, since the lack of visual appeal may affect the crowd will to participate in the challenge contests.

As Innonatives is a brand new platforms it still has to build its audience, so visual appeal is important to attract possible contributors.

As Innonatives is a platform about crowd design, its lack of presence in other social media it's a bit confusing; beyond providing informations about the initiatives and promote the challenges, Facebook update and audience traffic are also a great indicator of the success of a platform.

A facebook account full of comments and sharings attract users in visiting the platforms and participate in the challenges. Social Network are also a great tool to communicate the challenges going on and invite people to participate and spread the voice.

A well organized and sustained facebook page would moreover help Innonatives staff in share and support the challenges in the platforms: all the work could not be done simply by challenge owners: the crowd is interested in discover stories, following the process, and not simply see the results.

Duration: The duration of the entire challenge (and of the idea, concept and solution phase) is established by the crowdsourcer, according to the complexity of the problem that must be solved.

Motivation: strengthen sustainability skills and knowledge; join a worldwide network for sustainable development; collaborate for developing new sustainable solutions, earn rewards for the winning solutions.

Innonatives connects all the crowd design stakeholders, coordinating offline and online actions; the platform is still in beta testing, so various sections are still not activated, such as the crowdfunding area or the shop.

The aim is inform about the sustainability maker project and keep the different actors updated about the development of the process; it's also planned to have a blog session (at the moment, empty)

Main Actors

- Administrator(s) - Innonatives administrators at the moment manage mostly back office activities; they evaluate the challenges proposed and decide if they fits or not the platforms requirements before posting.
- Challenge Promoters - promoters can be both companies or organizations interesting in innovate through a crowd design process. Promoters have the responsibility of define the design brief and the requirements of the solutions. They are the bridge with real world and local issues, and so they have to update and sustain the contributors of their own challenges with upgrades, comments, suggestions etc.
They also have the important task of defining the rewards of the challenge winners.
- Users - Innovative users can be designers, sustainability interested people, students and so on.
They are sensitive so social and sustainable issues and offers their contributions to create solutions to the problems reported.

Secondary Actors

- Innonatives Expert Panel: expert panel is one of Innonatives points of distinction; it's a group of skilled people with strong knowledge in the topic of sustainability (declinated in its three aspects), helping the promoters deciding which one among the proposed solutions best fits the sustainability paradigm.

- Local Companies - The aim of Innonatives is not find solutions that stay on the papers, but they wants to implement and produce the solutions proposed; local companies contributions is then important to support this process and bring project to life. Companies can both offer money or skills and technologies supporting the implementation.

Considerations.

The platform has the noble purpose to solve problems using the crowd in all the phases of a project and sustainable principles as ethical background. Innonatives follows all the steps of a crowd design process, from idea to implementations and even sell.

Being still a beta version, it suffers of some little lacks and weaknesses in the user experience. On of Innonatives positive differences from other platforms is its focus on sustainability. The focus on sustainability is widely declared in the values, in the description, in FAQ section but is hard to find concretely in the platform.

When a user posts an idea, he is asked to leave a comment about how his solution improves the presented problem under a sustainable point of view. But no tool is provided to support people in auto-evaluation.

Furthermore, the sustainability topic is not enough “pushed” in the site. The blog is still closed, and no “inspirations” sections is available.

It would be a great point try to raise awareness of people around sustainability with articles, lectures, promising concepts, relationship between sustainability and design etc.

References and inspiring ideas could be helpful also for the project phase and to build an interested audience.

The opload format is not customizable in the different phases of the challenge. in the idea section, when people is asked to upload simply a sketch and a description, the upload has space for videos, larger texts etc and it generated confusion.

Users and challenge owners can express their opinion about either challenges and ideas submitted using a simple crowdvoting method: the star-voting system. But is not really clear what users are voting, criterias are not expressed clearly. It’s also unclear to the user if their votes will influence the final decision.

The voting system could be improved and became part of the evaluation.

Evaluation criteria should be more explicit and both users, challenge owners and expert panel should post publicly.

Chapter 3: RESEARCH METHOD

3.1 Problem Definition

While Open Innovation (Chesbrough, 2006; and crowdsourcing (Howe, 2006; Brabham, 2008; Schenk and Guittard; 2011) strategies are topics that have been largely debated over the past decade in reference literature, and the role of Design have been increasingly investigated

(Acha, 2008; Pan and Blevis, 2011), the connection of crowd-led initiatives and sustainability is very little explored.

Very few theses and dissertations directly approach the topic and find studies or references on crowdsourcing empowering the sustainable development of low income communities in emerging countries is difficult.

In the international panorama the books of Santos, Kramer and Vezzoli (2009); Krämer (2015) and the papers of Gupta, Thies and Cutrell (2012) enhanced the debate on the topic.

Due to the scarcity of references in literature and, this thesis would be characterized by an exploratory approach, aimed to supply arguments to the debate on the relationship between open innovation strategies (and crowdsourcing in particular) and sustainable development in low income countries.

Exploratory research is undertaken with the aim of provide wider understanding on the investigated topic (Gil, 2002). It also helps determine the best strategies, data collection method and selection of subjects; exploratory researches often rely on secondary research such as reviewing available literature and/or data; qualitative approaches (informal discussions with consumers, employees, management or competitors), and more formal approaches (in-depth interviews, focus groups, projective methods, case studies or pilot studies).

The research would also be characterized by: a practical approach, since its primary objective that its results would be used in future applications; the use of a qualitative research method; crowd-based, participative approach; an international and multidisciplinary research team.

3.2 Selection of the research method

Multiple methods satisfy the requirements of an exploratory research: picking the right one according to the objective of the work is crucial to guarantee the good outcome of the research. Yin (2001) affirms that exists three main criteria to select a research method: the type of problem investigated, the level of control over comportamental events and the level of focus on comportamental events over historical events.

What's the type of problem?

Is crowdsourcing impacting the sustainable development of low income communities in Brazil? How?

Do the study demands control over comportamental events?

The topic investigated is complex, and since the project is a pilot it involves a multiple number of variables; consequently, the level of control of the research team over the development of the events is very low. A reasonably long span would be necessary to complete the research, according to the high number of variables involved.

Do the study focus on comportamental or historical events?

The research would rely on contemporary data.

Due to the characteristics of this study, the research method should be: flexible; give opportunity of being developed gradually and leave space to test and refinements.

Case studies requires the existence of an already tested process, that is applied to direct the research and is not applicable to the following project due to the rich number of variables present.

Coughlan and Coughlan (2002) suggest the adoption of an Action Research methods when the research is limited to actions of a determined group, community or organization in a limited span of time; Robson (2002) emphasize the adoption of the method when constant improvement and active participation are fundamental.

Due to these elements, the selected research method is Action Research, defined as *“a form of cyclic learning that capitalizes on day-to-day work experiences as opportunities to improve practice. Action researchers gain deeper understanding of the social, political, and physical forces that shape actions in complex social settings. It is a way of learning more from practice by questioning, listening, watching, acting, analyzing, and reflecting.”* (Riel, 2013).

A specific type of Action Research, Participative Action Research- PAR (Denscombe, 2010) is a research approach that emphasizes participation and action within a community; it also promotes collective inquiry and experimentation; PAR is an interactive inquiry process that balances problem solving actions implemented in a collaborative context with data-driven collaborative analysis or research to understand underlying causes enabling future predictions about personal and organizational change (Reason & Bradbury, 2002).

3.3 Research Overall Strategy.

The research strategy was planned in two steps:

- Comparative Analysis of the traditional and the crowd-led PDP
- Definition of a Research Protocol for each step of Action Research.
- Validation of the sustainability of the process.

3.3.1 Comparative Analysis of the traditional and the crowd-led PDP

The first step of the research was compare two product development process models (PDP): the traditional one and the crowd-led.

In a traditional PDP, *“an organization transforms market opportunities and technical possibilities in informations for the manufacture of a commercial product”*(Rozenfeld, 2006).

Ulrich and Eppinger (2010), defines the traditional PDP as *“a set of steps or activities through which, from a market need, a company conceives, design and markets a product that seeks to meet the need identified.”*

Rozenfeld model is adopted as references, as it seek to integrate engineering and marketing elements in the design process, and is therefore known as PDP Unified Model.

The structure of this unified Product Development Process (Rozenfeld, 2006.) is organized in three macro-phases: pre-development, development, post development, each one split into different tasks and spets.

Traditional Product Development Process Model.

Generally, PDP is corporate-based, and in the Pre-development phase the strategy, goals and objective of the brands are pointed out. The products are generally compatible with the firm portfolio. During this phase are also defined deadlines, resources and people involved, evaluation phases etc.

The central phase of the process is the development, and involves the detailing of the project and the product production. The development is, in its turn, divided in Informational Project, conceptual Project, Detailed Project, Preparation of the Product Production and Launch of the Product.

The last part of a traditional PDP is the post-development, that starts with the post-selling activities and goes till the end of the product life cycle. Monitoring and Product Improvement, and finally the Product Withdrawal are the subcategories that concludes this process.

The traditional PDP model were compared with a crowd-based model; for the compared analysis, it was adopted the one proposed and used by the Sustainability Maker Project and available at Innonatives.com

Since the very first steps, this model is divergent from the traditional one presented; the starting point for the development of a new product is not a market research or a portfolio analysis. The first step of the crowd-based model is the identification of a problem in community and its implication with sustainability; the goal is identify a problem that really affects people, and to verify that the most urgent and relevant one is selected, a first crowd-voting happens. The next step the selected the sustainability problem is translated into an online open challenge, enabling the crowdsourcing phase. Thanks to an online platform, (SuM Brazil is going to use Innovations.com), the idea generation, the concept and solutions proposal is open worldwide.

As pointed out in section 1.8, the definition of the open challenge is crucial to the good outcome of the challenge: all the relevant informations collected during the problem definition must be provided to the worldwide group of possible solvers. The informations can be provided using different channels: reports, videos, storyboards, photographies and so on.

The crowdsourcing phase should consider a deadline.

After the deadline, the problem pointed out would receive lots of possible solutions, in forms of simple ideas, concepts or proper project.

The second crowdvoting helps defining the best solution that solves the problem. As SuM Brazil is studying the implication for sustainability of a Crowd-led PDP model, this step will involve also

the vote of the “expert panel”, a group of experts in the field of sustainability and design processes.

Once the best solution is selected, the implementation process starts. The visualization of the production could happen thanks to crowdfunding, or with the participation of a sponsor company.

The final step of the PDP Model is the sell phase, that can happen thanks to a virtual marketplace or an e-commerce.

3.4 Planning the Action Research

A crowd-led PDP model has never been adopted in any project developed at NDS, where new products and services are generally developed using the traditional PDP model; the researchers were therefore testing the model (through a pilot project) aiming to create a set guidelines and research path to apply in future projects.

The action research is planned according to Turrone e Mello(2011) and Thiollent (1947) principles, being such principles:

- Definition of the research problem
- Selection of context of intervention
- Definition of the research team

Definition of the research problem

The research problem that will be addressed is “the sustainable impact of crowd-led initiatives in low income communities in emerging context”.

Context of Intervention.

For this study, criteria to select the field of intervention were:

- a project that could be developed and followed from the beginning.
- focus on the development of sustainable solutions addressed to low income classes.
- active, collaborative participation of a low income community
- collaboration of a company

Definition of the research team

Thiollent (1997) affirms that to conceive, orient and administrate an action research process a permanent group of researchers must be created. This group could be, when necessary, be supported by some secondary participants.

Thiollent (1997) also defines the most relevant tasks of the research team: selection and prioritization of research problems; coordination of the activities; elaboration of the issue; elaboration of the results.

Selection criteria to be part of the permanent research group were established:

- active and cooperative participation in the project.
- specialization in service design, strategic design or PhD in design
- interest in develop projects related to sustainability, open innovation and crowd design.

3.5 Cycles of Action Research

The action research was conducted following a cyclic process organized in 5 steps, being such steps: data collection, data analysis and planning of future actions, implementation of actions, evaluation of the results and creation of the report, as shown in the model provided in the following table.

The overall process has been applied to the 6 macro-phases of the crowd-led PDP model:

1. Sustainable Problem Scouting,
2. Crowdvoting,
3. Open Challenge,
4. Crowdsourcing,
5. Crowdvoting best solution
6. Implementation.

Each section of the five-step model of action research adopted is further analyzed in the following paragraphs.

3.5.1 Data Collection.

According to Turrioni and Mello (2011), large used techniques for data collection during action research are: research diary, participative meeting, seminars, workshops, document analysis, interviews and questionnaires.

For this study, some hybrid techniques used in User Centered Design in developing regions (HCD) and co-design are also used.

For the data collection of this research, tools used include: meetings with partner community and company, socio-demographic questionnaires, video interview, direct observation in context,

informal an in-context interview, photo collection, direct observation, storytelling (Parrish, 2006), paparazzi (Wuggening, 1990; Kolb, 2008;).

3.5.2 Data Analysis and Action Planning

This step of the research is directly connected to data collection; the collected informations should be analysed in a collaborative way by the research team members (Coughlan and Coughlan, 2012). After the analysis, future actions should be planned.

For the project, after each cycle of data collection, meeting of all researchers were scheduled, to discuss the tools used and the collection strategy;

Among the tools used to analyse data: brainstormings, mental maps, transcriptions, codification, crossed analysis, storyboards.

3.5.3 Implementation of the Actions

The implementation phase is crucial to realize improvements and changes, discard not effective techniques. Implementation is made in a collaborative way among the research team.

3.5.4 Analysis of the Result of the Action Research Cycle.

The evaluation of the results involves the critical analysis of the actions of the research, intentional or non-intentionals; the following planning and action cycle would benefit of the cycle previously ended. (Coughlan & Coughlan; 2002).

In the analysis of results phase the researchers discuss about the data collections, the improvements, the planned actions; presencial meeting with all researchers involved were the main opportunity of self-evaluations. Some results were also shared with other stakeholders, according to their level of involvement in each phase of the process to gather further opinions and deeply evaluate the research.

For the qualitative, on field research, Johnson (2008) suggests that “as you collect your data, analyze them by looking for themes, categories, or patterns that emerge. This analysis will influence further data collection [and analysis] by helping you to know what to look for”.

Also qualitative research evaluation methods, such as partial transcription, coding and visual mapping were used.

3.6.5 Elaboration of Report of the cycle.

According to Rozenfeld (2006), during the whole process of an action research, continuous improvement are made; all the actions of the researchers should be therefore formally registered, since they were inspirations of the su improvements.

A formal report would be created at the end of each step of the research; all the documents created will form the final report of the pilot.

The report would be registered as:

-Problem Scouting Report

-Crowdvoting Report

- Challenge Report
- Crowdsourcing Report
- Crowdvoting best solution Report
- Implementation Report

Reports had primary importance for both internal and external validation of the research; they have been redacted both in english and portuguese and being shared among researchers, with NDS coordinator and with the Sustainability Maker european coordinator, Prof. Ursula Tischner. The validation of Prof Tischner had an important role to validate and legitimate the actions of the research team and also to verify if the actions were aligned with the Sustainability Maker Project.

Chapter 4: ANALYSIS OF THE RESULTS: The Sustainability Maker Brazil Case.

4.1 Sustainability Maker Brazil Overview.

The Federal University of Paraná (UFPR) is the SuM partner in South America and specifically in Brazil; sustainable-oriented design activities at UFPR are coordinated at the Design & Sustainability Research Center (Núcleo de Design e Sustentabilidade NDS), coordinated by professor Aguinaldo dos Santos, also member of the international advisory board of SuM; the work of NDS has always been focused on the relationship between design and brazilian low income communities.

In march 2014 the design team at NDS started planning the application of crowdsourcing techniques within one of their projects. The aim of NDS was evaluate the impact on sustainability (in its three dimensions) of a product development process (PDP) performed in a Crowd-Design platform, evaluating advantages and disadvantages.

The contribution of the research group consists on developing a local pilot project, thus enabling possible implications of crowdsourcing within the local economy and society. The project would also test and identify possible improvements of the Innonatives Platform, aiming to make it effective in an emergent context such as Brazil.

The aim of SuM is push local low income communities in report urgent sustainability problems they are facing in order to solve them through an open innovation process; a crucial question was how to enable such to report their problems.

The results and insights of the Sustainability Maker Brazil pilot were presented at the last two Sustainability Maker Project Conventions (Amsterdam 2014 and Milan 2015), through the keynote presentation “Lessons Learnt on Using Crowd-Design in an Emergent Context”, held by NDS coordinator Aguinaldo dos Santos.

4.1.1 What is a pilot project

Some of the main reasons why piloting is:

- leave the design team better equipped to plan and execute a larger scale project.
- reduce the risk of repeat mistakes by detecting and eliminate them at pilot stage.

- can be used to test the impact of a given technology in a community
- it's generally easier to fund a pilot than a larger project; success at the pilot scale can also support provide more funding.
- the design team can gain experience before engage in a more complex project
- if more than one solution is developed or the study conduce to multiple results, pilots can help compare different scenarios and choose the one that best fits the field.

A pilot is a small case preliminary study, project or experiment conducted with the aim of evaluate the viability of a larger, full-scale project. In the design field, pilots can help identify issues before the main project is done.

“Piloting consists in the setting-up of the desired technical environment (hardware, software, content, training, furniture, support material, etc) in a “controlled” space where its performance can be measured. Piloting allows a select group of intended users to interact with the technical environment and find potential problems. What are of significance are the results and the problems that are found in a real world situation, often referred-to as “the field”⁵

It's not possible to predict in advance the result of a pilot; to evaluate the expected outcome, a series of indicators or variables should be pre-determined. they would help during the test phase.

The aim of a pilot is afterwards detect potential problems, improving the quality of future work and minimizing the risks; a pilot is successful if planned and applied correctly, producing results that are reliable, whether positive or negative. while positive results proof that the methodology used is correct and should be applied also in the replication of the project, negative results shows that some parts of this methodology don't work. The challenge is then understand why they didn't work and eliminate or improve them to avoid larger scale mistakes.

A pilot requires a significative planning before being applied in order to provide meaningful insights and fulfil the expectations.

It's important to define objectives, tools, team members roles and responsibilities, scope etc Monitoring and evaluation of the project are also very important.

4.2 Sustainability Maker Brazil: the Stakeholders.

As previously presented in chapter 2, defining crowdsourcing, a crowd based process have some necessary elements: a crowd, a crowdsourcer and a process (performed through an online platform).

⁵http://www.researchictafrica.net/policy/universal_access_and_service/International-GESCI_Pilot_Projects_Education.pdf

4.2.1 SuM Brazil Team Members

NDS/UFPR permanent group of researchers was coordinated by Professor Aguinaldo dos Santos (NDS Coordinator and Member of the SuM Advisory Board).

The research team was composed by:

- Isadora B. Dickie (PhD candidate at Design Postgraduate Program, Federal University of Parana - Brazil)
- Greta Bottanelli (Master student at Politecnico di Milano - Italy)
- Michele Cuccu (Master student at Politecnico di Milano - Italy)
- Nicolò Micciché (Master student at TU Delft University - The Netherlands)

4.2.2 The Sustainability Maker Project

Sustainability Maker (SuM) is an econcept/ecosense initiative, started in october 2013; it's an european consortium of organizations and universities that aims to create an online community focused on open innovation and sustainability.

The project has two main focused: local communities and the solutions or urgent sustainability problems; one of the aims of the website is connect all the actors that might have a relevant role for the resolution of those problems.

in their website, they ask people within local communities to post short videos with friends, family, colleagues, neighbours etc describing which problems really needs to be solved.

SuM is carried out by six core partners, together with a network of university and non-profits organizations. Core partners are:

Econcept

Agency of Sustainable Design (management)

Ecosense media & communications
Webclusive
Politecnico di Milano
Forum soziale Technikgestaltung

The SuM core team features:

Ursula Tischner - econcept
Agim Meta - ecosense
Carlo Vezzoli - Politecnico di Milano
Elisa Bacchetti - Politecnico di Milano
Frits Klaver - Webclusive
Ronald Kleverlaan - Webclusive

The project also benefits of an international advisory board

Han Brezet (partly), TU Delft
Anil K. Gupta, Indian Institute of Management
Chris Ryan (partly), Uni Melbourne
Aguinaldo dos Santos, Universidade Federal do Parana
Dominik Walcher (per Skype), Uni Salzburg
Marc Tobias, BGW (partly)
Peter Stebbing, (emer.) Prof. HfG Schwäbisch-Gmünd/ Cumulus Network

Sum is led by econcept, a german organization, and the development of Innonatives is funded by the european community through a program called LIFE (LIFE11 ENV/DE/000342)

The project organizes once a year a Sustainability Maker Convention, the last two handled in Amsterdam, in April 2014 and in Milan in May 2015.

To develop new sustainable solutions, in July 2014 the platform Innonatives was launched.

4.2.3 The Open Innovation Platform: Innonatives

Innonatives is the Sum enabling platform, developed to launch sustainability related open calls and challenges; it combines crowdsourcing and crowdvoting with crowdfunding to realize and implement the developed solutions; the platforms is also going to be used as a blog and meetplace for SuM community, supporting and encouraging votes, comments, ideas sharing. People or organisations proposing great solutions could crowdfund their ideas or find companies that might have the possibility of develop and implement the solutions.

The platforms has just be launched and is still in Beta Testing

Anyone could participate, both users or legal entities; to join it's just needed to have an internet connection and a device.

The firsts steps are registration in the platform, both using e-mail or connecting facebook account; to join the crowdfunding section, is also needed a Paypal account or own a credit card;

As Solvers, users could team up with other community member to solve a problem, propose problems, run a challenge, participate, share, vote and comment ideas submitted, get rewards.

Process - Innonatives proposes its own crowd design process, presenting substantial differences with both traditional design and traditional crowdsourcing process, particularly during process firsts steps. SuM Brazil adopted Innonatives sustainability oriented and crowd-led process for its pilot project.

While in traditional processes the design action starts after the brief, Innonatives refers as starting point the analysis and understanding of problems of a given community or organisation. its also important to underline that any proposed problem should have a tangible implication with sustainability.

The determination of the problem is actually crucial and the perception of the community or organisation, and that's why the different problems should be voted by the group of people who report them; after this first crowdvoting actions the challenge is set and posted in the platform, starting the actual crowdsorce phase.

4.2.4 Low income community: Águas Claras.

Some selection criterias to identify a possible partner community for participating in the project were established:

- being a spontaneous community, therefore with some form of intern organization, such as a Residents Association, fact that would facilitate communications.
- being a safe community, where inhabitants don't generally face problems related to violence or crime.
- being familiar and trust the authority of UFPR.

Águas Claras was selected as sample target group of the SuM Brazil project; it's a low income community located about 20 km far from Curitiba city center, in the municipality of Piraquara. All the information the SuM Brazil team could find was given by the community leader, since the community is relatively recent-founded and is not officially recognized by the local administration, so finding official data is quite difficult.

Mrs Rodrigues, local community leader, explains that the community is self organized and her family provides some services included a sort of database of the inhabitants: almost five hundred people lives inside the community area, homogeneously distributed.

Mrs Rodrigues already participated in a design process with NDS, so she knows and trust the Institution represented by the SuM Brazil team.

Not yet officially recognized by Piraquara municipality, the community suffers some infrastructure problems: the streets are not paved and has no name, so people can not receive their mail directly at home. The majority of the houses has electricity and a plumbing system, but the community still has no connection with public transportation: the closest bus stop is a 30 min walk far, forcing families to own a car for working and other activities.

The community has a primary school, a bar and some basic services such as grocery shops and it's raising funds to build a new headquarter for their Residents Association.

4.2.5 The Partner Company: Ecodesign.

EcoDesign is a design webstore focused on sustainable furniture and interior design; their webstore also promotes contents related to sustainability, environmental education, tips to decor the house following sustainable principles.

Ecodesign Mission is create furniture and decoration elements for people that is looking both for style and accessible values, conscious that we must find more and more sustainable solutions.

Ecodesign furnitures respects the sustainability principles in the three dimensions;

Social sustainability: all their furniture are realized by artisans, with a high valorization of the labour.

Environmental Sustainability: all EcoDesign furniture main material is recycled pallet. The wood of pallets is first collected, then recycled and used to create new pieces of furniture. What has previously been discarded is now re valorized, with a functional and aesthetically second life.

All products are toxic free: when possible, the natural color of wood is valorized, creating pattern with different tones of wood; for painted products, water-based paints and natural oils are used for the surface finishing.

Economical Sustainability: all products are designed for being as simple as possible. They reduce energy in the production phase and during use; all of them are two years guaranteed.

Ecodesign also produces a lie of furniture called "brazilian biomasses", pieces that wants to raise awareness about the preservation of six brazilian ecosystems: Amazônia, Cerrado, Caatinga, Mata Atlântica, Pampa and Pantanal.

Ecodesign driving values are: products upcycling, environmental consciousness, sustainability differential

Dinho Gonçalves, co-founder and art-director, was invited to collaborate in the SuM Brazil project after a visit he made at NDS. He wanted to contact the design staff of the research center to develop a crowdsourcing platform for eco-design.

Eco-design has no internal product design staff, Dinho is an at director and his partner is a graphic designer. They work with freelance product designers, but they want to improve their product design development.

"I see a lot of potential in this project, therefore I will participate. Well, there is uncertainty, but i'm looking forward to see the results."

The co-founder and art director of Ecodesign, Dinho Gonçalves

Ecodesign engaged in the challenge because Innonatives promotes the same values of the company. One of the challenge of this pilot project has been match the problems of the community with the portfolio of products and the market demands of the partner company.

4.3 The research project: cycles of action research.

4.3.1 a Problem scouting phase protocol

The problem scouting macro phase was organized in different sub-steps:

- meeting with community leader to understand the interest in participate on the project
tools used: slideshow
objective: present the project, expose project objectives, underline the importance of the community participation.
- second meeting scheduled with the community
- tools: terms of conditions (see appendix); visual presentation of the project - contents were organized following three main steps: project overview, expected outcomes and timetable of the main activities.

Observation: as crowd design and crowdsourcing are quite new concepts and a tricky topic even for designers, creating the presentation trying to avoid buzzwords and over technical words to reduce misunderstandings as much as possible. As inhabitants within the community are completely unrelated with the design worlds, all the words and definitions must be accurately formulated.

- a socio-demographic questionnaire to track a profile of Águas Claras community (see appendix) - all the adults attending the meeting were invited to fill the survey;

Observation: To classify low income households, IBGE 2010 demographic census structure and indicators were adopted.⁶

- Video interview -not mandatory activity; semi-structured interview, questioning people perception about relevant problems within their households. To produce heterogeneous materials, the research team developed a short interview guide (see appendix 4), with a list of topics to cover during the interview.

Observation: People was asked to sit next to a researcher in front of a camera and a microphone, answering direct questions such as “What would be your priority if you could modify your house?”.

- Kids Activity - the team assumed that most of the parents would bring their kids at the meeting, since it was a saturday and they were not at school. This activity was mainly designed as a distraction, to keep kids in a different place to focus their parents full attention on the project.

Observation: the activity was a drawing session based on the toolkit distributed by the organisation Design for Change Brasil in its website. (toolkit available at the link <http://www.dfcbrazil.com.br/>)

- Suggestion Box - a suggestion box was left to allow people to leave comments, ask questions or clarify doubts about the project.

Observations: as not reached by post services, and all the inhabitants receive their mail at the community leader’s house, where the box was left

⁶ Ministério do Planejamento, Orçamento e Gestão - Instituto Brasileiro de Geografia e Estatística - IBGE http://www.ibge.gov.br/english/estatistica/populacao/censo2010/caracteristicas_da_populacao/resultados_do_universo.pdf

- On field, qualitative research: as pointed after the end of the meeting with the community, video interview were not enough to understand what urgent problem the community was facing. A more in-depth and insightful approach was necessary to involve the community and allow people to express their problems. Some contacts were collected during the presentation, and home visits were scheduled individually in the house of some volunteers community members. This approach is also suitable when the topic is broad and complex and involved multiple variables (Dul and Hak, 2008).

The team decided to undertake an in-depth, qualitative approach, and opted for visit a sample composed by 5-7 responsive units; all the families/house dwelling fitting the “low income” criteria (earning less than 3 minimum wages/months).

-Tools used: tools used during his step of the research are based on the IDEO Human Centered Design Toolkit. HDC toolkit is organized in three macro phases:

Hear: Preparation and conduction of the field research, collection of stories and inspirations from the community;

Create: in a workshop or jam format, translation field research into insights, themes, frameworks, prototypes, opportunities, solutions that are technically and organizationally feasible to meet people’s needs.

Deliver: realize solutions with financial viability and sustainability in mind. help launch sustainable solutions into the world.

The field research was part of the HEAR section; the goal of this home visits was understanding needs, hopes, aspirations, issues related to the domestic dwelling in social interest communities.

“Qualitative research methods enable the design team to develop deep empathy for people they are designing for, to question assumptions, and to inspire new solutions. At the early stages of the process, research is generative — used to inspire imagination and inform intuition about new opportunities and ideas. In later phases, these methods can be evaluative—used to learn quickly about people’s response to ideas and proposed solutions.” IDEO HCD Toolkit

The Home Visit Protocol

Each visit was planned to be carried out in one hour, although the time schedule was flexible. Every house was visited by no more than two team members; each designer had a defined role so his purpose was clearly visible to the participants: the interview, the photographer, the notes taker etc.(always after asking permission and making people signing a format to use the material produced).

The advantage of schedule personal home visits is engaging people in their own contexts in order to understand the issues at a deep level.

A set of techniques of qualitative data collection (Patton, 2002; Hennick,Hutter and Bailey,) has been used

Direct Observation.

Direct Observation is one of the most common methods for qualitative data collection;

According to Howell (1972), direct observation is structured in different phases:

-establishing rapport; get to know the participants of the research. Howell states that it is important to become friends, or at least be accepted in the community, in order to obtain quality data.

-in the field;

-recording observation and data; in this step, the researcher takes notes about what he sees and observe; recording or filming and taking photos is a good visual reference.

After a short conversation with family members to “break the ice”, each home visit started with a guided tour of the house: while family members showed their house and the different rooms, the designers had the opportunity to observe and take notes, supported by a tool developed by the team to check the house structure and take notes about fundamental informations.

The tool was developed using some quality criteria used by IBGE to define the quality of households in Brazil.

The visit was held in a really spontaneous way, trying to get meaningful information not only about the house but also about relevant topics, such as: where the construction materials come from? who build the house? who made the electrical system? do the community have some common problem?

Photos were taken as visual reference, and they were collected through the whole visits.

Photographs also allowed to better define households typologies, as well as the materials and finishing used or the object owned by the families.

Conversational, In-context Interview.

Contextual interviews are a field research technique adopted from psychology, anthropology sociology and interpretative hermeneutics (Darroch & Silvers, 1982; Glaser & Strauss 1967; Packer 1985). In-context inquiry aim to foster participatory design, as it's a technique to work with users and help them express their thoughts, enabling a deep and rich view into the behaviors, reasoning, and lives of people. In-context interviews give the participant greater ease and allow you to see the objects, spaces, and people that they talk about during the interview.

The topics of such interview were basically focused in understanding the family dynamics with the house spaces and artifacts.

Storytelling

Storytelling is a narrative technique, currently adopted in other field of knowledge such as marketing, pedagogy, design; storytelling is part of the HCD and User Centered Design methodologies of the Institute of Design at Stanford (2013), Suri (2003), IDEO (2014) among the most importants.

Parrish (2006) affirms that storytelling is “a process that combines analysis and synthesis. The stories are always based on extracted facts of life, as personal experiences or observations, and also may go further.”

To support the storytelling activity the researchers created a set of cards: family members were asked to choose among the set of cards and also asked why they choose that specific card and to tell with their own words to illustrate the story behind this card.

The cards were organized in the following topics:

- a. Rooms and Spaces of the House.
- b. Activities in the house
- c. Tools in the house
- d. Feelings
- e. Features of the house.

To analyse the complete set of cards, see appendix.

Paparazzi or Photoethnography.

In order to understand deeply the perspective and point of view on daily life and the domestic dwelling of the residents, a photo-ethnography technique (Wuggening; 1990). The purpose of this tool is to "emphasize the active role in the research process of the respondents" (KOLB, 2008). In every house visited, the team left a disposable camera and asked to families members to take pictures about thing they like or don't like within their houses.

Self-Documentation is a powerful method for observing processes over a long period of time, or for understanding the nuances of community life when the researcher can't be there. Records of experiences are very spontaneous and allow the team to see how participants see their life, community, and relationships. (IDEO; 2014).

Cameras were collected back after one or two weeks.

Analysis of Results and Crossed Analysis

The most common analysis and interpretation technique used was the researcher impression; All actions were discussed during meetings; the creation of a "cross analysis path" was necessary to organize the quantity of raw material collected during field research.

The two main interpretation techniques used to analyse audio files (storytelling and in-context interview) were partial transcripts and coding.

Coding is an interpretive technique that both organizes the data and provides a means to introduce the interpretations of it into certain quantitative methods. Most coding requires the analyst to read the data and demarcate segments within it, which may be done at different times throughout the process. (Saladana 2012)

Each audio file was partially transcribed, focusing only on the significant parts when family members were talking about the households context and related issues, expressed directly or indirectly. the significant passages of each interview were shared among all team members that applied then the "coding" technique (CHARMAZ, 2006).

In the following tables an example of this coding process:

Partial transcript (from audio files)	Initial coding
<p>“We don’t have space and we keep on amazing amount of stuff... you accumulate, and accumulate....” (The woman was showing a great amount of belongings which were stored in cardboard boxes on the corridor)</p>	<p>[Researcher 01] Lack of planning, lack of storing space [Researcher 02] Lack of planning/lack of space to stow [Researcher 03] accumulation [Researcher 04] disorder/lack of space</p>

Each segment is labeled with a "code" – usually a word or short phrase that suggests how the associated data segments inform the research objectives. Once coding was completed the codes were clustered, similarities and differences in related codes were discussed.

After the first initial tag, the codes were triangulated and condensed in a unique coding scheme. The analysis of the other raw material such as photos, disposable cameras etc followed in parallel. Photos were selected and categorized per topic.

The crossed analysis followed an “on the wall” approach (VISSER, 2005) creating connections, merging and clustering similar contents and creating a final list of problems. The material used to develop this visual mind map were both printed photos and printed codes from the previous analysis. Also meaningful sentences from the interviews or notes taken during the visits about house structure were included, creating an elaborated scheme of relations and connections through the different insights.

A visual combination of interview transcripts, codes, pictures, notes and connections facilitated the identification of dimensions of issues, condensed in a final list of problems shared by all participants and at least by the majority of the households.

Identification of key problems was made using the following criteria:

- the frequency with which issue was coded in the transcripts (transcripts)
- the emphasis given from the respondents to the specific issue (transcripts)
- the frequency with which each issue was observed (pictures)

4.3.1 b Problem scouting phase results.

On April 6th 2014, the project SuM Brazil was first presented to Mrs Lenira Rodrigues, leader of the local residents association of Águas Claras community. The objective of this first meeting was to tackle the community interests in participate in the project.

Mrs. Rodrigues asked us to join her in a visit though the community to better understanding the characteristics of the urban settings.

As the final decision was not up to mrs Rodrigues, a second meeting with the community was scheduled for April 26th.

This second meeting was mainly important to establish a sort of empathy with the inhabitants of the community, present the research team and build trust around our project.

It was important to clarify the team was undertaking a design research process, to avoid people to mix it up with some action of the city council or the state government. Some of the biggest issues the community is facing, for example no proper connection with public transportations and consequently difficult connection with the city, are not design issues but belongs to the competence of the local administration; make clear the expected outcome of this work was crucial to avoid over expectations.

The team wanted to raise awareness around the project, explaining which was the role of the community and its expected contribution and collect some generic information about its inhabitants (since through official channels it was almost impossible to obtain some meaningful outcome); the meeting was also a great opportunity to collect some insights about the topic of social interest domestic dwelling daily problems, which was selected as main field of research. For NDS coordinators, list urgent problems within this community is an easy task, since they work with this topic since a very long time; but the challenge was discover which one of this problem affects the population.

On Saturday April 26th, the project team presented SuM Brazil to Águas Claras community. The meeting was scheduled at the headquarter of the local community association. About 40 people attended the meeting, 10 of them were children.

The research team and the project were presented. People seemed interested and receptive. Although the concept of crowdsourcing was not familiar, they asked questions and demonstrate to like the idea.

A man questioned about which kind of problems they could talk about to find possible solutions, and he also brought an example: if he had to think about the biggest problem of the community, he would immediately think about the lack address identification or CEP (Brazilian postal code), resulting that they can't receive mail directly at home, register to some services and so on. Other urgent problem that came up to his mind was garbage collection. The team clarify the idea that weather being those urgent sustainability problems, the competence to solve them falls on the local municipality, and not possible outcomes of SuM Brazil project.

The idea of focus the research among households problems was embraced with enthusiasm, since is an issue affecting everyday life of most of the inhabitants.

The demographic survey

After the end of the presentation, the survey was applied to the participants and most of them answered to it on their own. About 20 people answered the questionnaire.

The main insights of the survey:

The sample families indicated that the community fit on the criteria of low income community, since more than half of the families earns from 0 up to 2 minimum wages.

An important discover is that 60% of people has internet access, an information that fits the national IBGE 2011 scenario, indicating that 65% of the population can access the web.

As the project is about crowdsourcing and co-creation, this element could affect the future steps of the research: a 100% web-based communication could not be possible, but an hybrid approach is going to be necessary.

Another interesting data is the number of rooms: the standard structure of the houses is divided in three rooms: bedroom, bathroom and kitchen. Most of the houses have no living room, and a great part of everyday activity is done in the kitchen.

Finally, the survey showed a relevant element: despite the small dimensions of the households, each house hosts from 3 to 6 inhabitants.

Video Interview

Together with the survey, every participant was invited to volunteer in a video interview. At the outset, people seemed to be reluctant in accepting the invitation, maybe for shyness, resulting in very few interviews.

At the corner of the room where the presentation was held, the research team set two interview desks: camera, microphone and two chairs around a small table.

The volunteer was asked to sit in front of the camera, an element that created an initial embarrassment and some kind caution of talking freely about their houses.

Kids Activity

Immediately after the beginning of the meeting, all kids were brought in the porch where the activity took place. About 10 kids participated.

Although the activity were initially born only to entertain, the team also tried to obtain some insights thanks to the drawing session.

Unfortunately, kids were very little and most of them were just entered in kindergarten, so it was almost impossible undertake the drawing session with a specific scope.

The suggestion box

Although the suggestion box has been left almost one month in the community, no suggestion was collected. Probably, this happened because no reminder was left, no maybe people thought the presentation was quite complete.

Insights from the first meeting

Creating a communication channel between a low-income community and an open innovation process including firms, researchers and crowd is a rather new and complex topic, where multiple variables are involved; this first approach with the community allow the team to reflect about the methodology used and make some observations about the research strategy and the tools involved.

Both the demographic survey and the video interviews did not provided the expected results. It was immediately clear that further research, changing the strategy from quantitative to qualitative, would be necessary; a deep and critical analysis of the used tools was made.

The demographic survey was a good tool to discover general information about the community, but it requires further improvements. The language used, following the structure of the demographic census, was a bit too technical and as a result, generated confusion and misunderstanding: some people filled the questionnaires partially or took a long time to complete it.

The video interview was a good tool to start talking about the household environment and get more qualitative information. An observation is although necessary: talking about a topic outside the context of use was tough for the majority of the interviewed, it looked like their capacity of reflection was reduced, people had to explain instead of directly showing the issues they were facing.

That's why the whole team concurred to say that the video interview was not successful, and to obtain deeper insight it was necessary to repeat the interview with some volunteer who allowed the design team to enter in their houses.

Also the suggestion box gave no meaningful results, maybe it was applied in a wrong way. It was maybe too impersonal and a tool really far from the community daily life. A suggestion for future replies is using more friendly archetypes, maybe making the box circulate from house to house in the neighbour.

The most important thing this first meeting provided to the project was build trust around the research team: people within the community had the opportunity to know the designers, see our faces and solve any doubt they had. Thanks to this "empathy", it was possible to arrange some home visits with some volunteers, to get more insights and go deeper in the collection of the information.

Field Research (Home visits)

The qualitative in context research respected the expected research and resulted in a huge amount of raw data; seven houses were visited and ten people have been interviewed.

more than seven hours of audios were collected and 312 photos taken. 5 of the 7 disposable cameras produced valuable material. The challenge was define a set of problems commonly shared by the members of the community;

Audio files

At the end of the on-field data collection, the design team had a huge amount of peoples' stories, observations of constituents' reality and - most important - deeper understanding of needs and barriers..

The recorded visits and the interviews, was the most complete raw material available, so they were prioritized and were analysed using a code method.

Direct observation.

While family members took the team on a guided tour of the house and rooms, one of the two designers took notes. Notes Allowed designers to draw a profile of the houses: of the seven houses visited, only one had just one room and no bathroom. Two other houses were completely build in masonry and only one had been designed by the owners themselves.

According to the notes and the observations, the most encountered problems were the lack of finishing and the electrical installations. While lack of finishing was a relevant issue for cleaning the house, the lack of safety with electricity was impressive.

Other relevant information is that most of the houses are built with wood.

Also photographs and videos were analyzed following the same scheme: the most meaningful photos of the houses were selected and associated with a code. The result was a moodboard for each house, showed in the image below. It's important to underline that despite some of the images correspond to issues pointed out by the residents during the guided tour, most photos were taken from the researcher perception about what they consider problems. During the cross analysis it was possible to make considerations about both resident and designer perceptions.

Conversational Interviews

10 People participate in the interviews, in each house the interview lasted from 40 minutes to 1 hour: people were asked about the main activities held in every room, trying to understand if the size and the objects owned were enough to such activities.

The profile of people taking part in the interviews is showed in the following table.

House per house	Number of interviewed people	Short Profile
#01	01	Female, 45 years old, married, lives with his husband and a 08 and 18 years old sons.
#02	01	Female, 38 years old, single, lives alone.
#03	02	Female, 60 years old, married, lives with her husband. - Male, 48 years old, married, lives with his wife.
#04	01	Male, 65 years old, married, lives with his wife, son and daughter in law
#05	01	Female, 27 years old, married, lives with her husband and a 06 years old son.
#06	02	Female, 64 years old, married, lives with husband. -

		Male, 66 years old, married, lives with wife.
#07	02	Female, 40 years old, married, lives with husband and an 11 years old son. - Male, 42 years old, married, lives with wife and an 11 years old son.

The files were distributed among the researchers to do the partial transcription, in tabular format, where the left column contains the transcript and the right one would be filled by the codes. The transcriptions were collectively discussed and interpreted to reach a final code scheme that helped to identify issues in an unique way.

Storytelling

The storytelling was the activity immediately after the guided tour; storytelling helped the team analyse households problems in a more friendly-way.

Cards represented dreams, desires but also problems or issues; they were asked to propose possible solutions to the issues they expressed.

It was a colloquial way to allow people to expose their values and the issues around a given problem. Storytelling was also a easy way to involve more than one family member in express his own thoughts. The cards used during this activity were selected to provide further insights about people’s perceptions on their own house and community problems. it was a powerful tools and resulted in a huge amount of raw material.

The most relevant informations collected during this activity were:

Kitchens - according those stories, the main issues expressed by people are: lack of space to perform activities such as cooking, eating, studying, playing, etc.

Bathrooms - the main problem was related to the lack of access to coating materials to coat the bathroom whole area, so the majority of families only coated washable ares as sink and shower. All people expressed the desire to have a washable finishing in the bathroom, so it would be easier to clean up.

Paparazzi Activity

According to the protocol, at the end of each home visit the research team asked to each house owner to undertake a self-documentation activity using disposable cameras, that would have been collected during the following days.

Some additional insights could be extracted from the resulting pictures. Only five families accepted to undertake the activity, and just four gave meaningful results.

Respondents got engaged from the activity and actually performed the required activity. Some pictures were just randomly shoot and fell out of the field of relevance of the research.

Some others were taken in bad light conditions and the results was not readable.

The research team gave some shooting guidelines and only photos showing objects of dissatisfaction or complaint were analysed. Most significant pictures of all cameras were organized and discussed.

This technique was interesting because allowed the team to understand if people was more spontaneous or showed different problems or issues when they were alone, because it's a self-documentation technique and offers the family members authentic point of view.

Data analysis and triangulation of the results:

(inserire foto di noi che facciamo le varie cose)

8 main final issues were listed, considering issues that were both frequently observed or coded.

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- lack of flexibility in the spaces inside the house (both living and storage space). houses within the community have an area of approximately 40m², Furniture create a big problem: it's often not designed for such small space, and most of the time people have no opportunity to choose: they gain furniture from family or neighbours. Families are Iso numerous and the rooms are quite crowded during activities like cooking or eating. Sometimes, although the space is a bigger, there's a big lack of planning. There are few possibilities of increasing the size of the house or the rooms and so create a flexible space is difficult.
- lack of appropriate finishing. (electrical and hydraulic system,, coat materials) lack of finishing results in both a practical and esthetical issue. having no proper finishing, above all in washable areas like bathroom and kitchen, results in a huge difficulty in cleaning, but has also a bad aesthetic: in a lot of rooms bricks are still visible or made by concrete. Also electrical and hydraulic systems have big problems: DIY is a common practice among low income families, since they don't have economic conditions for paying for proper installations. Therefore, some installations, like the electrical one, do not have adequate finishing resulting in a dangerous environments, possible cause of electrical shock or fire, and creating also a visual discomfort .

Besides this final list of problems, a concrete outcome of this process was raise the awareness instilled within the community and the participatory feeling that they got during this field research.

The problems underlined did not surprised, but the whole team was excited to discover which one the community would like to work with.

The voting phase was very important to confirm the involvement of the community in presenting their own problems and preserve the bottom-up, crowd-led connotation of the project.

At the end of this on-field process, it was possible to elaborate some conclusions.

- At first, the importance of having a contact such as a community leader on board of the project. It was crucial to understand real problems faced in everyday life in a low income community, Thanks to the community leader help, the community felt confident and trusted the project and the team, being respondents, collaborative, involved and not reticent in providing feedbacks. It was easy to find contact and combine home visits also because the leader was always with the team, welcoming in the community and actively participate in the on-field research. Thanks to this help and support, it was easy to collect all information required, and incentivated active participation of hosting families. Probably, without an active member of the community collaborating with the project, planning activity and build trust of people would be very difficult.
- Storytelling activity was a great opportunity to get insights but could be improved; the process of showing card could be studied better and also the number of provocative cards could be augmented. Categories could also be studied better.
- The conversational interview. shifting from conversational into semi-structured interview could be a good point, because during a conversational one the complexity of separate what is truly useful and what lies outside the project purpose. Semi-structured interviews with a check-list and guidelines.

4.3.2 a Crowdvoting phase protocol and tools

Planning the Crowd Voting

Following the crowd-led approach adopted by the whole SuM/Br project, the next planned activity was the crowdvoting of the idea that the community would like to bring to the crowdsourcing phase: the selected problem would be converted in a challenge and posted in Innonatives.com

Since the socio-demographic survey showed that 60% of people within the community had internet access, the voting phase was carried out through two approaches: web based and physical.

Crowdvoting strategies: online voting.

Since during our pilot project Innonatives was not available and we could not use their platform for the crowdvoting, the design team decided to use others existing social media to promote the crowdvoting phase.

The social network had to satisfy two criteria:

- allow the development of a poll
- be popular and familiar among residents in Águas Claras community.

As Facebook satisfied both requirements, it was chosen as support network, the poll created using the free app “Enquete”

Before publishing it, the enquete was tested and then shared among community members on Facebook, using SuM Br Facebook page, and through a group called “votação Águas Claras”

The link was shared also within the community thanks to two banners located in the local Resident Association Headquarter and in front of the community leader house.

Mrs Rodrigues daughter accepted to help us spreading the voice within the community members and shared the link of the enquete in her Facebook page, pushing other people to vote and make them hear their voice. The established online voting period started on June 21 and ended in June 29.

Crowd Voting Strategy: voting urne

On June 21 a visit at Águas Claras was scheduled to perform the physical vote of the community members, in order to allow also families with no internet access to express their opinion. A live, on-spot contact with the community members would also be important to enhance the community interest on the vote and spread the voice about the on-line vote.

The team went to the community with two cardboard ballot boxes, knocked at the doors of the houses and asked residents to vote for the problem they thought it was more urgent.

This voting phase reinforced the importance of the community leader collaboration, making people more comfortable to vote and give their opinion.

Each cardboard box had a sticker with the four statements, each one associated with the color of a poker chip (black, blue, red and green).

For people who did not attend any SuM Br meeting, the aim of the project was briefly revised, and then participants were asked to select which issue they considered most relevant.

As the Sustainability Maker Project is participatory, and aims to spot the most urgent problems perceived by Águas Claras Residents, collecting their opinion on the final list of problems identified during the on field research was crucial. The crowdvoting phase was also an interesting opportunity to test different voting techniques to enable future bottom-up crowdvoting initiatives.

4.3.2 b Crowd voting results

Online vote presented some issues. Although the Facebook post received 22 “likes”, after 1 week there was only one vote that could be considered valid.

Maybe this strange fact is due to the unfamiliarity of the community members with this kind of voting system and did not understand that they had to actually choose one issue and not just put like to the post.

This lack of adherence to the online voting point another possible reason: fear of sharing private information: after clicking on the voting link a message appears requesting access to the Facebook account information. Thus, it might refrain people from getting into the voting stage due to the lack of trust with such disclosure of personal information.

Fortunately, the ballot box gave a good number of votes: the team visited 33 houses and collected 33 votes (only one single vote for each house was allowed).
The issue that received more votes was the problem #2

“The space in my kitchen is too small in order to me to receive visitors.”

4.3.3 a Challenge phase protocol and tools

Once the most relevant problem had been determined through crowdvoting, the researchers had to select and convert all the knowledge acquired in a design brief that anybody could access.

The issue was condense all the information in a synthetic file: low income communities are a complex world and for a non-brazilian is maybe hard to understand the socio-cultural background and the issues they are facing in everyday life.

The challenge creation was divided in two steps:

- browse the challenges already posted in Innonatives.com (a short set of suggestion on how to present a challenge is given)
- benchmark of other crowdsourcing platform and their challenge’s structure; the aim was the creation of a list of contents that is commonly given

The challenge creation phase was structured in 3 main steps:

- brief creation
- testing the brief carried out for two main motivations:
 - a. Understand if the information provided by the design team was appropriate for people to understand the issue and propose a proper solution.
 - b) Evaluate the quality of the submissions.
- publication on Innonatives
- challenge promotion
 - a)online
 - b)offline

The offline promotion of the challenge has been supported by a Toolkits.

The development of the Toolkit has been divided in two phases:

- research of toolkits in open innovation platforms
- development of a SuM Brazil set of techniques and contents to promote the process.

4.3.3 b Challenge phase Results

SuM/Br challenge was called “the Kitchen Challenge” (as the main field of action was the domestic environment and socio-cultural behaves), to be short, flashy and direct.

The challenge was completed with the question: “*Can you design an artifact to improve the socialization in the kitchens of the low income houses?*”.

Challenge Abstract:

“In Brazil, low income houses have typically an average of 42m² and around 6m² being intended for the kitchen. If the kitchen space is already quite small for the family members, how will it also fit visitors?”

Video Challenge

To support the challenge the team decided to record a short video presentation (available at the following link:<https://www.youtube.com/watch?v=3WSSL7MSw3Y>).

The basics the video had to cover were: what was SuM/Br and the history behind our challenge, some meaningful insights about the context, what Solvers can do.

The designers of the SuM/Br tem themselves were the storytellers, and during the whole presentation videos and photos of the community Águas Claras were used, to express the mood of the project and make it more “real”.

Context Summary

“The kitchen space of a low income house in Brazil often works as dining room and a living room. Indeed, it is quite common for people to eat their meal on the kitchen or using the space to chat with family members or neighbors. These moments are quite important because it is when social cohesion is built within the family and with the surrounding community.

It is in the kitchen also that many families earn extra income by producing meals or snacks to be sold around the community. Sometimes it is even possible to witness children developing their school work on the kitchen. However, despite that this is an everyday reality of this people the built environment and the artifacts within the kitchen are not designed for such wide variety of activities.

In Brazil, low income houses have typically an average of 42m² and around 6m² being intended for the kitchen. If the kitchen space is already quite small for the family members, how will it also fit visitors?

We believe there is somewhere an idea to change this reality and make the kitchen a more comfortable and flexible place. To help you to get ideas, we provide the reports with more information about the problem we're talking about.”

The Challenge Sponsors

When the challenge have some sponsor or company who support the implementation of the winning solution, is important to provide Solvers information about them: who they are, their field of work, where they are located etc

The Kitchen Challenges could count on two main sponsor for implementation: Soliforte and Ecodesign.

“Soliforte Recycling Ltda. have been founded in 2007 with the installation of a construction waste processing plant, providing throughout the Curitiba Metropolitan Region. Besides pioneering the implementation of construction waste processing activities, Soliforte is the flagship company of the sector in which it operates. It already is able to produce pavers and

blocks out of construction waste and currently the company got funding to develop an entire construction system for low income housing, focused on low income households.

Ecodesign is a small company in Curitiba. Its core activity has been on extending the life cycle of wood waste through the production of furniture. Its organizational structure includes a small factory and shop attached to it. The commercialization of their products occur mainly through the web.”

Ecodesign decided also to support the crowdsourcing phase, offering the reward for the winning idea: the company would, in fact, produce the project and give the winning designer 50% of royalties on product selling.




That was the main reason why the solution requirements were shaped around Ecodesign production process and materials (recycled pallets).

During our meeting with Ecodesign co-founder, he expressed all his enthusiasm for crowdsourcing: his company is a small one and their portfolio has still few products. They perceived the contest as a great opportunity to implement their product offering with a brand new sustainability-focused and social friendly products, and that’s why they offered to the winning idea the 50% of royalties, to motivate as much designers as possible in participate.

The challenge phases.

As Innonatives allow challenges owners in set 3 phases for each challenge (idea, concept, solutions), the team discussed on the deliverables for each phase.

“This challenge has three phases: the first is to send ideas, i.e., a sentence that explains what you thought to solve the problem. The second is to send the concept, i.e., the most elaborate idea with more details of how the solution will work really. The third and final step is to send the solution itself. See the image below which should be sent in each phase:

<i>step</i>	<i>what to send</i>	<i>timeframe</i>
 idea	short description max 140 characters (... as short as a tweet!!)	15 TH OF SEPTEMBER / 6TH OF OCTOBER *
 concept	sketches storyboard concept description max 800 characters	13 TH OF OCTOBER / 3RD OF NOVEMBER *
 solution	technical drawing all the views, dimension in mm rendering technical specification	10 TH OF NOVEMBER / 1ST OF DECEMBER*

*will be accepted only the project sent till 23:59

Solution Requirements

The whole team agreed in set a list of requirements to facilitate the development of an appropriate solution for the challenge.

In order to be considered by both the expert panel and the community in the selection process, the proposed solution has to:

- Be economically accessible to the people representing the low-income segment of the Brazilian market: it is remarkable to know that the minimum wage in Brazil is around €250/US\$340. Based on field research each domestic dwelling - of the participating community - has available an average of two, sometimes three minimum wages;
- Use wooden pallets as principal source of material: there are a large amount of this material on the Curitiba metropolitan region.
- Be easy to assemble and disassemble, including the possibility of not requiring tools;
- The solution should allow an agile and easy transportation.

Selection Criteria

During the selection of the submitted ideas, the criteria that will be mainly considered will be:

- Compatibility with EcoDesign's portfolio and manufacturing process;
- Fulfillment of Sustainable Design principles;
- Objectivity and clarity;
- Quality of presentation;
- Alignment with the Challenge Brief.

Implementation

The best solution implementation will be viable by the companies EcoDesign and Soliforte. Together, they will produce a prototype that will be tested in one of the residences of the Águas Claras Community. In addition, the solution will be available with Creative Commons license.

Motivation and Prizes.

As first prize, the participant who submitted the best solution will have his product manufactured and marketed through EcoDesign e-commerce platform. The winner will receive 50% of the profit from sales of the product and a certificate of participation.

The second and third best solutions will receive a Sustainability Maker kit, and the certificate of participation

To finalize the challenge, some information about the design team of Sum/Br, the community and the methodology used were given.

“Sustainability Maker Brazil (SuM/BR) is a project carried out by the Design & Sustainability Research Center (NDS) of Federal University of Parana (UFPR), Brazil. The SuM/BR team is composed by:

- Prof. Aguinaldo dos Santos, PhD - Federal University of Paraná, Brazil
- Isadora Dickie - PhD candidate at Federal University of Paraná, Brazil
- Mik Cuccu - Master degree student at Politecnico di Milano, Italy
- Greta Bottanelli - Master degree student at Politecnico di Milano, Italy
- Nicolò Micciché - Master degree student at TUDelft University, The Netherlands

The team worked on field since april 2014 to unveiled urgent problems that could be tackled on a sustainable way.

Águas Claras is the partner community, located on the municipality of Piraquara, on the Curitiba's Metropolitan Region, State of Paraná.

Around 500 people live on this low income community. The urban area was not formally designed from the outset and the houses themselves were built using local workers or even built by the families themselves. The house are generally built on timber with some of them being produced using masonry. Do it yourself is a well spread habit although carried out without the support of proper tools or training. Materials and tools are re-used and recycled according to everyday life necessities. People often get furniture or construction materials for free from family members or neighbours: furniture is often old and out of proportions if compared to their house dimensions.

During a period of three months the Brazilian SuM team of the Design & Sustainability Research Center have interacted with this community in order to identify what they perceived as their key problems on the household. On this process the team used direct observation (through guided tours in each house), conversational interviews, photographs/videos, storytelling and "paparazzi" (self documentation through photographs). After this process a set of four key problems were identified and, subsequently, they were submitted to a voting process using both an web-based approach as well as a conventional approach (ballot box). The problem "The space in my kitchen is too small in order to me to receive visitors" received the highest number of votes.

Challenge testing

The brief and the challenge were tested in July and August; before publish the challenge and officially start the crowdsourcing phase worldwide, the challenge was tested with a small, closed group of volunteers.

As Innonatives was not yet available, this test was performed using Facebook; although Facebook is not properly a crowdsourcing platform, it allows some features that are sufficient to perform a simulation, such as the creation of closed groups, post photos and videos, allows multiple users in modify the information provide etc.

The "challenge test" base was a brief with: abstract; short video overview (2:15) report containing information about pre-challenge and the process of Crowd Design; information about the sponsors (Soliforte and EcoDesign); brief description of the SuM/BR Project; requirements list for the resolution of the challenge; in addition to an e-mail to if there were any questions.

Volunteers were recruited among design students of UFPR; a group of 25 students, from first to sixth semester attended the test on September, 1st.

The students joined a closed group, were the design team of NDS supplied informations and instructions: first of all, watch the video overview of the challenge and then read the whole brief. As the main goal of the test was verify the clarity of the crowdsourcing brief, students were pushed to report any doubt or suggestion.

They were asked to post a sketch and short description of their ideas, the time span established to post ideas was 4 days. On September 5th, just 1 idea was submitted; to enhance

participation, the deadline was extended till September 9th and as motivation, a ticket to the Brazilian Congress of Design in Gramado-RS was given as reward for the best idea submitted. By the deadline, a total number of five ideas were posted in the closed group.

Challenge Test observations:

- 20 of th 25 volunteers did not upload any ideas within the closed group
- Any of the participants directly asked for more informations (neither within the group nor sending an e-mail), or showed any doubts about the information provided or the type of product that the challenge was crowdsourcing.
- The ideas posted had a good quality level: good sketches and brief descriptions were appropriated; all the ideas posted had as primary goal to optimizing the lack of space, with multi-funcional or modular products; however, none has specific focus on improving socialization within the environment.

For the design team, understand the motivation of the non-participation was crucial; two questionnaires were created: one for students who submitted an idea (4 answered) and another for people who don't (11 answered).

The main reasons of non-participation were:

- short time span for the idea submission
- priority to academic works.
- lack of understanding of the challenge
- the informations were provided in english. (for 2 students was the main reason).
- discomfort on exposing their own ideas - even in a closed group. (1 student)

The main suggestions were to offer the material in portuguese a greater time to submit ideas.

All people who submitted an idea answered that they fully understood the object of the challenge and the informations. Their main motivations for participants were

- the opportunity of win a roundtrip ticket to the Brazilian Congress of Design in Gramado-RS
- the pleasure of being challenged.
- Certificate of training hours. (1 student)
- The challenge context - low-income community and sustainability (1 answer).

By the end of August the platform Innonatives was launched online; the team could use the material developed for the test and adapt it for the platform for the proper launch. All the material uploaded was provided both in english and portuguese, since the challenge was addressed to an undefined crowd. the team thought it was a nice option leave also the informations in portuguese because english is still not so used in Brazil. Also the complete reports of the on-field research were available, in case some designers provided further informations about the community and the socio-cultural context of the challenge.

Challenge Diffusion

The dissemination strategy of “The Kitchen Challenge” was carried out both online and offline, simultaneously: as Innonatives was new on the web and it still had to build its audience, the team decided to support the challenge and promote it both locally in Curitiba and through social media, spreading the challenge worldwide.

Offline Diffusion

The offline diffusion has been supported by a toolkit; toolkits are an element that might be applied at different steps of the crowd based process. The researchers started research material and tools already offered in open innovation platforms, to understand which type of elements should have been included in the Toolkit.

Open Ideo Meetup Toolkit is designed for people who’s planning to bring one of Open Ideo Challenges into their own community (facilitators), guiding users through the process. Open Ideo staff suggest to use it as a template or as an inspiration: people is not forced to follow it strictly, because the aim is just to support the collaborative process.

In the introduction, users find a short description about how Open Ideo Works and the values they are promoting; they also explain the importance of both on-line and offline interactions among the member of the community.

The toolkit also explain how people can innovate through Open Innovation and all the different roles they can have.

A sort of ideal agenda and spaces is defined, and also provide a list of materials that could facilitate the design actions.

The central part of the Toolkit is dedicated to accurately describe actions and phases of the meetup, together with Tips and Suggestions.

Finally, the toolkits is completed with some Templates, such as template mail or upload formats.

Making your Idea real

Some Challenges on Open Ideo come together with a sort of Upload Format user can download to create more heterogeneous contents.

The Format is just a group of short guidelines and sections to fill and upload.

Participants in the challenges are however free to upload their own version.

Impact Story Template

On OpenIdeo people is encourage to innovate in all the possible way, from develop solutions to simply share their experiences. Impact Story Template helps communicate small actions undertaken within local small communities.

The template give tips and tools.

Brainstorm in a Box

Brainstorm in a Box is a support Toolkit to stimulate the generation of creative solution thanks to a list of “brainstorm questions” the designer have to ask himself to get inspirations.

The toolkits include also a brainstorm worksheet to go deeper with one of the generated ideas, and a sheet where they can share the insights they got during the brainstorm phase.

Global Service Jam

The global service (but also game, gov, sustainability) jams are a strong case that brings lots of meaningful insights.

The Global Service Jam is a non-profit volunteer activity organized by an informal network of service design lovers, who all share a common passion for growing the field of service design and customer experience. The Jam has a staff of none and a budget of nearly nothing.

The first Global Service Jam took place in March 2011, where more than 1200 participants in more than 50 cities created around 200 unique service designs around the Theme "(Super)HEROES".

Jams are an interesting example because they express a merge of digital and physical: all the solution posted are digital, but they are developed during a physical event.

The website offers contents for people who wants to join a jam, but also organize one.

"A local Jam can be a polished event for hundreds of attendees, or a simple meeting of a few people around a kitchen table... ANYONE can Host a Jam, so why not give it a try?"

The motivation of local facilitators is totally non-profit: promote service design in their region or country, Introduce people to a design-based approach to creativity and problem solving, extend their network globally etc. ers,

The Global Service Jam organization has no taff and no budget but Jam Hosts receive: a Firestarter Handbook of about 50 pages, crowd written by jam hosts, shares the best experiences from hundreds of Jams and is packed with tools, timelines, warm-ups and good advice from many Jammers all over the world. It's free to every Host.

a Host you will be invited to the Organiser's Basecamp - the online community platform where Jam Hosts share ideas, help, support, motivation, tools and files with each other.

Physical Meetings: "Repentinas de Ideias" INCLUDERE PIU MATERIALE E FOTOGRAFIE QUIIIIIIIII

To encourage participation and greater understanding, the team decided to organize some "Idea Jams". The aim of those Jams was mainly raise interest around the challenge and the project, and encourage people in develop ideas or concept to post in Innovatives.

To guarantee a homogeneity of the posted ideas and facilitate the organization of those Jams both from Team Members and external members, the team created a "Kit Repentina" (repentina is portuguese for Jam), that was tested within NDS designers before being shared.

The toolkit includes:

- a visual presentation of the SuM/Br Project in general and more specific contents about "the Kitchen Challenge"

- a visual presentation supporting the Idea Jam.

- some printables tools.

Each Jam was structured as a short workshop and planned to last from 2h 30 minutes up to 3 hours. The SuM/Br design team directly held 4 Jams, (the test with NDS members and 3 Jams with undergraduate design students in UFPR and UNIVILLE, university of the city Joinville).

The toolkit was shared also within professors of:

- Design PUCR-PR
- Design UNIPOSITIVO
- Design UTFPR
- Design UNICURITIBA

The workshops were structured as follow:

- Briefly introduction about Crowd Design and Innonatives Platforms;
- Explanation about the instructions that the students should follow.
- 1- Team building
- 2- Registration on Innonatives platform (at least one per group)
- 3- Read the briefing of “The Kitchen Challenge” (10min);
- 4- Brainstorming about the topic of the challenge (social and low income households). The brainstorming was repeated 5 times (talk with 5 different people). Students were given 5 min for each conversation;
- 5- Return in original group and ideas generation (30 - 40 min);
- 6- Submission of the idea on the innonatives platform (5 min).

The workshops directly held by SuM members had a general positive outcome in terms of participation (around 100 people attended) both students and professors were very receptive and gave useful insights about the project and possible improvements.

The Jams were also a further opportunity to test the effectiveness of the information provided within the challenge.

All the participants had no difficulties in find all the information they need about the challenge. Some of them suggested to post more photos, to give people a general idea of how kitchens and houses look like, because images have more visual impact than words.

Some students suggested to provide designers some further tools to “play” during the idea creations.

Until the first date of the first workshop, 13 October 2014, only two solution ideas had been posted on the platform. After the four workshops, the number of ideas submitted increased to 26, pointing out the positive outcome of physical meetings and group work.

Selection Criteria and Requirements have been clearly understood, and the submitted ideas demonstrate it, since most of the ideas respected them.

An observation about the visual quality of the outcomes is necessary: during the jam a sort of “upload format” has been provided, but it was not mandatory to upload it on Innonatives. That’s why the quality of the images uploaded is so different: some people uploaded the result of the Jam, a quick sketch developed in few hours, while some others refined the idea and provided quality sketches.

The team noticed a tricky point during the upload phase: people uploaded images and texts but did not notice the “save” button on the lower part of the page, so they did not “confirmed” their uploads. So, it was necessary to ask the Innonatives staff to make them officially uploaded in the challenge. The Save button should be made more visible or the platform had to remember to users to save their uploads.

An interesting fact is that although students had already generated an idea, only few of the workshops participants uploaded it on the platform, even if they were asked to do it before the end of the jam.

Digital and Online communication

Social networks were evaluated as the best option to share the challenge, as Innonatives has no strong intern community yet; SuM/Br already had a profile on Facebook, used to share images, materials, videos etc.

A total number of 57 posts (from september to february) were posted within the page “Susainability Maker Brazil”; the communication strategy consisted of memes created to promote and inform about different features of the “Kitchen Challenge”: SuM Brazil project overview, Innonative overview with link, challenge overview and link; informations about: sponsors, deadlines, prizes, community and designer involved.

To maintain contacts with people who was participating in the challenge, also an e-mail strategy was adopted, e-mails of the participants were obtained with the innonatives platform technical team.

Table 02 - List with the date and subject sent to the participants of "The Kitchen Challenge".

Subject*	Sent date	Informations
Reminder to access the site, vote and comment on ideas, and share with friends.	18/november/2014	As an attachment, a file was sent explaining step by step and with illustrations how to proceed with the vote and comment on innonatives.com platform
Information about the extension of the deadline to be sent the solution (third and final stage).	12/december/2014	Site Disclosure www.designintothecrowd.com (whose content is unique on crowd processes). Reminder to participants to share the link of your ideas / solutions.
Information about the extension of the deadline to be sent the solution.	20/december/2014	Do not apply.
Information about the solution crowdvoting process.	28/january/2015	Reminder of the last challenge deadlines.

*Messages sent to the e-mail of participants are available in Appendix of this report.

Font: The authors.

In february, the Facebook page of the project had 187 likes, but according to the likes, re-posts and comments to the posts, the main audience of the challenge were people already involved with the project (team members, NDS researchers, friends etc).

It is important to mention that throughout the challenge, email for communication with the public was released (sum.ufpr@gmail.com). Only an email was received and referred the questions of a potential participant.

4.3.4 Crowdsourcing phase protocol and tools

As is Innonatives.com is the enabling platform of the Sustainability Maker Project, all actions planned during this phase were generated according to Innonatives features.

As the researchers decided to structure the challenge in an open form (no copyright restrictions), any platform user could submit an idea.

Innonatives allows users to submit three different type of ideas, with a growing level of complexity:

ideas, concepts and solutions; challenge owners can decide if the phases are open simultaneously or to select ideas that goes to the following step.

For the project, the three crowdsourcing hase were one consequently to the other;

- idea phase was opened from September, 15 to October, 6.
- concept phase from October, 13 to November,3.
- solution phase form November,10 to December, 1.

To encourage participation, the initial phase did not require a refined work; at the end of each phase, the most promising ideas will pass to the following step.

Idea Phase: short description and a sketch.

Concept phase: more elaborated description; sketches; storyboard.

Solution hase: technical drawings, renderings, technical specifications.

The challenge was organized in 3 steps: Ideas, Concepts and Solutions.

Because of the time and the processes of administration of innonatives platform, some deadlines were revised.

Table 03 - Deadline changes

Step	First Deadline	First Deadline Change	Second Desadline Change	Third Deadline Change
Phase sending ideas	15/september/2014 a 06/october/2014	15/september/2014 a 31/october/2014	No change	No change

Phase sending concepts	13/october/2014 a 03/november/14	08/november/2014 a 21/november/2014	No change	No change
Phase sending solutions	10/november/2014 a 01/december/2014	29/november/2014 a 12/december/2014	29/november/2014 a 15/january/2015	29/november/2015 a 31/january/2015
Winner's annunciation	05/december/2014	20/december/2014	01/february/2015	18/february/2015

Font: The authors.

In the following table, the number of participants who submitted an enter during the different steps.

Table 04 - Number of participants by step

STEP	STEP DURATION (in days)	NUMBER OF VALID PARTICIPANTS*
Sending ideas	46	23 (from 26 posts)**
Sending concepts	17	07 (from 08 posts)***
Sending solutions	63	06 (from 06 posts)

*Valid participants refers to participants who have submitted proposals in accordance with the request in the challenge of the briefing.

**From the 26 posts, three did not provide the materials requested in the briefing, making it difficult to understand the idea.

***From the 08 posts, one referred to an existing solution recommendation, as an incentive and exchange information with participants.

Font: The authors.

Some observatios:

- Considerable decrease in relation to the number of participants by step;
- From the 26 submitted ideas, only seven sent concepts;
- From the seven valid concepts submitted, six sent solutions.

Quality of the ideas submitted (through the different steps of the challenge)

STEP 1

Propose an idea through a short sentence. (max 800 characters) = a rough sketch.

The submission had different quality level and some descriptions exceeded the 800 characters.

SUBMISSION INFORAPHIC.

2 submissions were only text with no image.

16 hand made sketches (11 black and white and 5 coloured; 7 of them had a good quality of image and view, the other 9 were bad or poor).

6 solutions were a vectorized drawing, 2 of them were poor in quality.

2 people uploaded only images and no text

2 participants submitted more than 800 characters.

Observations:

Some submissions provided images cutted or stretched; this was reported as a technical problem of innonatives.

No instruction for submissions were provided.

STEP2

Send a more detailed concept description, going deeper within the idea.

Also images had to be more detailed;

The submissions text was between 1200 and 2400 characters.

All the concept but one were vectorized drawings.

4 concepts showed clearly the used materials

3 concepts presented the product lifecycle storyboard.

1 concepts showed product details; 1 showed product operations.

5 participants posted 2 images;

STEP3:

text as a memorial about the product, in addition to an blueprint, with the product dimentions specification.

Texts were shorter: about 1200 characters each.

7 solutions presented 2 images: all of them were a blueprint and the product specifications.

What is possible to infer in the infographics is that:

- At the stage1 (ideas) the number of characters varied widely. In part, it is due to two reasons: (i) briefing instructions requesting to 800 characters; (ii) the platform's instructions brought questions like "Explain why is sustainable" - which may have left the participant confused as to which instructions below.

-In the step2 (sending concepts) the variation of the number of characters in the description of the solutions is less. However, in relation to images, some participants sent storyboard, for example, and others just the sketch sent in the previous step.

-Regarding shipping solutions step, one can see that only one of the participants did not send technical drawing, as requested in the briefing.

4.3.5 a Crowdvoting best solutions protocol and tools.

The crowdvoting phase of the best solutions would include all the stakeholders involved in the crowd design process; to select the winning idea, therefore would be considered the vote of:

- the expert panel
- the sponsor company
- the local community
- Innovations online community

The expert panel vote also provided an analysis of the sustainability level of the proposed solutions; the SDO (Sustainability Design-Orienting Toolkit) has been used as reference method to vote the solutions according to their impact on the three dimensions of sustainability: environmental, socio-ethical and economic.

The platform only allows to perform a generic online vote of the Innonatives users community. Users can vote an idea giving a “like”; to include the other stakeholders in the crowdvoting the researchers develop their own voting system (no voting forms or tools are provided by Innonatives platform to evaluate the ideas).

Expert panel vote

An online voting document has been developed and then e-mailed to every member of the expert.

The structure of the document was simple: procedure explanation and a table to fill the vote, according to the requirements and the selection criteria previously established in the brief; sheets describing the set of solution options (in english); instructions to evaluate. Instructions and Ideas were provided in separated files.

The assessment should be performed topic by topic. Each topic is worth zero to ten, where:

- 0 to 6.9 is Poor
- 7 to 7.9 is Good
- 8 to 8.9 is Very Good
- 9-10 is Excellent

At the end, the "total" field must be filled with the average (add up the values of each topic and divide it by five); in the same file with Instruction also a comparison table to note all scores was provided.

The sheet only evaluated the requirements, while selection criteria were not considered.

To facilitate the vote with different actors, the evaluation sheet was provided also in google questionnaire format, easy to share online and to use.

Águas Claras community vote.

The partner community, Águas Claras, was stimulated in voting and comment to support the “crowd” base of the project.

The researchers decided to perform an offline, presencial vote, dued to the poor internet availability in the area, but mainly because of the language barrier (Innonatives is not available in portuguese).

Due to the characteristic of the population of the low-income community, being semi-illiterate and/or functional illiterate, the vote was taken in a simplified way: each resident should choose one of the six alternative solutions presented - and not make the ranking with notes.

The vote within the community was organized in steps:

- schedule a meeting
- promote the meeting (word of mouth and leaflets)
- share and promote via facebook

Some physical tools to support the vote were developed:

- Identification poster of the voting local;
- Poster with project retrospective in the Community, with photos and explanations of interventions;
- Urn for gathering of voting cells;
- Voting cells;
- Cell to fill and run for a draw ;
- Three printed blocks containing six alternative solutions submitted by participants crowdsourcing

Partner Company Vote

The vote of the partner company, for the same reason described above with respect to the voting of the Expert Panel, was held offline. The documents were the same emailed to the expert panel members.

Online Community.

The vote of Innovations online community would be collected through the platform itself, since a public vote and like action is possible.

Crowdvoting phase Results

The second crowdvoting phase concerned the selection of the best solution among the proposals submitted to "The Kitchen Challenge". The following table shows the deadlines of the crowdvoting processes.

Table 01 - Crowdvoting deadline relatet to the three crowsourcing steps

Step	Period	Crowdvoting deadline
Sending ideas	15/september/2014 to 31/october/2014	31/october/2014
Sending concepts	08/november/2014 to 25/november/2014	25/november/2014
Sending solutions	29/november/2014 to 31/january/2015	15/february/2015

Fonte: Dos autores

In addition, Innonatives allows users to vote each submitted work from the beginning of the crowdsourcing phase. When the Idea phase was closed, the team had the role to judge and select the best submitted ideas.

The crowd vote was performed by different actors involved in the “Kitchen challenge”: Expert Panel, community members, business partner and platform users.

The expert panel for “the Kitchen Challenge” was composed by 5 members.

Table 04 - Voting of Expert Panels

Solution	Member 01 (CV)	Member 02 (EB)	Member 03 (PS)	Member 04 (MT)	Member 05 (EH)	TOTAL
#01 Hidden Pantry	0.76	1.0	4.6	3.0	4.4	2.75
#02 Retractable Table	0.9	1.28	4.0	2.6	4.0	2.56
#03 Coffee Desk	0.78	1.1	4.6	4.0	4.5	3.0 (2.996)
#04 Trolley Support	0.88	1.26	4.6	2.0	4.4	2.63
#05 Multifunctional Pallet	0.76	0.8	3.0	2.0	3.4	2.0 (1.992)
#06 Keep Space	0.82	0.88	2.0	1.0	3.6	1.66

Font: The authors.

Some members have left comments on the alternatives that will be sent to participants.

Table 05 presents these comments.

Table 05 - Expert Panel Members Comments

Solution	Member 03 (PS)	Member 04 (MT)	Member 05 (EH)
#01 Hidden Pantry	This idea I found very attractive, optimising the use of a narrow, left-over space. Unfortunately, there are some problems concerning its use which needs to recognize which artefacts are used most often so that the space for the brooms which might be used less often than getting to food objects on the shelves. In other words	No comments	<ul style="list-style-type: none"> a. Guarantee for stability/straightness of floor? b. Guarantee for stability of wall regarding stop? <ul style="list-style-type: none"> i. If both issues solved, then interesting solution for providers c. Saving space (most storage of all solutions!)

	the broom space goes on the other end. Stability could be a problem, but this could be solved by attaching a rail to the wall with a tongue and groove fitting allowing the structure to slide safely close along the wall.		d. Maybe the Pantry should not be hidden, but just mounted to the wall?
#02 Retractable Table	I understand that the table is extendable but how this is to work is not clear in the presented material. Like the Coffee Desk the extension of the table allows for spontaneous organisation providing flexibility for social and private living.	No comments	<ul style="list-style-type: none"> a. Clear objective b. Looks cosy c. Saving space on the table part (but how about the chairs) & enabling socializing
#03 Coffee Desk	The mobile elements of the chair and table allow for spontaneous organisation providing flexibility for social and private living.	This is my favourite as it presents an entire innovative solution including table, range and sitting options.	<ul style="list-style-type: none"> a. Panel only with two shelves, but with hooks for cups b. Why not removing wood of the panel pallet to get more depth for the shelves? c. Glass top? d. Good transportation afterwards (3 units) e. Saving space (storage) & enabling socializing (cosy)
#04 Trolley Support	This seems a useful room 'tidier' which doubles as a mobile table.	No comments	<ul style="list-style-type: none"> a. Good transportation afterwards b. Saving space (moveable storage/...) within 6m² ?
#05 Multifunctional Pallet	Again this seems to be a design for a different brief, taking up space and does not show how things can be stored away to save space.	No comments	<ul style="list-style-type: none"> a. No specific mounting needed b. Practical? Saving space?
#06 Keep Space	This is a kitchen working unit which seems to be a response to a different brief to this one. It is also a much more complicated structure compared with the relative	It was difficult to value because the concept was not clear.	<ul style="list-style-type: none"> a. No clear detailing. Each kitchen is different? b. Saving space & enabling socializing, but highly depending on the given situation

	simplicity of EcoDesign's manufactures.		c. Best part: the collapsible table by using hinges. This is also popular as to be used to the wall itself.
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Águas Claras Community.

On February 5th a physical vote was scheduled; during all the previous week, leaflets were delivered and shared among the residents calling them for express their vote.

The voting session was organized at the local Residents Associations and the community leader spread the voice and manually shared the leaflets.

The community leader daughter's, Tamires, also encouraged her neighbors to vote on Facebook.

On 09 February, team researcher Isadora Dickie, went to the community association to perform the vote supported by the tools developed for this phase.

17 people spontaneously took part in the voting session. To all of them, a short overview of the project was presented, then the six alternatives were showed. The vote was performed for 3 hours, when the researcher collected the material.

The number of votes received by alternative is presented in Table 06.

Table 06 - Community Vote account

IMAGE	SOLUTION	QUANTITY OF RECEIVED VOTES
	Nº 01: Dispensa ao lado da geladeira (Dispensa Hidden)	zero
	Nº 02: Mesa que abre e fecha (Mesa escamoteável)	05

	Nº 03: Balcão do café	01
	Nº 04: Carrinho de apoio	07
	Nº 05: Pallet multifuncional	zero
	Nº 06: Cozinha reduzida (KeepSpace)	04
	TOTAL	17

Vote of Partner Company EcoDesign

Final notes from partner company

Option	Note
#01	4.2
#02	4
#03	4.4
#04	4.2

#05	3.8
#06	4

Font: The authors.

No comments were left about the alternatives by the partner company during the voting phase.

4. Counting of votes and ranking

The counting of votes, as shown previously by each voting group, was compiled as shown in Table 10.

Table 10 - Counting of votes

Solution	Expert Panel	Community	Partner Company	Online Vote	FINAL RANQUING
#01 Hidden Pantry	2nd	-	2nd	4th	2nd
#02 Retractable Table	4th	2nd	3rd	5th	3rd
#03 Coffee Desk	1st	4th	1st	2nd	1st
#04 Trolley Support	3rd	1st	2nd	3rd	2nd
#05 Multifunctional Pallet	5th	-	4th	6th	-
#06 Keep Space	6th	3rd	3rd	1st	-

The final phase of the crowdsourcing process was the winner's annunciation. For disclosure, the challenge was issued in innonatives platform where the cover image (Figure 07) was exchanged, and posted the posters (in versions in Portuguese and English - figure 08) and the instructions for the winners in the body of the Challenge Brief.

Figure 07 - Imagem de capa do "The Kitchen Challenge" na plataforma innonatives

Font: The authors.

Figure 08 - Disclosure posters

Font: The authors.

Also, it was emailed a called to check the result is announced on the site, as shown in Figure 09.

Figure 09 - Sent message by email to the participants

Font: The authors.

4.5.7 a Implementation Protocol.

“Implement solutions: The best identified solutions will either be developed further, if needs be, or can go to the crowdfunding part of the platform, if funding is needed for implementation. Additionally, they can go directly to the online marketplace, if it is a tangible product, concept or service that you like to sell to others. In case you need additional partners for implementation, the platform will help to find those” (Innonatives.com, 2014)

For the research project, the implementation of the best solutions was already guaranteed by the selected partner company.

“All copyrights belong to the inventor(s) of the solution. In the case of open challenges and solutions we adopt the Creative Commons License “Attribution-NonCommercial-ShareAlike 3.0 Unported (CC BY-NC-SA 3.0)”. The basic idea behind open challenges is that everybody around the world shall be able to use solutions for free and develop them further but the owner of the solution will always be mentioned as such.” (Innonatives.com, 2014)

4.5.7 Solution implementation.

As arranged, the sponsor company produced a first prototype of the winning idea, with the purpose of including it in its product portfolio and sell it through its e-commerce; at the same time, the prototype has been used as reward to incentivize the crowdvoting within the residents of Águas Claras: one of them would be drawn to win the piece of furniture.

After the decision of the winner, the technical drawings (both 2D and 3D were delivered to EcoDesign; as one of the requirements for the submission of an idea/solution was the

conformity with EcoDesign materials and production process, building a prototype was a not too complex operation.

The SuM Brazil team delivered the prototype to the winner of the raffle during a party organized by the residents association to raise funds.

Chapter 5 Conclusions

“The Kitchen Challenge” was the third challenge posted on Innovations, in september 2014. Innonatives was a recent launched open innovation platform, and SuM Brazil team had the opportunity to test the platform while developing its crowdsourcing process.

The first observation is that Innonatives provides only some generic guidelines about the challenge creation,

The platform could provide to the Challenge Owners some further tools to create a complete brief, especially talking about Solutions Requirements and Selection Criteria.

Although Innonatives has its focus in sustainability, few tools are provided to Promoters to understand the impact of the solutions.

SuM/Br team set its own list of Requirements and Selection Criteria, and counted on the help of Prof Aguinaldo dos Santos as sustainability expert.

Although there's a space available to upload a video, no guidelines tips or suggestions are provided to develop a catchy video to promote the challenge.

Also Challenge phases can create doubts: it's not clear if the three phases are consecutive or if they should be all simultaneously open, with different deliverables depending on the solution development phase.

For example, the SuM/Br design team decided to create three different phases and select the best ideas submitted during each one.

Also Deliverables for each phase were pretty unclear, and was the team itself who decided what to ask to designers.

Chapter 5: Conclusions.

Conclusions of this work would be structured in 3 phases:

- the internal results of the pilot project “Sustainability Maker Brazil”
- the insights learnt from the test of the platform “Innonatives”
- general overview on the effectiveness of crowdsourcing strategies and their impact on sustainability in emerging contexts, with focus on low income communities.

5.1 Sustainability Maker Brazil: an overview.

SuM Brazil Project has been piloted along a whole year; it was a reach soil for tests and reflections, thanks to the diversity of stakeholders involved in the process.

The first insight learnt from the action research has been the importance of create a connection with the local community; according to Barkin “the challenge is to find opinion leaders and influences; it’s important to note that is not uncommon that such people are not community leaders.”

Barkin also affirms that benefits must be mutual, and the communities should be visited often to a successful interaction; all this affirmation were validated and confirmed during the research process.

Águas Claras is a small community, and its residents were initially distrustful and intimidated by the research team ; the collaboration of the community leader Mrs Rodrigues and her family was crucial for the good outcome of the field research, and during the whole process.

Conquer her trust and respect has been a primary goal, reached through transparent communication, authentic behaviour and building mutual esteem.

To avoid that participants feel utilized, the project intentions and realistic expectation as well as the involvement required were expressed in the most authentic way possible.

As the participation of Águas Claras residents was spontaneous and volunteer, their working and leisure schedule was respected as much as possible; the research’s time schedule has been structured not with the aim of being time and resource effective, but matching residents tasks.

The overall interest and participation about the project has been a bit lower than the expectations.

In particular, the research team felt a general lack of interest from young people; although they are massive technology users, and could give a meaningful contribution to the research, their opinion have almost be unexpressed.

The better results were observed among middle-aged residents, that maybe felt more engaged in the households issues due to their higher connection with the topic: the majority of them build or contributed in building their houses, and have a wider perception of problems related with building, cleaning, organizing the domestic landscape.

The research method:

Action research has been a successful strategy to produce meaningful results; about not all the techniques used had a positive outcome, the cyclic process build around test and improvements gave the research team the opportunity of correct and re-focus the next actions.

The qualitative, on field data collection had a positive outcome, although it requires a high participation of researchers and terms of resources and time.

Among the tools and techniques used by the researchers, oral techniques such as storytelling and interviews gave the better results, but only when they were performed inside the context the research. Also visual approaches such as taking photos gave good results, and were more simple for the residents to undertake without the support of designers.

Activities such as drawing or sketching were not so effective without the support of the researchers, may be caused by the poor drawing skills of the residents; a possible improvement

could be perform drawing/ sketching activities with the support of designers, that will draw according to the instruction of the residents.

The tools used could be collected in a toolkit that would facilitate replicability of the research and the crowd-led process in different contexts (different communities in Curitiba city area, as well as other cities or region of the country).

Households issues and sustainability related problems in a low income context are so numerous that one single challenge could not condense all of them; although price is not, theoretically, a main driver in low income customers in practice few items match their limited economic possibilities.

Both construction materials and furniture are either gained or second hand or bought according to the most advantageous credit or pricing method.

For these reason, furniture are often excessive and disproportionate if compared with the available space within houses; planned furniture stores are an un-realistic options for low-income classes, and low-budget furniture store offer solutions that don't fulfil users necessities;

Most of the residents own a smartphone with internet access, but this factor is not a sufficient condition to affirm that low income consumers have internet access and can easily undertake tasks online.

Most of smartphone owners only rely on internet coverage within the community, which is really poor, and don't use the potential of the smartphone as much as they could: phones are mainly use for phone calls, messages and social network access (mainly on facebook, youtube, whatsapp).

Although some tasks within the research were meant to be undertaken online, the results were not the expected, since the residents of the community mainly use facebook to entertain and for fun and are not very used with other features offered by the social network (voting, communicate with the research team, get actively involved in an initiative etc).

An hybrid approach should be adopted also for the crowdsourcing phase: as observed in Open Innovation initiatives like Múrmura, digital platform work effective tools to facilitate the development of local, small scale, physical initiatives; Innonatives should work as a empowering technology, but it can not completely substitute physical, local generated actions. It's important to engage local communities in such actions, promoting participation and collaboration, stimulate in report issues and suggest improvements; through the platform a worldwide network of potential solvers can contribute in solve local problem, and also contribute in connect the different stakeholders: companies that could implement the solutions, potential investors etc.

The mixed digital and physical approach could also benefit the communication strategy of the crowdsourcing process, using social networks and internet to support events or group experiences such as workshops, presentations, jams etc. A visual approach is recommended to communicate the challenge online: photos, image, real-life references and experiences are more relevant than just pure descriptions or texts to enhance participation and also give a more reliable overview of the context in which the challenge is setted.

The company involvement

Ecodesign was involved in a second time of the project, when the researchers perceived that the contribution of a sponsor company would drastically improve the process; the importance of a business, market oriented company, was important under different points of view:

- During the problem scouting phase, having a reference company was helpful to delimit the research problem to household. Low income communities faces so many issues in every day life that indicate a single one was unrealistic. As Ecodesign is a eco-furniture brand, the field research was focused on discover problems related to spaces, rooms and activities, in a social-oriented point of view.
- Ecodesign provided a concrete, individual motivation for contributions, offering the development of a prototype and the inclusion of the winner project in their products portfolio; as monetary reward, Ecodesign offered a 50% on sales profits. Motivation and rewards are a huge fuel for idea contests, and Sustainability Maker Brazil needed to offer them to their contributors.
- The company core business (recycled wood from second hand pallets) has been an important element during the challenge and brief creation, defining selection criteria and product requirements. The best projects were chosen among the ones that match at the same time the community needs, sustainability criteria and the company portfolio.
- Developing a prototype was also important to capture the community attention and curiosity and further motivate them in the crowdvoting.

Perhaps, the involvement of Ecodesign as a sponsor also contribute in some negative aspects, such as:

- As the working field of Ecodesign in really limited, it did not provides many opportunities of innovation; their products are generally simple and minimal, and their visual identity don't match low income customers preferences.
- the necessity to develop a product also limited the range of solutions; no services or re-design were proposed, not matching the solution requirements.
- Ecodesign is a recently-founded, new company in the design scene in Curitiba; as previously analyzed, one of the main motivation for posting solutions in an idea contest is to create network and portfolio improvements; Ecodesign is unknown worldwide, point that may dissuade solvers outside Brazil in proposing their solutions.

The challenge phase has been supported by a consistent theoretical analysis; the brief test confirmed the importance of supplying the material both in english and portuguese, since english is not so widespread in the country. The language barrier is an important element asking contributions from local communities, especially the poorest, that have access to internet but can not understand texts in english.

The crowdsourcing phase has been the most critical one in the whole process; such complexity may be attributed to different reasons: the recent introduction of Innonatives online, the lack of a large community within the platform, a general indifference towards the challenge.

Few weeks after the launch of the challenge, the team immediately perceived that the digital promotion strategy (facebook posts, invitation to participate for students and designers in Curitiba, diffusion of the challenge with other universities etc) was not enough to catch ideas and possible innovations.

The creation of a Toolkit for organize Idea Jams around the city and in other cities and university has been one of the positive achievements of the research. Organize physical crowdsourcing workshops positively affected the participation in the challenge, as the biggest number of ideas posted were developed during such sessions.

The quality and the concrete innovation level of the submitted material has been questioned by the research team and, more in general, by the SuM Project team.

Ideas, Concepts and Solutions within “the kitchen challenge” were developed by students during the workshops, but the quality has been very dishomogeneous and sometimes poor.

The reason of the low level of innovation have been reconducted to multiple factors:

- The ideas and concepts were developed during university class and sometimes students perceived it as an assignment and not an opportunity to improve their sustainability knowledge or test their product/service design skills.
- The workshop were conducted in 3 hours, approximately. Although the research team underlined the possibility of further develop the ideas before upload on the platform, some students just posted the result of the quick idea generation session.
- The benefits offered as a motivation for participation were not so attractive for the target audience (designer studios, design students etc); this might have been affected by the small dimension and diffusion of the sponsor company.
- The very same raw materials and technologies that constitute Ecodesign core business could have been a limitation on the innovation process. Ecodesign furnitures promote simplicity and resources economization, and might have discouraged participation.
- no professionals, studios or communities participated within the submissions.

Sustainability Maker Brazil: future steps

The SuM Brazil Project has been an overall positive experience for the researchers and represent a good reference for future similar initiatives.

SuM Brazil actions within the research, the tools and techniques used have been tested and some remarkable improvements were made, leaving as result a research method and guideline, tips and a set of tools for future possible projects.

How could the possible actions be organized?

The very first observation concerns the field of investigation; low-income households is a huge topic that involves multiple issues. “The Kitchen Challenge” was mostly focus about the bad organization of the small space in low income kitchens and the consequent problems related to socialization and leisure activities.

Nevertheless, as proved by the big quantity of raw material collected along the field research weeks, space within kitchens is just one of the huge numbers of problems reported during the research: unsafe electricity systems, humidity and infiltration, lack of finishing, problems related to difficult cleaning surfaces (especially in kitchens and bathrooms) were just some other highly reported issues that could be crowdsourced.

MIT HeartHack initiative showed that, to encourage users in submit ideas and promote participations, complex and “scary” issues (such as social housing) could be “split” into multiple, smaller and more affordable problems that can be combined to pursuit better results.

An interesting insights from WorldBank (2011) report is the importance of national social housing initiatives to achieve sustainable development in Brazil. The report show how adopting sustainable solution within governmental programs (such as MCMV or MCM) can actually enhance bigger scale transformations and have benefits for environmental, social and economic sustainability (WorldBank; 2011).

SuM Brazil future initiatives could be focused on local and national social housing initiatives and look for the partnership of local companies related to material construction as well as furniture, to have a more realistic application of the crowdsourced solutions.

Establish requirements and selection criteria would be facilitated, since such programs generally rely in standards dimensions and specific rules.

Although the domestic dwelling represents a primary urgent issues low-income communities face, it's not the only one. SuM Brazil could open up to some further fields of action, such as the lack of infrastructures, reorganization of public spaces, bottom-up collaborative services, alternative forms of transportation etc.

As observed, many low-income families use secondary, part-time an artisanal activity to earn extra money: cooking snacks, knit, wood toys etc. Promote such activities and add value to the artifacts realized in local communities in another topic that could easily be explored. -

A different approach could be adopted: Innonatives could, for instance, allow people in posting solutions already founded for a specific problem. Low income communities are really context-connected but ideas developed in India or South Africa could be adapted for the brazilian context and have a positive outcome.

Other strategy could propose the re-design of already existent (and successful) product and services and ask the crowd to re-adapt them to fit the low income context.

A significant element has been the participation of a company as a sponsor; the involvement of a firm has to be a pillar for possible future context. The researchers should try to tackle companies interest on open innovation strategies and promote the use of Innonatives to increase possibilities of improvements.

Bigger or well known companies could improve the participation at the crowdsourcing phase, and try to recreate them is a challenge for the next initiatives of SuM Brazil, since in the

metropolitan area are located the headquarters of big companies such as Renault, Volkswagen, CocaCola, Whirlpool etc etc.

A further challenge, but also big opportunity, could be the involvement of governmental institutions and crowdsource solutions to improve services and infrastructure related to low income communities. Public transportation, health system, leisure, child and elderly care are issues that affects all the population but that creates biggest repercussions within low income contexts.

Solve this problems through products is not the best options, since services would have more impact on sustainability.

5.2 The Innonatives platform

“The Kitchen challenge” has been a great test to evaluate how the platform works and support both the crowd and the crowdsourcer during the open-innovation process; the insights of the project, together with the Innonatives usability analysis, were a strong base to suggest some improvements.

The SuM project research team felt like Innonatives lacks in contents and tools supporting their users; another weak point is the community: as the platform is new-born, it still has to build its audience and “attract” possible solvers.

Ideas and solutions are developed through collaboration, so it’s crucial to develop some tools to enhance the participation of a larger group or solvers into the crowd design process.

Also the “sustainability oriented” contents is not as present as it should be: the blog is still empty and no tools are offered to improve users knowledge on the topic or with the aim of developing new design and evaluation skills.

Starting from this observation, improvements should be focused on improve the experience of users, in addition to help enhance the construction of a strong community.

Toolkit might be helpful to lead with communities with no experience with design activities, when the design team wants to have deep insights from people or replicate a successful actions within a local community, that might be troubling.

Toolkits are flexible and can be used for different goals; they generally contain linked learning materials (further informations on sustainability could be provided), link to other resources on the web whenever possible (remix existing contents when possible, always with attributions), tools and tips to undertake a certain process.

Starting from the SuM Brazil experience, two actions were identified as critical: the creation of the challenge brief and the evaluation of the submitted solutions.

The crowdsourcing brief is a description of the challenge and of the company involved, and it’s the first contact within the crowd of possible solvers, therefore promoters should present effectively the problem they’re trying to crowdsource.

Promoters should write the brief in order to maximize the potential and increment the rate of success of a challenge, avoiding mistakes, such as don’t communicate why the challenge is meaningful and the positive impact that solutions are going to create.

As Innonatives is focused on sustainability, the brief should include considerations about sustainability indicators and selection criteria.

The second crucial questions for a successful open-innovation process for Promoters is the evaluation phase.

Evaluate the best solutions that solves a challenge is crucial. Sometimes, Promoters don't have a figure inside their staff that has the knowledge to understand which solutions should be chosen, especially when it comes to the sustainability dimension.

Although Innovations Expert Panel has the important role of helping and guiding the decisions, Innonatives has the aim of create and spread skills and knowledge on innovation and sustainability.

Engage the community

Build an audience and enhance the feeling of belonging to a community is an hard topic. For SuM Brazil, integrate some off-line moments and meeting helped the good outcome of the crowdsourcing process: physical meeting and team work to solve a challenge can be funny and stimulating, and gave the opportunity of give some theoretical content on open innovation and crowd design.

Two categories of potential situations to build the community are promising: within local communities and in universities and schools.

In schools or universities, organize a session could be a moment of learning and making. The sessions can have different levels of involvements: from a simple brainstorm among colleagues to organize regular sessions campus-based.

The best strategy vastly depends on school's culture, interests and schedule. It's not important if the contributions are complete solutions or just votes or comment, the most important thing is to share Innonatives, its challenges and its guiding principles within the school network, in a high-impact,engaging, authentic and fun way.

As Innonatives promotes the idea that anybody can be a Solver, there is no certainty that students undertaking the challenges are design students, and that's why a guideline on how to develop their ideas should be given.

As there's no opportunity for Innonatives to follow directly each group of contributors, toolkits are a good tool for small-medium groups to self-organize their meetings and submissions.

To upload the ideas generated during school or university sessions, students and teachers will find upload formats or submission tips, where they can place all the deliverables.

As said for schools, some off-line sessions within local communities can efficiently support the on-line, web based collaboration process. Local communities might be a working team, a family, a group of friends, an organization somebody work or volunteer for etc.

The only limitation is their genuine interest in the challenge, in sustainability or open innovation: neither their experience nor working background is important.

The toolkit would be addressed to a member of this community that is going to be a mediator between the platform and the community, facilitating group meeting and brainstorm sessions; the sessions will follow the same scheme as the school meeting, but offers also some tips on

how to set up the best space for the meeting, how to evaluate the best organizational strategy according on how many people is going to attend etc.

The toolkit would also provide some theoretical content on sustainability and on how to introduce sustainability priorities within the design process.

5.3 Sustainability impact of crowdsourcing in low income, emergent contexts.

The conclusive paragraph of this work will offer a critical overview on the adoption of crowdsourcing strategies in the sustainable development of low income communities.

The considerations made within the paragraph are going to be developed starting from both the theoretical background (assertions and hypotheses) and the experience of SuM Brazil.

The structure of a traditional new product development (could be a product, a service or a technology) is used to understand, in a comparative way, in which phases of the design process, open innovation and a crowd-led model is more efficient and offers further possibilities of improvement.

The pre-development phase, involving the strategic planning of the product and the planning of the project, is traditionally performed by an internal R&D, but it could be positively influenced by the adoption of some external sources or open innovation techniques, such as the knowledge of individuals, customers' ideas and technology adoption ; as argued in chapter 2, low income users are still an unexplored target audience, their needs and characteristic not yet defined. Crowdsourcing the research within the context of use of new product and services or problems involving low income communities could be an effective way to improve cost and resources involved this complex phase, helping companies and organization in create more products diversity and better fulfill customers needs and preferences.

Within the last 40 years, the R&D made in low income countries grew till the 27% of total worldwide research (Kaplinski, 2011); more and more companies are targeting emerging and low income markets as an area of improvement, nevertheless their level of knowledge of such contexts is very poor, determined an high risk.

Improve the knowledge around the low income context would probably underline the necessity of re-think and re-design how products are designed, produced, sold, used etc. Already existing solution would need to be re-shaped.

Open Innovation could be the key to create a network to enhance the diffusion knowledge about successful pattern within the design process, since a cost-effective method to catch insights from new locations and from diverse, multiple sources: customers, communities, researchers, design studios, other companies etc

Particularly in vast countries such as Brazil, India, China, local communities can not be identified through uniques descriptions, since the characteristics are very different from one area of the country to another. Lower classes in these markets represents the largest part of the country's' population, and their development would play a relevant role in the sustainable development; while developed countries and upper classes generally perform a capitalistic model of consumption, it's almost impossible imagine that also lower classes could consume

as much as upper classes do. the consume paradigm should face a huge shift, from access to product to access to services; that is why Improve how low income classes access and use services will have giant consequences on the environmental, social and economic development of emerging countries.

In emerging countries, and with focus on the social agenda, open innovation will be probably the key to contribute in start societal challenges like water and energy supply, health, public transportation etc. Both private corporation and public institution should invest in open innovation to foster the sustainable development.

To reach valuable results in the sustainable development in emerging countries, a huge shift should be made, from the traditional technology transfer mentality to a collaborative, inclusive one.

In this scenario, low income countries start being a partner for sustainable development and social innovation. Low income markets should be empowered to provide inputs and participate in the innovation process, and to reach such goal, the production and circulation of knowledge will have to find its balance between competition and cooperation; for this reason, the adoption of an open innovation approach seems to be the more effective to reach such goal.

Big, worldwide challenges the world is facing (renewable energies, malnutrition, access to drinkable water etc) and that are crucial in emerging countries should be faces using a “small challenges thinking” (Guímon, 2014) , adopting multiple strategies to reach the biggest goal. New technologies development could be created in different ways: incremental innovation or frugal innovation.

Gross Roth innovation, or innovation led by the BoP users, is one of the most promising techniques to solve emerging countries most urgent and biggest problems: transform informal business in formal, regulated activities;

Crowdsourcing and open innovation can be effective in two main senses:

- to perform a small scale activity, addressing really local needs that don't fit in current market demand. in cases when a product, technology or service benefit just a very small target audience, big company could not be interest in invest in research, innovation or development of a solution. crowdsourcing and collective funding could solve such problems.
- the reach radical innovation

Designers as a facilitator to promote the sustainable development of low income communities.

A key element emerged from the research project and the theoretical analysis is the crucial role of designers as mediators: design for sustainability is not about prediction and control, but about appropriate participation, flexibility, and constant learning (Wahl, Baxter; 2008).

Sustainable development is a community-based process of coevolution and learning that involves both design decisions and responsible citizens that progressively become co-designers

of future sustainable solutions (Wahl, Baxter; 2008); in this complex landscape, design must play the meaningful role of mediator and facilitator, as promoted by Vezzoli (2010), who highlights the crucial paper of design professionals in the promotion and development of local-based activities and initiatives, organized in network; the author also promotes the interaction between local communities and companies to fulfill more sustainable solutions. Sustainability requires the ability of an informed citizenry to engage in the process of continuous lifelong learning through transdisciplinary dialogue. Sustainability depends on the full participation of responsible and informed local communities that meet their needs within the limits of their local ecosystems and the biosphere, thus remaining able to respond and adapt to global and local changes of both nature and culture (Wahl, Baxter; 2008). The sustainable development of low income communities in Brazil is an issue involving multiple actors (residents of the communities also local administrations, federal government, companies and community administrators) and requires appropriate interactions and relationships among the active participants in the complex cultural, social, and ecological system. Users within low income communities actually gives meaningful insights about products and services they consume, and express their needs better when they are inside their context of use; a transdisciplinary design dialogue connecting companies and communities can help to contextualize the contributions that diverse perspectives can make to more inclusive decision-making processes that are informed by a wider knowledge base (Wahl, Baxter; 2008). Also in this sense, designers play a relevant role: although BoP users are conscious and success in express the issues they are facing, the solutions they propose (vernacular, home-build, DIY solutions) are sometimes not appropriate for safety and are very risky. The solutions to “urgent sustainability problems” are also more likely to be new processes, lifestyles, and changes in meaning, rather than purely material artifacts. The necessary shift towards more appropriate and sustainable modes of participation requires that design and education contribute to a widespread increase in social and ecological awareness through transdisciplinary design dialogues (Wahl, Baxter; 2008).

5.3.1 Critical aspects of Crowdsourcing for reach sustainable development

This paragraph is a reflection on the weaknesses of crowd-led processes; however, the following list should be intended more as a challenge for further improvements to create better and better results rather than a reason to discourage the adoption of crowdsourcing in low income contexts.

The first weak point is still the disequality in the digital inclusion between upper classes and developed countries and BoP users and emerging contexts. To ensure a democratic participation both in knowledge creation and diffusion process, the democratization of technologies should be an high priority in emerging countries, as a key for social inclusion and innovation.

ICTs are covering a leading role in promote services for banking, health, education etc; design, open innovation and crowdsourcing could play a relevant role in adapting those services to better fulfil BoPs users necessities and create high quality user experience.

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