

Cooperating for Sustainability

Experiments on Uncertainty,  
Conditional Cooperation and Inequality



# Cooperating for Sustainability

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Conditional Cooperation and Inequality

Marijane Luistro Jonsson





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Cooperating for Sustainability: Experiments on Uncertainty, Conditional  
Cooperation and Inequality

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To  
*victims of disasters due to insufficient cooperation*



# Foreword

This volume is the result of a research project carried out at the Department of Marketing and Strategy at the Stockholm School of Economics (SSE).

This volume is submitted as a doctor's thesis at SSE. In keeping with the policies of SSE, the author has been entirely free to conduct and present her research in the manner of her choosing as an expression of her own ideas.

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*Bonn, July 24, 2015*

*[Marijane Luistro Jonsson]*

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Part 1:  
Summary of the Dissertation





# Chapter 1

## Introduction

"If you want to go fast, go alone. If you want to  
go far, go together."  
*South African Proverb*

### Background

The above quotation gives a glimpse of the content of this dissertation. It resonates to one of the complexities inherent in collaborating for sustainability – the perpetual decision of choosing between our self-interests (going fast) and the collective benefits (going far). This chapter sets the scene as it shows how the sustainable development agenda gave birth to collaborations that integrate and change the role of business in society. To contribute successfully to sustainability, these collaborations also need to sustain themselves in facing global challenges such as growing social inequality and environmental instability. However, it is not evident from current knowledge if they will be able to persist in the face of disasters and inequality. Under these conditions, can cooperation among its members go far when some of its members want to go fast? What type of cooperation emerges in these conditions? These are some of the questions we encounter in understanding the intricacies of collaboration in general, and cooperation in particular – in a world of increasing uncertainty and inequality.

## Collaboration for Development

Since its proclamation as a global agenda, sustainable development has become a familiar concept that we encounter daily. In the 1980s, the Brundtland Commission set the challenge for generations to meet their own needs, without compromising the ability of future generations to likewise meet their own needs (Brundtland & World Commission on Environment and Development, 1987). It was an effort to address the inter-related development and environmental challenges facing the world, and introduce a path that leads toward a combined economic growth, environmental protection and social equality. A couple of decades later, the concept has grown into a popular term, embraced by various sectors in different countries. Governments, business communities, civil societies, local communities and academia immersed themselves in projects involving sustainability. In particular, corporations reinvented their reputations as they attached themselves to voluntary corporate social responsibility (CSR) initiatives and human rights principles. To date, there are more than 8,000 corporations and 4,000 other stakeholders from 145 countries adhering to the UN Global Compact's common principles in the areas of human rights, labour, environment and anti-corruption (UN Global Compact, 2013). Moreover, business is active in providing infrastructure and building capacity in developing countries, as aid agencies push private sector involvement instead of giving donations (e.g. OECD, 2005; OECD, 2008).

Alongside the popularity of sustainability was the recognition that global challenges are inter-related and no single actor alone can solve problems that go beyond national and sector boundaries. Thus, there was also a perpetuation of collaborative actions to meet the challenges of sustainable development. This can be seen for example in one of the Millennium Development Goals to end the global problem of poverty by the year 2015, formalized under the agenda "Towards Global Partnerships" (UN Resolution 62/211, 2008). The call for collaboration particularly emphasized the involvement of business actors and the private sector, as can be observed in the rhetoric of the United Nations:

“Sustainable development is not only about promoting economic and social well-being while protecting the environment, it is about working together, across the globe, to responsibly manage the earth’s life support systems and ecosystems. This is a collective undertaking that requires all countries to cooperate to secure our common future. It also requires the engagement of all actors, particularly business and industry and other major groups of society.”

*Wu Hongbo, UN Under-Secretary-General for Economic and Social Affairs, Op-ed on the Occasion of the First Anniversary of Rio+20, June 2013*

“We cannot achieve a more equitable, prosperous and sustainable future without business engagement and solutions.”

*Ban Ki Moon, UN Secretary-General, Global Corporate Sustainability Report, 2013*

The response of business to the call to engage and be part of collaborations led to the creation of new products, services, business models and markets fostering sustainability. We begin to hear about the "green" economy and organic markets which promote environmental-friendly and socially-fair produced goods; the "circular" and "shared" economies which stimulate industries to recycle and re-use resources; and "inclusive or the base-of-the-pyramid" markets which encourage multinational companies to collaborate and create value with local communities. Concrete examples show that in the green economy, the Body Shop collaborates with local farmers, communities and NGOs in developing countries to create organic cosmetic products and a supply chain that considers environmental and social concerns. In the circular and shared economy, Indiska, KappAhl and Lindex collaborates with Indian municipalities and local textile manufacturers, as well as with the Swedish aid agency and water experts, to build textile manufacturing zones with environmentally-friendly dyeing technologies, recyclable water management practices, and re-use of materials. In the base-of-the-pyramid market, Ericsson collaborates with NGOs, governments, different local sectors, and local communities in the development of renewable energy and solar-power base stations in developing countries to reduce carbon emissions, and in the construction of villages to improve health, education and livelihoods in sub-Saharan Africa.

These cross-sector collaborations often face challenging conditions. In most cases, and as in the given examples, the goods, services and markets integrating sustainability are produced or provided in vulnerable areas of the world, which are often badly hit by natural disasters. Scientists argue that natural disasters are generally expected to increase now that we have entered the Anthropocene age. Human activities have escalated beyond the carrying capacity of the world's resources and limits of our planetary systems, creating a more vulnerable world marked with biodiversity loss, climate change and interference with the nitrogen cycle (Rockström et al., 2009). As a result, we experience increasing numbers of systemic shocks in the biosphere, which are symptoms of long-term stressors like climate change. This is seen as extreme events or natural disasters have become more frequent and intensified in the recent years, such as the longer droughts, stronger typhoons, sudden temperature drops, harsher winter storms, frequent heat waves and rampant floods.

Climate reports show that the losses these disasters create are also escalating, particularly among vulnerable societies (Kreft & Eckstein, 2013). For instance, when typhoon Haiyan hit the Philippines in November 2013, more than 6,500 lives were lost, around 225 million USD of agricultural crops were damaged, and many of the affected 11 million people were left homeless. The typhoon happened barely a month after one of the deadliest earthquakes left parts of the country in rubble, and another typhoon and earthquake followed after a few days. The typhoon caused damages as well in neighbouring countries like Vietnam, Taiwan and China. At the same time, a cyclone hit Northern Somalia that left almost 500 fatalities and missing people. With these recurring natural disasters, collaborations are becoming more important in order to deal with the aftermaths, and relevant for the prevention and mitigation of future disasters. However, these collaborations are also vulnerable to the disasters.

These recurring natural disasters also mirror the series of economic crises and political upheavals that have risen from the worsening poverty and deteriorating social systems in different societies. Although these different types of repeated disasters vary in their nature and impact, a common characteristic is that they usually occur in developing nations and they can be prevented or mitigated when there is ample cooperation. In most cases, the

losses could have been avoided or minimized with sufficient cooperation among influential decision-makers. However, similar to cross-sector collaborations for sustainability, we do not know with certainty if cooperation among important actors will be able to sustain itself in the face of repeated economic and political disasters. The collective scientific knowledge remains unclear and limited whether human cooperation can persist in a precarious environment. We also do not know what happens to the underlying mechanisms driving cooperation in these situations. Do individuals continue to cooperate conditionally, as claimed by studies on cooperation in a deterministic environment, or do we change the way we interact with others when there is uncertainty involved?

The other inconvenient truth that cross-sector collaborations face is the inherent inequalities among its members. Since the actors come from different sectors and countries, they have varying stakes and are affected in different ways when natural disasters occur. In general, they often have different interests and preferences, resources and status that can cause conflicts and tensions. On one hand, there are business actors, who have the advantage of having more financial resources, influence, and power than other actors. Business actors are often corporations based in high-income countries or the affluent members of the local communities, who have other resources to count on when disasters affect them. On the other hand, there are local and marginalized communities, who are often the targeted beneficiaries of the sustainability projects, but whose voices are often missing and hijacked by the global agendas. There are also actors from governments and public sectors involved in the collaboration, who are exposed to a different organizational culture and have another *raison de être* from business. These inequalities complicate collaborations, in addition to the volatile and uncertain environment. There is a tendency to over-emphasize win-win arguments and synergies among these actors involved, and overlook the possible tensions that may arise from their inequalities. Thus, the inclusion of business partners into collaborations is not a simple solution that assures long-term success.

Inequality is all around us, and is a structural condition that collaborations need to factor in. Income and wealth inequality, already at historically high levels, is predicted to continue to grow (Piketty, 2014). The 2013 Unit-

ed Nations Report on the World Social Situation informs that high-income countries, comprising of 16% of the world's population, generate 55% of global income, while low-income countries, comprising of 72% of the world's population, create just above 1% of global income (United Nations, 2013). Other than income, disparities in education, health and other dimensions of human development also remain large despite marked progress in reducing the gaps. One can say that inequality is a double edge sword - while deprivation can drive innovation, yearning to maintain status quo can worsen impoverishment. The latter is especially true when societal structures allow less mobility in the economic and social ladder (Reich, 2008), which is often the case in developing countries.

Therefore, scaling-up sustainability collaboration initiatives has been quite a challenge. Although one can find several cases here and there, they have not been fuelling the engine of sustainable development. Not only do they have to deal with disturbances caused by natural disasters but the inherent inequality among themselves. Moreover, the presence of cross-sector collaborations alone does not assure success for sustainability. It can happen that they are created for greenwashing and window-dressing purposes for some actors, and in reality, there is more depletion and mismanagement of resources happening behind the scenes. On the contrary, there are cases when extra efforts to transform behaviour among actors happen, such as when consumers change their purchasing habits, workers minimize wastage in using and producing goods, and investors alter goals and preferences to include the needs of the marginalized. Still, we do not know from the surface if self-interests or the common good is driving the collaborations. Thus, collaborating for sustainability is not a simple and straightforward process, and we do not know if it can persist with increasing disasters and inequality.

In retrospect, the role of business in sustainability requires more reflection beyond the pronouncements and agendas of the United Nations. Sustainable development can indeed be achieved through collaborations, but these collaborations need to be sustainable as well. An understanding of the complexities and dynamics behind cooperation can give an awareness that we cannot always go both fast and far in the path towards sustainability.

## Towards an interdisciplinary approach

There has been an increasing interest in the past decades to study the phenomenon of collaborating for sustainability in the management literature. However, as will be discussed in the next chapter, most of the studies in this area remain in the macro and organizational levels, most methods are qualitative, and theories are descriptive. Analysing business collaborations from an individual level is also important, as some would argue that it is the individual and not the corporations who decides, act and collaborate. Business corporations are not people but merely legal fictions and bundles of contractual agreements (Reich, 2008). As individuals, business actors might be influenced by the organizational environment they represent, but they are the ones deciding, acting and collaborating, not the business organization.

In filling the void in the individual level, this dissertation takes an interdisciplinary approach, using the lenses of game theory and behavioural economics to come up with more predictive studies on human cooperation. Although the terms collaboration and cooperation have different definitions as will be shown in the literature review, they are often used interchangeably and viewed as referring to the same phenomenon. In this dissertation, the term collaboration infers to empirical real-world cases, while cooperation refers to the abstract theoretical dynamics behind it.

When taking a behavioural economics perspective, one can alternatively view the intricacies of collaboration through a public goods game approach. The sustainability platform can be considered as public goods, where no one is excluded from availing the benefits, even if it results from the efforts of only some actors and others free-ride on the sustainability bandwagon. This situation is not far from what our ancestors experienced when they protected their small communities from danger. They built walls of sandbags and fences to prohibit floods and predators from entering. Everybody is welcome to help in piling up the sandbags. If there were no floods, the labour of those who helped were wasted; if the flood occurred and the water level was above the built wall, everyone's homes will be damaged; if the flood occurred and the wall was higher than the water level, everyone's homes including those who did not help was protected. Other similar ex-

amples are vaccination and disease prevention programmes that will only be effective as long as everyone vaccinates themselves and their children or take the sanitation measures promoted to prevent an epidemic.

These examples show that as individuals cooperate, they face the basic dilemma of choosing between self and collective interests, both in the short- and long-term. This dilemma has always been present at the core of the sustainable development concept, of having to consider future generations in making our present decisions. There is a perpetual threat that the present generation will exhaust and destroy the natural resources of the planet, leaving nothing for future generations. If the efforts and contributions of the business community is not enough to curb the environmental repercussions of human activities, we all share the consequences of having a bleak or no future for our children. On the other hand, if business can contribute in changing the path of an insatiable consumption pattern and wasteful use of resources, we can all together share a healthier planet and a sustainable future. Imparting a better world for future generations can be regarded as part of the collective interest, where the current actors also gain some direct benefits or sense of achievement from these sustainable development endeavours when they are provided. The question we need to answer first is if the contributions and efforts of actors in these cross-sector collaborations will sustain or wane into the future. Can human cooperation thrive, considering current conditions in the environment, where disasters can strike anytime and the gap between the rich and poor is growing?

## Purpose of the Study and Research Questions

The overall purpose of this dissertation is to explore the persistence of cooperation in an uncertain and unequal world. To achieve this purpose, it aims to experimentally investigate and compare cooperation and strategy patterns in different environments. This provides an alternative perspective in incrementally understanding the dynamics of collaboration in the individual level. Therefore, to contribute to the over-all purpose, the different papers in this dissertation address the following specific research questions, which respectively covers different facets in understanding the persistence of cooperation in an uncertain and unequal world:



- Research Question 1: Does cooperation persist under uncertainty?
- Research Question 2: What forms of cooperation emerges under uncertainty?
- Research Question 3: What happens to cooperation in the presence of inequality and uncertainty?

Research question 1 is addressed in Paper 1 as it explores cooperation under different types of uncertainties. In particular, it investigates what happens to cooperation when there are uncertainties in the timing, threshold level and impact of repeated disasters. Paper 2 delves deeper as it explores the interaction strategies and mechanisms that emerge behind the effects investigated in Paper 1. In particular, it investigates if conditional cooperation is prevalent, or is replaced by another pattern of interaction. Finally, Paper 3 adds inequality into the picture by exploring if cooperation persists, what form of cooperation emerges and who cooperates more when there is both inequality and uncertainty. It extends the findings and analyses of Papers 1 and 2 by including inequality in an uncertain world.

## Intended Contributions

By crossing disciplines, this dissertation aims to offer business research an alternative perspective and method in studying cooperation, and provide a deeper understanding of the intricacies of collaborations. Theoretically, it aims to fill a void in the cross-sector collaboration literature, through presenting a game theoretical and behavioural economics approach to analyse cooperation on the individual level. It also attempts to extend current theories in public goods games to go beyond explaining cooperation with a risk for a single disaster, to cover uncertainty for repeated disasters. Empirically, the data gathered from different countries – Sweden, South Africa and the Philippines – enriches the empirical knowledge in the experimental field and informs theory on which behavioural predictions are taken. Thus, the different studies specifically contribute to the public goods games literature as they investigate unexplored dimensions of cooperating with uncertainty for repeated disasters. Methodologically, this dissertation shows how exper-

iments can be useful research tools that can give deeper insights to our understanding of concepts such as collaborations. The design of the experiments also presents a novel way of introducing the face of disaster in public goods games. Finally, the results presented in the different papers leave several implications and insights for business, science and policy, as discussed in the conclusion.

## Outline of the Dissertation

This dissertation has two parts. Part I provides a comprehensive summary of the dissertation. While this chapter gives an introduction, the succeeding chapters review the literature, describe the research design, present the papers, and conclude with a synthesis. In particular, Chapter 2 individually reviews and bridges the collaboration literature in business studies with the cooperation literature in behavioural economics. Chapter 3 presents the methodology as it describes the different phases of the research process, from the pre-studies, experiment design and implementation, and the analysis and presentation of the results. Chapter 4 gives an overview of the purpose, design, main findings and contributions of the different papers. Chapter 5 concludes with the synthesis of the studies, implications, limitations and suggestions for future studies. Part II presents the individual papers.

## Chapter 2

# Linking Collaboration and Cooperation

This chapter begins by reviewing concepts related to collaborations for sustainability in the business literature and exposes the missing behavioural dimension in the discourse. It then presents an alternative perspective, particularly how game theory and behavioural economics can contribute in exploring the dynamics of cooperation in the individual level. An overview of public goods games studies on uncertainty and inequality shows the current knowledge from which the different papers build upon. Finally, the chapter concludes by reiterating the link between studies on collaboration and cooperation.

### Collaboration for Sustainability: Reviewing the Business Literature

In reviewing the business literature, one finds that collaboration has many names, ranging from partnerships, joint ventures, and alliances - and they are often used interchangeably. Regardless of the differences in terminologies and definitions, these concepts share a common meaning of being collective efforts having a shared goal. In general, collaboration occurs when a group of autonomous stakeholders of a problem domain engage in an interactive process, using shared rules, norms and structures, and act or decide on issues related to that domain (Wood & Gray, 1991). A growing

research area in this type of collaborations consists of studies where the actors have different specialties and integrates sustainable development as their shared goal. The main actors usually consist of business, government, NGOs, and the local community, and the multitude of combination links between them have given rise to a plethora of concepts and terms such as business-NGO partnerships, public-private partnerships, multi-sector partnerships, etc. This dissertation focuses on collaborations of this nature, where actors from different sectors are engaged in projects integrating sustainable development into its shared goals.

One concept related to these types of collaborations, focusing in particular on poverty issues in developing countries is the *base of the pyramid (BoP)*. The BoP proposition originally posits that there is a fortune for companies to be made by targeting the 4 billion people who are living on less than 2 USD per day while alleviating poverty (Prahalad, 2006). The BoP discourse later shifted its focus on creating fortune "with" and not "at" the BoP (London, Anupindi, & Sheth, 2010), implying a change from top-down to a more collaborative, bottom-up approach. The new orientation claim that BoP research can offer new insights into how collaborative interdependence between sectors can lead to more sustainable and scalable outcomes, and enhance the connection between profits and alleviation of poverty (London & Anupindi, 2011). A systematic review of a decade-long BoP literature shows that the BoP concept evolved dramatically where the role of the multinational companies is de-emphasized, giving wider variations of BoP contexts and initiatives (Kolk, Rivera-Santos, & Rufin, 2013). The BoP, nevertheless, is also used as a term representing the "poor" or the people at the base of the global socio-economic ladder, who primarily transact in an informal market economy (London, 2008). Other terms used to refer to the BoP are inclusive markets, emerging market models, and untapped markets.

There have been critical views against the BoP literature, namely surrounding its assumptions and impacts, focus on consumption, and overconfidence on market forces (Karnani, 2005; Karnani, 2006; Karnani, 2010; Karnani, 2011). Market solutions for poverty oftentimes romanticize the poor as creative and resilient entrepreneurs, and to be well-informed and discerning consumers (Karnani, 2007; Karnani, 2009). They put an over-

emphasis on micro-credit and under-emphasize the legal, regulatory and social mechanisms that protect the poor (Karnani, 2010). Other critiques also reveal that the BoP literature is naive of the intricacies in working with participatory partnerships with the poor, and underestimates power relations and hierarchies (Arora & Romijn, 2009).

Despite the debate, both proponents and critiques of the BoP appear to generalize the BoP into a homogenous group, the "poor" or emerging market who are devoid of individual preference, history, and values. A critical review of the BoP literature in the next chapter shows how the introduction of the concept leads to stereo-typing of behaviour and hi-jacking of views, in order to bring forth corporate agendas. The BoP discourse nevertheless reveals that individual voices are missing in the literature, where collaborations for poverty alleviation are interpreted from the perspectives of corporations and business actors. Although collaboration is identified as a win-win strategy in doing business at the BoP, the literature does not cover the complexities of the interactions and views of other actors involved in the process.

Another concept dealing with collaborations for sustainability in the business literature is *cross-sector collaboration*. Compared to the BoP, this concept looks beyond the surface of collaboration. It is generally defined as the linking or sharing of information, resources, activities and capabilities of organizations in two or more sectors to achieve jointly an outcome that could not be achieved by organizations in one sector separately (Bryson, Crosby, & Stone, 2006). Similarly, cross-sector social partnerships (CSSP) are voluntary collaborative efforts of actors from organizations in two or more economic sectors cooperatively attempting to solve a problem or issue of mutual concern that is in some ways identified with a public agenda. Actors from business, civil society and governments cooperate to jointly address social issues and challenges such as poverty alleviation, economic development, community capacity building, and environmental sustainability by providing society with "public goods" like clean environment, health care, and education (Waddock, 1988).

The emergence of cross-sector collaborations can be related to the concept of collective social entrepreneurship, where multiple actors address social problems, create new institutions and dismantle outdated institutional

arrangements (Montgomery, Dacin & Dacin, 2012). There is the discovery and exploitation of opportunities to reproduce public goods through the generation of disequilibria in market and non-market environments (Hockerts, 2006). Collectively they form an innovative force for social change, for example, how community-driven enterprises contribute to building social capital (Paredo & Chrisman, 2006) and act as transformation tools for innovation and resilience-building (Westley et al., 2011; Geels and Schot, 2007). The social entrepreneurship literature, however, focus more on entrepreneurs and societal impacts, rather than the collaboration process with the other actors.

There have been a number of systematic reviews of the cross-sector collaboration literature that provide different overviews of this area of study (e.g. Branzei & Le Ber, 2013; Gray & Stites, 2013; Kolk, 2012; Kourula & Laasonen, 2009; Laasonen, Fougère, & Kourula, 2012; Wassmer, Paquin, & Sharma, 2012). These reviews note the increasing popularity of cross-sector collaborations, primarily in the business journals and publications in the last decade (e.g. Gray & Stites, 2013; Kourula & Laasonen, 2009; Kourula & Laasonen, 2009), as well as in public sector, non-profit and interdisciplinary studies publications (Branzei & Le Ber, 2013). In general, these reviews show that although the literature appears to be fragmented and lacking in some aspects, they have actually progressed from the myopic view of business actors that collaborations is the panacea to sustainable development. The various studies begin to uncover the research area through different theoretical lenses, enriching our understanding of the collaboration phenomenon. Table 1 shows a wide array of organizational theories that can be used to explore the different analytical levels in studying cross-sector collaborations for sustainability. These theoretical lenses are matched, but are not limited, to the different level of analyses.

The reviews reveal that the most commonly used theories are institutional, resource dependence and stakeholder theories (Gray & Stites, 2013), and to some extent the resource-based view (Kourula & Laasonen, 2009). These dominating theoretical perspectives are generally suited to research questions and methods in the macro and organizational levels, limiting studies in the individual level. Theories in the individual level are not been commonly used to study cooperation and sustainability. Thus, there is a

void in the individual level, not only because of the limited studies, but generally because of lack of methods and theories (Branzei & Le Ber, 2013; Kourula & Laasonen, 2009) suited to the investigation of individual behaviour in a cooperation. The remaining of this section reviews the cross-sector collaboration literature and the relevant theories used from different levels of analysis to gain a better overview of the study landscape.

Table 1: Overview of Theoretical Perspectives on Sustainability

<b>Levels of Analysis</b>	<b>Theoretical Perspective</b>	<b>View of business involvement in sustainability (Adapted from Gray and Siftes, 2013)</b>
Macro/ Institutional	Institutional theory	To enhance their legitimacy and image as socially and environmentally responsible
	Stakeholder theory	To have better stakeholder relations that can maximize social well-being
	Critical Theories	To reinforce the neo-liberal order without generating substantial changes in resource distribution or the well-being of marginalized groups
	Environmental Justice	To improve environmental fairness through working with various organizations and communities
Meso/ Organizational	Resource-dependence	To reduce environmental uncertainty and secure access to important resources
	Resource-based view	To access and develop heterogeneous and complementary assets and knowledge for competitive advantage
	Network theory	To make the supply chain relationships more sustainable to impact the firm's sustainability direction
	Transaction Cost Economics	To save costs by partnering with others in delivering social goods
Micro/ Individual	Agency theory	To be exposed to key shareholders who can be influential in shaping the business ethics and social responsibility orientations
	Actor Network Theory	To examine the power struggles and controversies among other actors in defining what knowledge will prevail in the collaboration
	Deliberative Democracy and Dialogue Theories	To make changes through authentic deliberation, communication and ethically motivated interactions with others having lower or higher political power in terms of economic wealth or interest group backing

## Macro Level

The studies taking a macro perspective, including those outside the business literature, view cross-sector collaborations as a new form of global governance that bridges multilateral norms and local actions by drawing on diverse actors (Bäckstrand, 2006). To the extreme positive side, they transform social service to social justice, challenging existing practices of power, wealth and control that contribute to the growing inequities in society (Himmelman, 1996). Cross-sector collaborations also become institutions of collective action (Ostrom, 1990; Olsen, 1971) that builds social capital, enhancing the resiliency of vulnerable communities (Adger, 2003; Dietz, Ostrom, & Stern, 2003). On the other hand, critical views would argue that collaborations often have limited inclusiveness and weak accountability mechanisms (Bäckstrand, 2006). The implementation and monitoring of multi-stakeholder standards through auditing companies have also dampen the participation of the different actors (Fransen & Kolk, 2007).

In the business literature, studies taking a macro perspective specifically show that cross-sector collaborations have become legitimate means and implementation channels to address global problems (Kolk, 2012), as well as vehicles to fill-in institutional and regulatory voids in developing markets (Rivera-Santos, Rufin & Kolk, 2012). Examples are BoP and social enterprises cases (Webb, Kistruck, Ireland & Ketchen, 2010; Mair, Martí, & Ventresca, 2012). These studies often use theoretical lenses focusing on institutions, stakeholders, critical views, and environmental justice in viewing the involvement of business actors in sustainability (Gray & Stites, 2006). Institutional theory demonstrates that cross-sector collaborations enhance the legitimacy and image of business actors to be sustainable, especially if they bring in appropriate institutional logics (e.g. Vurro, Dacin & Perrini, 2010; Vurro & Dacin, 2014). Stakeholder theory shows that having better stakeholder relations can maximize sustainability, particularly with fringe stakeholders such as indigeneous communities (e.g. Murphy and Arenas, 2010). Critical theory argues that cross-sector collaborations reinforce neo-liberal agenda without changing resource distribution and the well-being of marginalized groups, so it is important to bring in the voice of the beneficiaries since they also matter for value creation (e.g. Le Ber &



Branzei, 2010). Environmental justice claims that environmental fairness can be improved through working with various communities and organizations, and this entails costs with positive results, for example to consumers (e.g. Oyewole, 2001). The availability of these different theoretical springboards results to an abundance of studies in this level. However, it is difficult to evaluate collaborations in the macro level because aside from lacking good methodologies and outcome measures, collaborations are by nature moving targets that change over time. The few attempts that assess their impacts reveal that only a very few have high overall effectiveness, expressing the need for better institutional design and capacity development (Liese & Beisheim, 2011).

### Organizational Level

In general, studies taking an organizational level of analysis identify the mechanisms behind the formation, process and outcomes of the collaboration. These studies mostly focus on the key factors affecting the success or failure of the outcomes, particularly the drivers, motivations, partner and partnership characteristics, and process issues (Gray & Stites, 2013). Learning, commitment and adaptation are recognized as important factors for success (Berger, Cunningham, & Drumwright, 2004). In opening the black box of the collaboration process, five variable dimensions are identified, namely, governance, administration, organizational autonomy, mutuality, and norms of trust and reciprocity (Thomson & Perry, 2006). Some view collaboration as a linear continuum consisting of philanthropic, transactional, and integration stages (Austin, 2000), or a progression from an arms-length relationships, to interactive collaborations, and then to intensive environmental management alliances (Rondinelli & London, 2003). In contrast, others view it as a non-linear and iterative framework, consisting of initial conditions, process, structure and governance, contingencies and constraints, and outcomes and accountabilities (Bryson, Crosby & Stone, 2006), and can be grouped according to its co-exploration and co-exploitation activities (Parmigiani & Rivera-Santos, 2011). Majority of these studies use case studies and expert interviews with practitioners in examining collaboration, resulting to descriptive and relatively atheoretical studies

(Wassmer et al., 2012). While this approach provides necessary insight into the collaboration phenomenon, there is a need for more theoretically grounded research to establish greater generalizability of conclusions.

In the business literature, studies taking an organizational approach build on theoretical perspectives that focus on the resources, networks and transaction cost aspects (Gray & Stites, 2006). The resource-dependence view would consider collaborations as a way to reduce environmental uncertainty and secure access to important resources, and this applies as well with learning from voluntary codes of conducts (Arya & Salk, 2006). Alternatively, the resource-based view argues that collaborations are helpful to access and develop heterogeneous and complementary assets and knowledge for competitive advantage (e.g. Dahan, Doh, Oetzel & Yaziji, 2010). Studies taking a network theory would posit that collaborations would make the supply chain relationships and networks of board members influence the firm's sustainability direction (e.g. Guo & Acar, 2005). Transaction cost economics view collaborations as a way to save costs by collaborating with others in delivering social goods (e.g. Forsyth, 2007; Rivera-Santos, Rufin & Kolk, 2012).

These studies in the organizational level can be linked to the macro level, for instance, through the typological classification of the different collaboration models based on the contributions of the organizations to sustainability. One framework shows a sustainability continuum, based on the scope of partnership (i.e. increasing with the number of actors, sectors and size of problem area) and degree of shared ownership and responsibility exhibited by the actors (Austin, 2000; Austin & Seitanidi, 2012). From this framework, several types of collaborations are identified (Gray & Stites, 2013). At the lower end are reactive collaborations (e.g. philanthropic and sponsorship activities, short term dyadic problem solving), followed by transaction (e.g. sustained dyadic partnerships, changes in supply chain, eco-labelling, and environmental impact assessments), then integrative (e.g. industry sustainability standards, policy dialogues) and transformative collaborations at the higher end (e.g. collaborative governance, BoP strategies). Considerable previous learning and investments are necessary to reach the final stage of the continuum, where collaborations function as channels for global governance.

## Individual Level

Studies on collaboration on the individual level are quite limited, particularly those that focus on the interactions among the actors. On one hand, there are case studies showing that employees experience intra- and inter-organizational identification, as well as community and relationship building as a result of collaboration activities (Berger, Cunningham, & Drumwright, 2006). Consumer marketing experiments further find that consumers are more open to business and non-profit partnerships when they perceive a good fit between the company and cause (Vock, van Dolen, & Kolk, 2013). However, others show the opposite effect, arguing that managers are the ones actively involved in the process but employees are neglected, resulting to missed opportunities, less effectiveness and bad organizational reputation (Seitanidi, 2009). In the bigger picture, others argue that evolutionary factors are the causes of destructive and unsustainable human behaviour, particularly the tendencies for self-interest, relative status, social imitation, short-sightedness, and disregarding impalpable concerns (Griskevicius, Cantuú & van Vugt, 2012). Thus, in line with this view, strategies directed to encourage sustainable behaviour among marketers, policy makers and social entrepreneurs should work with these human tendencies rather than against them. For example, instead of imploring people to value the group above themselves and urging self-restraint for the sake of the environment, it would be better to create small, dense and interdependent social networks where it would be easier to threaten reputation and foster group identities.

These few studies use theories beyond those commonly used in business studies, crossing over other fields like psychology, sociology and evolutionary studies. There is still a need for more exploration, especially empirically investigating and linking the findings to other levels of analyses. Among business studies, most use agency theory in studying the individual in cross-sector collaborations, focusing on shareholders who can be influential in shaping the business ethics and social responsibility orientations (e.g. Crosby & Bryson, 2010). Other possible theories to use are actor network theory, as well as deliberative and dialogue theories. The former offers a perspective that can examine the power struggles and controversies among actors to define conditional paths and knowledge that will prevail in

the collaboration (e.g. Arnaboldi & Spiller, 2011). The latter can create change through authentic deliberation, communication and ethically motivated interactions with others who have lower or higher political power in terms of economic wealth or interest group backing (e.g. Ball, 2005). These theoretical views, however, have specialized and unconventional methodologies focusing on certain aspects other than individual behaviour in collaboration.

Overall, the extant literature in cross-sector collaboration is concentrated on the macro and organizational level. There is a void in the individual level, not only due to the lack of studies and empirical support, but absence of theories and methods suited to the investigation of individual behaviour in a collaboration and linkages to other analytical levels. This view is shared by other systematic literature reviews in the field (Branzei & Le Ber, 2013; Kolk, 2012; Kourula & Laasonen, 2009). The next section presents how an alternative perspective and methodology can enrich and complement the missing areas in the collaboration literature.

## Cooperation in Experiments: Exploring the Economics Literature

Other research fields offer complementary perspectives to address what is lacking in the cross-sector collaboration literature. In particular, game theory and behavioural economics provide useful ways in linking the macro and organizational environment into individual decision-making. Game theory simplifies social situations to its rational core and allows predictions on how self-interested individuals will behave. In its essence, game theory is a mathematical expression of describing strategic interactions and their probable outcomes. The logic that it provides allows social science to better understand complex situations and predict the effects of different factors. Experimental games provide counterfactual situations that can test the effects various factors influencing human behaviour.

In its basic form, a game consists of players, strategies for the players, rules on how the players will choose their strategies, information for the players when making a choice, and the pay-offs or utility (i.e. earnings) of

the players from the outcome of the game. These basic elements can represent facets of complicated real world situations where understanding human behaviour is essential and hard to predict. For instance, some studies represent climate change negotiations as a game where players are countries; strategies as committing to minimize carbon emission; rules are the agreed sanctions of the international community; information as scientific knowledge and experiences of climate change; and utility as better quality of environment and future for our children.

A central concept in game theory is the Nash equilibrium, which is a set of strategies that is the best response (i.e. gives the highest utility) to the strategies of other players. Players are expected to end up in this equilibrium, allowing predictions for human behaviour. Although others argue that people are not rational and participants in experiments do not always play equilibria (Croson, 2000), advanced game theoretical models continue to explore complicated equilibria dynamics that can explain the findings from an evolutionary (Blonski, Ockenfels, & Spagnolo, 2011; Weibull, 1998) or learning (Ho, Camerer, & Chong, 2007; Camerer, Ho, & Chong, 2002; Camerer & Ho, 1999; Camerer & Ho, 1999) perspectives. Evidence that deviate from equilibria predictions have also led to the emergence of behavioural economic fields that explore the roles of norms, preferences and other non-rational factors affecting human decisions (Camerer, 2003; Camerer & Fehr, 2002).

### Cooperation and dilemmas in public goods games

There are different games that allow us to dissect factors affecting human behaviour in various social situations such as the trust, ultimatum, dictator, coordination, and the public goods games. The latter is often used to investigate cooperation, and cooperation in this setting is defined as when one individual pays a cost for another to receive a benefit (Nowak, 2006). An insightful starting point in understanding the core of cooperation in this perspective is the prisoner's dilemma since it exemplifies the tension between self and collective interests between two people. If both will cooperate, each will get a higher pay-off than if they both defect; if one defects and the other cooperates, the defector gets the highest payoff while the co-

operator gets the lowest payoff. Given these options, it is rational and in the interest of an individual to defect because one will always be better-off regardless of the action of the other (i.e. defection is Nash equilibrium).

The prisoner's dilemma reflects a social dilemma that arises when making decisions within a group, depicted when what is best for the individual is not always best or efficient for the group (Dawes, 1980). A standard public goods game extends the prisoner's dilemma to more than two people and two strategic choices, and often with repeated interactions. Participants are given endowments in each round of interaction from which they will have to decide how much to keep for themselves and give to the group. What they give to the group earns a profit and the total sum is equally divided to everyone in the group, even if one did not contribute. Defection still dominates but if everyone will use this option, the group suffers. For cooperation to arise in the prisoner's dilemma, several mechanisms have been proposed: direct reciprocity, indirect reciprocity, network reciprocity, kin selection and group selection (Nowak, 2006).

These mechanisms can be manifested in the various interaction patterns that arise in cooperation. People behave differently when they cooperate – they appear to be genuinely altruistic, stubbornly selfish, forgiving or unforgiving when others are selfish, and the list of strategies goes on. Most people, however, take the middle path of mirroring and reciprocating how others treat them. Conditional strategies, used by the same individuals in repeated interactions, allow direct reciprocity to give rise to cooperation. One example is the robust strategy of tit-for-tat (i.e. copying opponent's previous move), which won computer treatments in the prisoner's dilemma (Axelrod & Hamilton, 1981). Another is conditional cooperation in public goods games, where individuals match or conform to the contributions of others in the group. Experimental evidence shows that a majority of the participants in public goods games are conditional cooperators (Fischbacher, Gächter, & Fehr, 2001; Keser & Van Winden, 2000), and this is found to be persistent in different parts of the world (Brandts & Charness, 2011; Herrmann, Thoni, & Gächter, 2008; Hofmeyr, Burns, & Visser, 2007; Kocher, Martinsson, Myrseth, & Wollbrant, 2012). Others emphasize that in many circumstance, people are strong cooperators who responds positively to cooperative behaviour and retaliate to free-riders even at a person-

al cost and without any future personal gains (Gintis, 2000). The conforming behaviour is what some perceive to be social norms, when based on empirical and normative expectations (Bicchieri, 2006).

In interactions between two people in public goods games, there is no difference between direct reciprocity and conditional cooperation. In interactions with three or more people, however, the difference between direct reciprocity and conditional cooperation emerges, since one cannot selectively reward one member and punish others in a group. Pressures to behave according to what one thinks the majority is or should be doing also makes it unclear how people will cooperate. Thus, although in theory direct reciprocity is a mechanism driving cooperation in groups, it is not stable, and is undermined by errors and free-riders (Rand & Nowak, 2013). This gives us a glimpse that the underlying forces behind cooperation are more complex than what they appear to be, and can be more elusive with uncertainty. Public goods games, nevertheless, has been used as a framework to study the dynamics, intricacies and different dimensions of cooperation in various settings, and offers a rich knowledge-base on how people behave when facing dilemmas (for a comprehensive overview of the literature, see Ledyard, 1997; Zelmer, 2003; Chaudhuri, 2011).

### Sustainability dilemmas

Cooperation in collaborations focusing on sustainability and development often entails a multiplicity of dilemmas, beyond the prisoner's dilemma. They involve group solutions toward a larger environmental or social goal; however, losses are involved if cooperation cannot be sustained. Moreover, sustainability deals with generational issues that are embedded in different dilemmas involving a time dimension and an intrinsic valuation of present and future benefits. Although studies generally reveal that people tend to discount or value the immediate future at a higher rate than the distant future (Gintis, 2000; Jaquet, Hagel, Hauert, Marotzke, Röhl & Milinski, 2013), we do not know if this holds true when combined with other choices we need to consider.

Unlike a standard prisoner's dilemma, where there are only gains to be achieved, these collaborations surrounding sustainability are permeated

with the avoidance of a public bad, in the form of exhausting natural resources or worsening poverty. What emerges is a collective risk dilemma, where reaching the target requires sacrificing private interests to benefit collective interests without guarantee that others will also do so. In this situation, there is an incentive for everyone in the group to contribute just enough to reach the threshold to avoid the risk of a collective loss, but at the same time, there is a temptation to defect or free-ride on the contributions of others (Chakra & Traulsen, 2012). The temptation of contributing less to induce others to contribute more is still there, risking failure for the whole group (Milinski, Sommerfeld, Krambeck, Reed, & Marotzke, 2008). Defection becomes the best option for the individual if others are also defecting, while cooperation becomes the best option if others are also cooperating. In the case of the latter, the best case for everyone is any outcome that exactly meets the threshold even if contributions are not fairly distributed among the participants. The dilemma involved in this coordination decision is not as rigid as in the prisoner's dilemma because there is no single dominating strategy and it is possible for some cooperation to evolve even without any mechanism in place (Taylor & Nowak, 2007). However, even if the dilemma is relaxed, it is still not assured that cooperation will emerge, and more importantly, if it will be sustained with iterative interactions and repeated risk for losses.

Collective risk dilemmas are simulated in a variant of a public goods game called threshold public goods games. In here, an adequate level of cooperation is needed to avoid losses, and the threshold levels decide this. In the real world, thresholds come in different forms, such as required provision points, carrying capacity of the planet, and tipping points. In some cases, meeting these thresholds entail a push towards an escalating level of production or cooperation (i.e. critical mass), while in others, it can be modelled as warning signs against changes leading to losses and lower levels of production (i.e. carrying capacities). Whatever direction, the consequences are dramatic, entailing disasters or drastic changes, since all investments are usually lost. For people to guard themselves from probable losses, they need to cooperate adequately to meet the threshold level. It remains uncertain though when these disasters will happen, what will be the consequences and what is the adequate level of cooperation needed to pre-



vent it. If disasters will not happen, it makes more sense to act according to the prisoner's dilemma rather than the collective risk dilemma.

### Disaster uncertainty and Inequality

The threshold public goods game described in the above section can be a setting to study both disaster uncertainty and inequality in cooperation. Since the design entails a possibility of losing one's earnings if the group contribution does not meet the required threshold, it is possible to introduce inequality through the heterogeneous endowments of the participants, and uncertainty when losses can be randomly incurred. Studies involving uncertainty and thresholds often involve the case of a single disaster. The results are fragmented, showing that it can both increase and decrease cooperation, depending on different factors, not just the threshold. Some of these factors are group-size (Rondeau, Schulze, and Poe, 1999; Santos and Pacheco, 2011), expectations and estimation of the group's average contribution (Suleiman, 1997; Suleiman, Budescu, & Rapoport, 2001), decision protocols (Budescu, Suleiman, & Rapoport, 1995), number of interactions (Hilbe, Chakra, Altrock, & Traulsen, 2013; Rand & Nowak, 2013), feedback (Chen, Szolnoki, & Perc, 2012), and initial endowments (Wang, Fu, Wu & Wang, 2009). In general, studies focusing solely on uncertainty or stochastic environments (i.e. without thresholds) attribute low cooperation to slow learned behaviour caused by noise of the payoffs (Bereby-Meyer & Roth, 2006). Punishment is also not as effective in this environment compared to a deterministic one due to uncertainty (Xiao & Kunreuther, 2015).

Studies on global cooperation and climate change have also used the same threshold game setting to study avoidance of environmental disasters. In general, cooperation is low when there are large uncertainties on the occurrence of a loss (Milinski, Semmann, Krambeck, & Marotzke, 2006; Milinski et al., 2008; Milinski, Röhl, & Marotzke, 2011), as well as the threshold level but cooperation does not get affected by uncertainties surrounding the impact (Barrett & Dannenberg, 2014; Barrett, 2013; Barrett & Dannenberg, 2012; Dannenberg, Lössel, Paolacci, Reif, & Tavoni, 2011). These studies further identify conditions that enhance cooperation such as the provision of expert information and non-anonymity of contributions (Milinski, Sem-

mann, Krambeck, & Marotzke, 2006), intermediate targets (Milinski, Röhl, & Marotzke, 2011) and communication of commitments (Tavoni, et al., 2011). Conversely, cooperation generally decreases with inequality (Milinski et al., 2011; Tavoni, Dannenberg, Kallis, & Löschel, 2011) and when the benefits of avoiding the catastrophe are low (Barrett & Dannenberg, 2012). If the rewards to cooperation are delayed into the future, cooperation is also found to be low indicating that intergenerational discounting undermines cooperation (Jaquet, Hagel, Hauert, Marotzke, Röhl & Milinski, 2013).

Some studies on insurance have used similar theoretical framework to investigate if people insure themselves with repeated risk for disasters. Their findings show higher investments in a deterministic than a stochastic environment among individuals (Kunreuther, Silvasi, Bradlow & Small, 2009), but the opposite applies among groups making collective decisions (Gong, Baron & Kunreuther, 2009). However, their focus is not on cooperation to provide for a public good or avoiding the public bad, but on investing to privately avoid a financial loss from a negative event.

Although the above studies give valuable insights on the direction of cooperation under disaster uncertainty, it should be emphasized that they often investigate a single possibility for a disaster to happen at the end of the study. If there are recurring losses, it does not affect accumulated earnings. They do not give any predictions on what will happen to cooperation if the interaction continues and the risk for disaster or losing everything remains, amidst their success and failures to cooperate in the past. If cooperation results to higher levels, we also do not know which interaction strategies or type of cooperation that emerge. This unexplored area is what the different papers in this study investigate.

## Bridging collaboration and cooperation

This chapter bridges the literature on cross-sector collaboration and the literature on cooperation in public goods games. It demonstrates how the game theory and behavioural economics approach to cooperation can provide new theoretical and methodological paradigms in examining the sustainability of collaborations in the individual level, which is lacking in the

business literature. As the literature overview shows, studies on cross-sector collaborations are concentrated on the macro and organizational levels, limited by theories on the individual level, and use mostly descriptive methods. The public goods game approach to cooperation provides a new theoretical approach into the complexities and dilemmas involved in the process, and offer predictive methods that allows the testing of various factors, including those in the macro and organizational environments. This makes linking the different levels of analyses possible, instead of having separate clustered studies. Thus, it is a suitable method in studying what happens to cooperation, particularly how individuals cooperate, when there is an unstable external environment and inequality among the members of the group. This inter-disciplinary orientation is often needed in studying issues surrounding sustainability since it is complex phenomena that require multifaceted approaches.

The next chapter describes the different stages in the research process. In doing so, it gives a glimpse on how the scientific quest was carried out across the two disciplines.

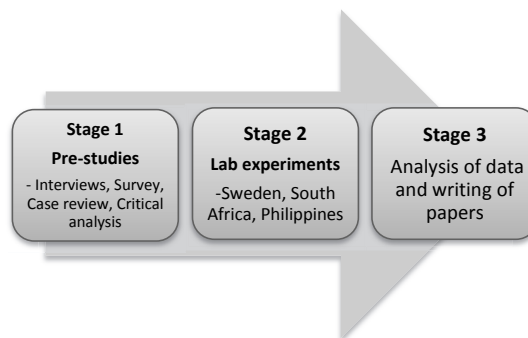


# Chapter 3

## Research Process and Methodology

This chapter describes the different stages that this research dissertation has evolved through in finding its way to its culmination. It started with exploring of studies and cases on sustainability in the business literature, then discovering the fields of behavioural economics, and game theory; then creating tools to run experiments, and then bridging disciplines. In particular, the stages involved in this research process entail (1) doing pre-studies to discover the salient issues and factors to be further investigated, (2) conducting a series of public goods games experiments to investigate pertinent research questions, and (3) analysing the resulting data. Figure 1 shows an overview of the research process behind this dissertation.

Figure 1: Research Process



## Stage 1: Pre-studies

Different pre-studies were made to explore and identify the relevant issues and crucial factors facing collaborations engaged with sustainability issues. These were done through different methods and the insights from these pre-studies aided the direction and design of the main studies.

### Exploration of practitioner's issues

Continuous interviews with practitioners and experts were performed throughout the whole research process, which provided insights to the experimental design and interpretation of results. Semi-structured interviews were conducted with practitioners, for example, from donor agencies, organizations involved in collaboration projects, private sector representatives engaged in social business in developing countries, and scholars engaged in similar studies. The questions in the interviews covered the problems, issues, challenges and their own views and experiences of being involved in collaborations (See Appendix A for a sample of pre-study materials and list of interviewees). In general, there is a consensus that working towards uplifting the conditions of the poor or the environment entails hard work that requires deep and genuine commitment. There is also a shared view that collaborations are essential to go forward in addressing development issues, it can be very challenging and complicated process, and without any success formula.

To complement the interviews and to get a more general voice from business actors, an exploratory survey was distributed during a sustainability conference at the Stockholm School of Economics in May 2012 (See Appendix A for the survey and results). A majority (82%) of the respondents think that the role of business in development is to engage in partnerships and collaborations. The findings also show that there is a positive attitude on the possibility (55%), and to some degree, the acceptability (43%) of business earning profit from the working with the poor. A majority (61%) also believe that it is very likely that there will be more environmental disasters, economic crises and political upheavals in the coming years. Given a hypothetical scenario that an earthquake occurred which destroyed invest-

ments in the collaboration, willingness to contribute to the group decreased, with some respondents opting to exit the collaboration. Negative emotions also increased, especially among females. When there is inequality and the respondents were on the advantageous end, there was a tendency to contribute more, reflecting tendencies for inequality aversion. The vignette in the survey, however, revolved on a single disaster, leaving it unclear if this behaviour among business actors will be the same when there are repeated disasters.

In sum, the sporadic information gathered from practitioners, particularly business actors, reveal their favourable interest to engage in collaborations. However, those who are more engaged in these collaborations expressed their concerns of the daunting challenges involved in engaging themselves in poverty alleviation and environmental issues. Examples are the need for leadership, commitment, and bringing in the voice of the poor. Nevertheless, collaboration for sustainability was confirmed to be a relevant area of interest and activity among business practitioners, and they find environmental uncertainty as an important challenge. Interest for the dilemmas faced by actors in their decisions was also expressed.

### Familiarization of empirical cases

To get an overview of the challenges and issues faced by organizations already involved in development issues, 166 cases from the UNDP Growing Inclusive Markets database were reviewed. The cases represented a broad range of organizations, but a majority consisted of micro and small medium enterprises, and from Sub-Saharan Africa. They were mostly engaged in the agriculture, consumer products and micro-credit sectors. The cases exhibited business models that included the poor in ways that could be profitable and clearly promoted human development.

A majority primarily viewed the role of the poor as consumers and secondarily as producers and entrepreneurs. Among the different millennium development goals, most cases considered themselves aiding to end poverty and hunger, followed by contributing to environmental sustainability and global partnership. The latter reveals that most are engaging in collaborations with other actors, and this is supported by the themes that the cases

identify with. Although majority of the themes are focused on the environmental impact, others are also engaged with civil society-business collaborations, women empowerment, donor support, public-private partnership, entrepreneurship, financial inclusion, and minority communities. Other common themes were climate change, and conflict and emergency, revealing that uncertainty in the natural environment is also a relevant concern that these collaborations aim to address.

As for the challenges, the common constraint identified by the different cases is the lack of knowledge and skills, followed by access to financial products and services. These needs indicate an inequality in information, knowledge and resources among those starting these initiatives and the local communities. To address these constraints, the most common value-creation strategy adapted is to “combine resources and capabilities with others” and to “adapt products and processes”. Once again, the need to collaborate with other sectors is highlighted in realizing efforts to combine resources and capabilities with others. Other strategies were to invest in removing market constraints, engage in policy dialogues with government, and leveraging the strength of the poor.

In sum, the cases show that among others, uncertainty and inequality are issues and challenges that sustainability initiatives deal with. Collaboration has been a common practice adapted to address these concerns.

### Critical analysis of the discourse

In addition to surveying empirical studies and the views of practitioners, popular discourse in the literature was also critically analysed as part of the process of finding out salient factors that are relevant to investigate. Using postcolonial theory, a pre-study with other colleagues, scrutinized the works of the both proponents (i.e. Prahalad, Hart & London) and critiques (i.e. Karnani) of the Base-of-the-Pyramid (BoP) discourse. Postcolonial theory provides an appropriate lens in analysing the BoP discourse because it problematizes Western representations of non-Western peoples and geographies. The study is based on the analytical perspective of Edward Said, wherein he systematically examines the power relations between the colonizer or the West and the colonized or the Orient (Said, 1978). The study



reveals how the West or the dominant academic system created an Orient, or the BoP concept in this matter, in order to reinforce current business logic rather than giving voice to the marginalized (Altafi, Luistro Jonsson, & Yildiz, Submitted).

Among others, the critical analysis examined the assumptions behind the “poor” and how both proponents and critiques of the BoP represent them in the discourse. One finds in examining the texts, examples of contrasting representations, but in the end serve common agendas. For instance, while the proponents assume the poor to be resilient and informed consumers, the critiques infantilize them as weak and hopeless individuals, incapable of making decisions. Both views are problematic and parallels colonial assumptions, as they ignore the heterogeneity at the BoP and complexities of the interplaying global structures that created their poverty. The BoP is also represented as devoid of its own context, history and culture. The prescriptions suggested by the proponents and the critiques support a global system that maintain and legitimize the dominant position of business actors and giving them more power to exploit what they have created, the “BoP”.

As a whole, the critical analysis exposed how the business agendas are dominating and the marginalized voices are missing in the mainstream literature on BoP collaborations. This inequality of representation can also be a reflection of the real world collaborations being studied. A suitable approach to further investigate collaboration is to move beyond descriptive and prescriptive studies, and towards theoretical perspectives that allows objective and predictive methods.

## Stage 2: Laboratory Experiments

The pre-studies (i.e. interviews and survey among practitioners, and critical analysis of the discourse), as well as the survey of the literature lead to the realization that collaboration is a relevant phenomenon within sustainability, and there is a need to pursue research taking an individual perspective with a focus on issues such as uncertainty and inequality. With the discovery of experimental method, further readings and courses on game theory and behavioural economics, ideas to conduct public goods game experi-

ments eventually evolved and were found to be suitable in addressing the research questions. While the pre-studies revealed the relevant issues, the experiments dissected these conditions in a sterile environment, and the results were eventually connected back to the insights gained from the pre-studies.

### Experiment Method

An experiment is defined as a study in which an intervention is deliberately introduced to observe its effects; and a randomized experiment is defined as an experiment in which units are assigned to receive the treatment or an alternative condition by a random process (Shadish, Cook, & Campbell, 2002). Group experiments can be seen as a continuum of field and lab experiments (Harrison & List, 2004). On one end, conventional lab experiments usually employ students as subject pools, an abstract framing, and an imposed set of rules. On the other end, natural field experiments are framed field experiments but where the subjects naturally undertake the tasks and do not know that they are in an experiment. In between are artefactual lab experiments, which are conventional lab experiments but uses non-students as subject pools, as well as framed field experiments, which are field experiments that use the field context as either commodity, task, or information set that the subjects use.

While lab experiments can be seen as a useful tool for generating qualitative insights, they are not well suited for obtaining structural parameter estimates, and can exaggerate or understate the importance of social preferences and properties of the situation (Levitt & List, 2007a; Levitt & List, 2007b). Moreover, criticisms to lab experiments are that the student subject pools are unrepresentative and that sample sizes are small. Although laboratory experiments appear to be rigorous in terms of internal validity or confidence from which to draw cause and effect conclusions from the results, its Achilles heel lie in its external validity, or how the results can be generalized to other settings or extrapolated to the real world.

To address these critiques, there have been studies demonstrating that the behaviour of students in the lab and non-students in the field do not vary (e.g. Stoop, 2014; Fréchette, 2011). The use of students should not

deter from providing representative evidence since they are human beings who perceive their behaviour as relevant, experience real emotions and take their decisions with real economic consequences (Falk & Heckman, 2009). Their failure to account for experience is not an intrinsic weakness of the experimental method, and to address their experiential shortcomings, it is common to run experiments with experienced participants to check for learning effects. One should also keep in mind that the external validity should not affect the established cause and effect relation of the findings, but only to express doubts that the same effects could be demonstrated under different circumstances or with different participants (Aronson, Wilson, & Brewer, 1998). Lab experiments provide controlled variation that is necessary for causal knowledge to be established, ruling out confounding effects that might be present in other methods (Falk & Heckman, 2009). This makes generalizability and realism not the issues between the lab and the field, but rather determining the best way to isolate the causal effect of interest. Having this mindset, the burden of proof lies on the critics rather than the experimenters (Druckman & Kam, 2011). Thus, having complimentary studies such as expert interviews or case studies on the phenomena, such as in the pre-studies, are valuable in bridging the perspectives of critiques and experimenters.

Behavioural experiments in particular are considered to shed light on human cooperation. This is achieved by recreating rules of interaction and testing effects of additional factors, or by recreating artificial settings to expose unobservable elements of human psychology and cognition (Rand & Nowak, 2013). However, it is critical to bear the artificiality in mind when interpreting the results, thus complimentary studies, such as the pre-studies in this dissertation, are important as they provide insights that can connect and balance realism to the results. Experiments are useful because of what they reveal about the psychology produced by the outside world, rather than being good representations of that world. Therefore, in the other direction, they can complement the findings of other methods commonly used in sustainability research, which are often based on a sample of successful cases or large, conventional statistical databases. Given the counterfactual situations created in the treatments, different rigorous conclusions can be derived that are complementary to other methods.

The papers in this dissertation used conventional lab experiments, which had an abstract framing and the target subject pools are a mixture of students and non-students. Conducting lab experiments was suited in studying the effects of disaster uncertainty, considering that it is hard to get real-time empirical data. The timing of disasters is hard to predict in the real world, thus, a laboratory simulation fits as an appropriate method to capture real-time decisions. Moreover, since the focus of the studies is exploring and understanding the effects and mechanisms rather than the generalization to different contexts or finding exact parameter estimates, lab experiments suffice compared to the more expensive and longer time-frame field experiments.

Furthermore, since the participants in the experiments included non-students, we were able to do control measures showing that age was not correlated with the results. This reflects that young participants did not pose a problem in representing human behaviour. The studies also added rigour and further addressed the external validity concerns by conducting the experiments in different countries, particularly those that have contrasting conditions of the factors being investigated. This also resulted to having a large subject pool base and strong statistical results. Finally, the lab experiments were abstractly designed to avoid framing effects and violations of description invariance. They were conducted following the economics tradition where deception was not allowed, group compositions were anonymous, and participants were given thorough instructions and monetary compensation according to their performance.

## Experiment Design

The basic experiment design entails having four participants to a group and they interact anonymously with each other. In the control group, which is a standard public goods game, each player decides how much of the 20 units, endowed in every round, will be contributed to the group and how much to keep for oneself. The contribution to the group earns a 60% profit (i.e. corresponding to a marginal per capita return of 0.4 which is commonly used in public goods games), kept in a group account and equally divided among all the members of the group at the end of the session. The units that are

not contributed to the group are stored in the individual account. After everyone has made their contribution decision in each round, each participant is updated with a summary for the round, consisting of information on the contributions of the other group members (in random order for anonymity) and the balances in their individual and group accounts. The participants interacted anonymously in 20 rounds, but the number of rounds was not disclosed.

In the treatment groups, the different studies introduce the concept of stochastic shocks wherein random checks and consequent losses are incurred if group contributions do not meet a specified threshold level. In contrast to the control groups, where there is a deterministic environment, the treatment groups exhibited a stochastic environment to capture disasters when there is insufficient cooperation. The basic design is that in every round, there is a probability that a check will happen and if it happens, a green or red screen appears after the participants submit their contributions. The screen informs them that there was a check, if the group passed (green screen) or failed (red screen) the threshold check, and if they keep or lose their earnings. A summary screen appears afterwards with the same information as in the control, and the game continues. If the check does not happen, the summary screen appears immediately with information that a check did not happen in that round.

The experiments included in the papers have the same basic control group design and different variations of the basic treatment group design as discussed above. Altogether, they contribute to address the overall research question if cooperation persists in an uncertain and unequal world. In each treatment, a specific parameter is changed with other conditions remaining the same, in order to gradually and systematically investigate the respective effects of uncertainty and inequality to cooperation.

Briefly, in Paper 1, the experiment design consists of the control and four treatment groups. Two treatments look into the effects of having respectively a 10% and a 40% probability of a check in each round, wherein if the group contribution does not meet the threshold of 60 units, everyone's cumulative earnings in both the individual/private and group accounts will be reduced to zero. The other two treatments have the same conditions with the 40% probability but in the impact treatment, there is equal proba-

bility that the cumulative earnings in either the private, the group or both accounts will be lost when the threshold is not met. In the level treatment, the threshold level is a whole number between 50-70 units, chosen with equal probability, every time there is a check.

Paper 1 investigates research question 1 – if cooperation persists under uncertainty – by looking into the effects of the different types of uncertainties to cooperation with stochastic checks or repeated disasters. The experiments were conducted in the Philippines and Sweden, countries with opposing disaster risk exposure. In Sweden, additional treatments with 70% and 100% probabilities were conducted to further investigate the effects of the additional probabilities on contribution.

In Paper 2, the experiment design consists only of a control and one treatment, which is the 40% treatment. The experiment was replicated to another country, South Africa, to check the external validity. The focus of the paper is to investigate the interaction and strategy patterns behind the effects, particularly probing if conditional cooperation persists with repeated disasters. The paper addresses research question 2 – what type of cooperation emerges under uncertainty.

Paper 3 deals with research question 3, as it studies what happens when inequality enters the picture. The experiment design is the same as Paper 2 but there are two additional treatments focusing on inequality. There is a control and three treatment groups – inequality, uncertainty and inequality+uncertainty. The inequality treatment is the same as the control but with heterogeneous endowments. Instead for the four players in the group receiving 20 units in each round, it is randomly decided that two players receive 10 units and two players receive 30 units. The uncertainty treatment is the same as the 40% treatment in the other papers. The inequality+uncertainty treatment is the same as the uncertainty but the endowments of the players are heterogeneous as in the inequality treatment. The experiments were conducted in Sweden and South Africa, countries with divergent income inequality index. The results reveal how does cooperation manifests itself in the presence of inequality and/or uncertainty.

Since each paper builds on each other, there are some overlaps among the data, where the same control and 40% treatment groups are found in the different papers. However, the replications in different countries and

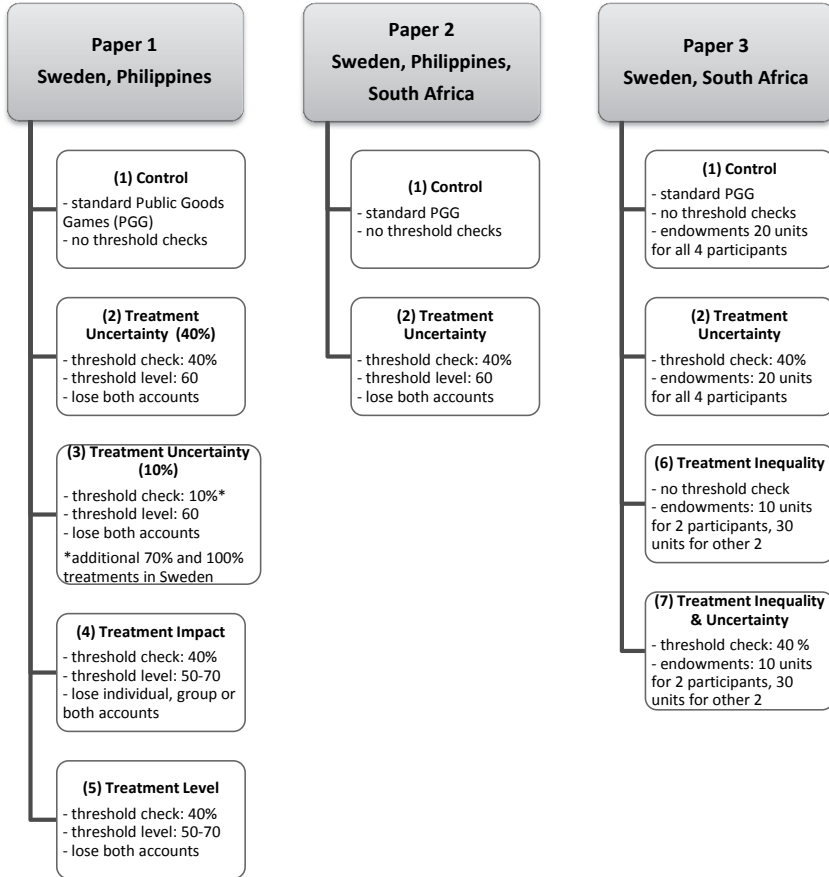
additional treatments make the data in each paper unique. Table 1 and Figure 2 gives an overview, and the details can be found in the respective papers. By comparing the control and the treatments, the results of the different papers altogether contribute in addressing the overall research question if cooperation persists in an uncertain and unequal world.

**Table 1: Overview of the Studies**

	<b>Study 1</b>	<b>Study 2</b>	<b>Study 3</b>
<b>Focus</b>	Effects of different types of uncertainties	Underlying mechanism: Conditional cooperation	Effects of inequality and uncertainty
<b>Countries</b>	Sweden Philippines	Sweden Philippines South Africa	Sweden South Africa
<b>Control</b>	Standard public goods game	Standard public goods game	Standard public goods game
<b>Treatments</b>	10% 40% (70%, 100%) Impact Treatment	40%	Inequality 40% (Uncertainty) Inequality+Uncertainty
<b>No. of Participants (Groups)</b>	Total: 884 (221) • Sweden: 440 (110) • Phils.: 444 (111)	Total: 500 (125) • Sweden: 136 (39) • Phils.: 180 (45) • South Africa: 184 (46)	Total: 648 (162) • Sweden: 280 (70) • South Africa: 368 (92)
<b>Gender Distribution</b>	Sweden: • 53% Females • 47% Males Philippines: • 45% Females • 55% Males	Sweden: • 51% Females • 49% Males Philippines: • 46% Females • 54% Males South Africa: • 37% Females • 63% Males	Sweden: • 46% Females • 54% Males South Africa: • 44% Females • 56% Males



Figure 2: Overview of the Experiments



## Experiment Implementation

As shown in Table 1, at various periods in 2012-2013, a total of 1,392 individuals participated in the experiments conducted in Sweden (September 2012 and December 2012 - January 2013), the Philippines (August 2012 and February 2013) and South Africa (July 2013). The experiments were conducted at the game laboratory at the Centre for the Study of Cultural Evolution (CEK) at Stockholm University; the computer laboratory of the Computational Science Research Center (CSRC) at the University of the Philippines, Diliman; and the computer laboratory at the North West University at Potchefstroom. Participants were recruited through the laboratory's database (Sweden), as well as through direct approach, signing-up, campus posters, and social media announcements (Philippines and South Africa).

Prior to this, three pilot studies were also conducted in Sweden in 2011 to 2012, to MBA students at the Stockholm School of Economics, to aid in the design and detecting practical and technical problems with the software infrastructure of the experiments. These pilot studies also explored different facets and treatment designs, such as prior interactions, punishment possibilities and variations of losses, which served as testing ground for the main design. Prior to finalizing the main design, a pilot study with a different variant (i.e. checks were pre-determined before the game and the same for all groups) was also conducted to 80 individuals in the Philippines. Thus, behind the main experiments is a series of experiments for trials and fine-adjustments.

Since the studies build on each other, the experiment groups overlap as seen in Figure 2. Of the 1,392 participants, there were 884 participants in Paper 1, and an additional 508 participants in Paper 3 for the new treatments (i.e. the remaining 140 participants in Paper 3 overlap with Paper 1). The 500 participants in Paper 2 overlaps with the participants in Papers 1 and 2. In each experiment group, it was usually the case that there was equal representation of male and female participants. The average ages were 20 (Philippines), 21 (South Africa) and 28 (Sweden) years old. The fraction of non-students are 9% (Philippines), 20% (Sweden), 9% (South Africa). The participants came from diverse academic fields and resided in different

geographical locations, thus, it was unlikely they knew most of the people in the same session.

Prior the game, the participants were briefed about the study and written consent for participation was obtained from everyone. They were then instructed to read the instruction sheet, answer the control questions on the computer and continue with the trial rounds to ensure that they understood the instructions. A sample of the instruction sheet can be found in Appendix B, and they were given in Swedish (in Sweden) and English (in the Philippines and South Africa). The participants appeared to have understood the instructions well enough, as reflected from results of the control questions and self-reported confusion measure. The participants found the instructions sheet relatively easy to understand (i.e. 4 in a scale where 5 is very easy and 1 is very hard) and they were allowed to ask questions prior to the start of the game. The control questions consisted of three multiple choice questions in two scenarios and they had three chances to answer them correctly before an explanation to the correct answer appears. On average, 74% answered correctly on the first attempt, 16% on the second and 10% on the third. After answering the control questions, there were two trial rounds that were played with the computer until everyone was ready to start the experiment. Moreover, the participants appeared to have full understanding of the instructions as they reported low levels of confusion after the game (1.8 in a scale where 1 is very slightly or not at all confused and 5 is extremely confused).

After the last round, the participants were asked to answer a questionnaire, wherein among others, their emotions, locus of control, risk preference, motivations and comments were solicited. Emotions were elicited using the I-PANAS-SF measure (10 items), which gauged the positive and negative affects or moods of the participants after the experiment (Thompson, 2007). The locus of control was measured through the Levenson's IPC Scale (24 items), which assessed if participants attributed events to internal, powerful others or chance factors (Levenson, 1981). Risk willingness was solicited in a direct manner with a general context, through a 5 point Likert scale, which is considered to be an effective and good measure of individual risk attitude (Dohmen, Falk, Huffman, Sunde, Schupp, & Wagner, 2011).

The information about the participants were solicited to check if such factors are correlated to the resulting effects.

The participants interacted anonymously in partitioned computer terminals, through the internet-based experiment software *Behavery*, and the sessions lasted on the average for an hour. At the end of the session, the balances in their individual and group accounts were added and converted into monetary earnings, and served as their remuneration for their participation. The participants received their earnings in cash, with two units equal to one Philippine peso, four units equal to one South African rand, and four units equal one Swedish krona.

### Stage 3: Analysis and writing of the papers

The analyses of the results were done from an individual level. In most cases, the data was analysed using OLS regression and other non-parametric methods with the use of *Stata*, *Excel* and *Matlab* programs. In the OLS regressions, the Control served as a dummy and the errors were clustered by groups and participants to deal with the dependencies in the data. The results from the control were compared to the treatment groups to identify significant effects. Other types of analyses, for instance the identification of strategy types, are discussed in detail in the papers.

The analyses and writing of the papers were done in 2013-2014. The results were also presented at the Nordic Conference in Experimental and Behavioural Economics, as well as seminars at the Stockholm School of Economics, University of Pennsylvania, Max Planck Institute for Collective Goods, and poster presentation at the International Max Planck Research School on Adapting Behaviour in a Fundamentally Uncertain World. Earlier versions of the papers were also sent around for peer reviews before submission to general science journals. Being inter-disciplinary, the papers were written to address a wider audience and to cover cooperation contexts in the social science, similar to cross-sector collaborations. Thus, the story in each paper does not revolve on cross-sector collaborations, as this cover summary of the dissertation does.

# Chapter 4

## Overview of Papers

This chapter presents an overview of the research problem, purpose, theoretical background, design, main findings, research contributions, implications, and contributions of the different papers to the overall thesis. As they build on each other, they together give insightful directions to what happens to cooperation and interaction patterns in the presence of disaster uncertainty and inequality. A synthesis of the three papers is given in the next chapter, and the full papers are found in Part II. Since the previous chapters already presented the research questions and experiment designs, they are briefly repeated in this section.

### Paper 1: Cooperation in the face of disaster

**Research problem and purpose:** The purpose of this paper is to investigate if cooperation can persist in the face of disaster under different types of uncertainties. Through a public goods game, it compares what happens to cooperation in a deterministic and a stochastic environment. The different types of uncertainties investigated are: when there are different probabilities that a disaster will happen (uncertainty on the timing/occurrence); when the level of adequate cooperation needed to avoid the disaster is not known (uncertainty on the threshold level); and when the consequences for loss can randomly vary (uncertainty on the impact).

**Design:** The experiments consisting of a control and four treatment groups, were conducted to 884 participants (221 groups) from Sweden (440 individuals) and the Philippines (444 individuals). The experiments were conducted in these countries because they have contrasting disaster risk exposure, which improves the external validity to the findings.

The control is a standard public goods game. The treatment groups are generally threshold public goods games with stochastic shocks. There is a certain probability that a check will occur in each round, wherein if the group contribution does not meet a required threshold level (i.e. 60 units), everyone lose his or her total earnings. Two treatments respectively looked into the effects if there is a 10% and 40% probability of a check. Additional treatments, with 70% and 100% probability, were conducted in Sweden to see the effects of a wider range of probabilities on contribution.

The other two treatments investigate the effects of additional uncertainties when there is a 40% probability of a check, namely, when the impact and threshold level are not known. In the impact treatment, there is equal probability that group, individual or both accounts will be reduced to zero if the group does not meet the threshold level of 60 units when there is a check. In the level treatment, the threshold level in every round can be any whole number between (and including) 50 to 70 units, randomly chosen with equal probability. The applicable threshold level for the round is disclosed after everyone in the group made their contributions.

**Findings:** The main finding from both countries shows that high levels of cooperation can be present under different types of disaster uncertainties – when there are uncertainties surrounding the occurrence/timing, threshold level, and impact of the disasters. People generally cooperate when they are not certain when a disaster may strike, how much cooperation is required to avoid it and how they will be affected.

Looking further into the uncertainty of the timing and given the whole range of probabilities that a disaster will occur, contribution levels increase stepwise and not linearly as the probabilities increase. Cooperation still fails and the threshold level is not met even if it is certain that there is a check in every round. In looking into the individual behaviour, the findings show

that after a failure, cooperation stagnates in the immediate round, and then recovers fast afterwards. The study also gives indication that those exposed to higher real-world disaster risks are riskier in cooperating, as Filipinos procrastinated higher contributions until the checks and losses became real. Swedes were quicker to cooperate, even from the very beginning, and showed lower risk willingness. There were no strong correlations found between emotions and locus and control, with cooperation.

**Research contribution:** The paper pioneers the investigation of the effect of risk for repeated disasters to cooperation. The current literature only looks into the case of a single but not repeated risk for disasters to happen. It provides theoretical predictions and empirical evidence, which in turn inform other theoretical models that cooperation can persist in the face of disasters without reliance on altruistic or social preferences, institutional sanctions or communication. Methodologically, the paper offers a novel experimental design with the stochastic checks throughout the duration of the experiment, allowing the investigation of recurring disasters to cooperation.

**Implications:** The study gives insight that cooperation persists with different types of uncertainties surrounding the risk for repeated disasters. This reveals how uncertainty functions as a natural mechanism to cooperation, as long as adequate information about the probability of the occurrence and the possible losses of a disaster happening are provided. It can be valuable for both policy and management to disseminate information surrounding causes and consequences of disasters, and highlight the need for cooperation to prevent them.

**Contribution to the dissertation:** This study lays the foundation of the dissertation as it takes an individual level perspective, and links micro and macro variables through experimentally investigating how individuals cooperate in the presence of external uncertainties. It provides theoretical support and empirical evidence of individual behaviour, given the different types of uncertainty. The implications uncover that cross-sector collaborations can thrive in an age of increasing natural disasters and instability.

## Paper 2: Conditional cooperation and disaster uncertainty

**Research problem and purpose:** The purpose of this paper is to explore interaction patterns and strategies when cooperating in different environments. While Paper 1 studies the effects to cooperation, this paper delves into the individual strategies behind the effects, particularly investigating the presence of conditional cooperation in certain and uncertain environments. Indirectly, it also checks if the mechanism of direct reciprocity is driving cooperation when there is disaster uncertainty.

**Design:** The experiments consist of a control and one treatment group. The control is a standard public goods game. The treatment is the same as one of the treatments in Paper 1, where there is a 40% probability that a check will happen and the participants lose their all their earnings if the group contributions do not adequately meet a specified level when there is a check. The experiments were conducted among 500 participants (125 groups) in Sweden (136 individuals), South Africa (184 individuals), and the Philippines (180 individuals). The experiments were replicated in these countries to check if cultural factors affect the findings, which other studies on conditional cooperation have found (e.g. studies on strong reciprocity, which involve punishing those who do not cooperate).

**Findings:** The empirical findings show that conditional cooperation is tamed by disaster uncertainty. Both conformity and the number of conditional cooperators are lower in an uncertain environment, and a spirit of unconditionality replaces this. This supports the theoretical prediction that conditional cooperation will be lower due to more asymmetric equilibria. The findings are consistent across the different countries indicating that exposure to real life disaster risk does not lead to variations in conditional cooperation behaviour. Unconditionality appeared not to be influenced by strong emotions or control traits resulting from the success or losses in cooperation. In sum, this study generally suggests that high levels of coopera-



tion are not always driven by reciprocity and conditionality – unconditionality takes over when there is disaster uncertainty.

**Research Contributions:** This paper initially examines the links and differences between conditional cooperation and reciprocity, which most studies ignore. It theoretically shows how reciprocity can vary in different environments, and the empirical findings are also the first to show how conditional cooperation behaves differently when there is repeated risk for disasters.

**Implications:** The paper informs policy and management how the environment can influence interaction patterns. As the experiments reveal, social preferences such as conditional cooperation do not always dominate. Therefore, in designing and implementing policies and incentives in a changing environment, it is important to note that interaction patterns of people might change and that other mechanisms can drive cooperation. Fostering conditions as in the experiment (e.g. sufficient information on the uncertainties were provided) can result to norms and institutions that can nurture cooperation in an uncertain world.

**Contribution to the dissertation:** This study extends the findings in Paper 1 by looking into the internal mechanisms driving cooperation, particularly focusing on conditional cooperation. By doing so, it goes beyond the effects of disasters on cross-sector collaboration, but also uncovers the mechanisms driving individuals to cooperate. It also broadens the empirical investigation to one more country, increasing the general validity of the effects.

### Paper 3: Cooperating in an unequal and uncertain world

**Research problem and purpose:** The purpose of this paper is to investigate the respective and combined effects of uncertainty and inequality to cooperation. It also looks into emerging interaction patterns, particularly

between the rich and the poor. It extends the findings gained from the previous papers by looking into the case when there is resource inequality (i.e. heterogeneous endowments) among the participants.

**Design:** The experiments consist of a control and three treatment groups. The control is a standard public goods game similar to the previous papers, where everyone receives the same endowment of 20 units, and there are no thresholds and checks involved. The first treatment focuses on inequality, where participants receive different endowments or resources. Two of the participants in the group consistently received 30 units (i.e. rich players) in every round, while the other two received 10 units (i.e. poor players). The computer randomly decides before the experiment who gets to be rich or poor. The second treatment focuses on uncertainty, similar to the set-up in Paper 2. Participants get the same endowments and there is a 40% probability that a check on group contributions will occur, and if this is not met, the participants will lose their earnings. The third treatment combines both inequality and uncertainty conditions, where participants have heterogeneous endowments and there is also a 40% probability of a check in every round. The experiments were conducted among 648 participants (162 groups) in Sweden (280 individuals) and South Africa (368 individuals), to see if the findings are consistent among countries with contrasting societal inequality based on the Gini index.

**Findings:** The findings show that compared to a controlled setting, uncertainty increases cooperation while inequality leaves it unchanged, and in the presence of both, the effect of uncertainty on cooperation is stronger than inequality. The trace of the effect of inequality, as in the case of South Africa, has a small magnitude. Moreover, the effect of uncertainty on the distribution of player types is stronger than inequality. There have been less number of free-riders and more unconditional cooperators, resulting to higher cooperation. In most cases, it is also the poor who relatively gives more than the rich, but a fair-share of cost distribution can arise. Cultural factors, particularly exposure to more real-world inequality, can play a role.

**Research Contributions:** This paper adds to the literature on inequality in public goods games providing empirical evidence that can shed more clarity to the fragmented theoretical directions. It also extends the existing knowledge by linking both uncertainty and inequality, giving more complex but realistic insights in linking micro and macro variables.

**Implications:** As the results give insights on who often shoulders the costs in cooperation, and which environments and conditions can encourage fair-share cooperation, it can aid the design of incentives and policies for a more fair and sustainable cooperation. For instance, spreading awareness on uncertainties surrounding disasters can be more geared to environments with higher social inequities in order to dampen free-riding.

**Contribution to the dissertation:** By extending the analysis in Papers 1 and 2 to a situation where there is inequality, this paper adds another dimension to the experiment conditions, making it closer to the reality of cross-sector collaborations. As it links macro variables to the individual level, it also fills in a void in the business literature and fortifies the bridging of both disciplines.



# Chapter 5

## Discussion and Conclusion

As the different papers addressed the overall research question that cooperation persists in an uncertain and unequal world, this chapter lifts the findings to give an alternative perspective in understanding the dynamics of collaboration in the individual, organizational and macro levels. It gives a holistic approach as it synthesizes the studies and discusses the importance of recognizing the links among different analytical levels in problematizing sustainability. It concludes with the insights, caveats, implications and future directions of the dissertation.

### Synthesis of the Studies

Overall, the different papers in this dissertation show that in the face of disasters, high levels of cooperation emerge and are sustained, unconditional cooperation surge to high levels, and the effects of inequality (e.g. increased free riding) are weakened. These are the primary effects of disaster uncertainty in the absence of interventions such as communication and sanctions. They give supporting evidence that cooperation in particular, and collaboration in general, can be sustainable in an uncertain and unequal world. This gives hope that collaborations geared for sustainable development can thrive the global challenges they face today, even without institutional incentives fostering communication or punishment such as giving pledges or sanctions. This dissertation also demonstrates that cooperation

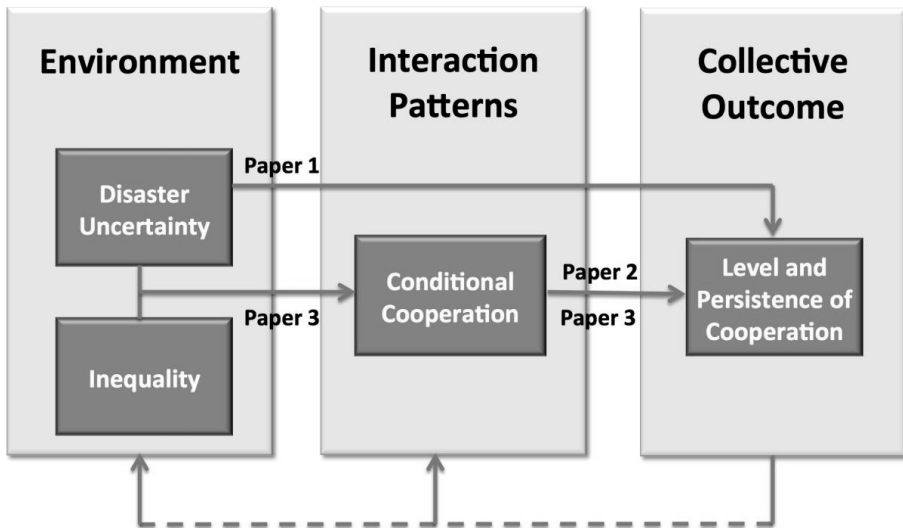
can flourish as long as actors are aware of information on the conditions disasters may happen, even if they are uncertain. This insight becomes more important and relevant when business actors are involved or when there is inequality in the collaboration, to remind us that free-riding and selfish behaviour does not necessarily need to prevail.

Paper 1 establishes a positive relation between disaster uncertainty and cooperation, as it shows that cooperation persists given different types of uncertainties. Cooperation thrives regardless of the probability of the occurrence of a disaster, and additional uncertainties on the impact and threshold levels. When the uncertainty looms over, knowledge of even a small risk of disaster can drive cooperation to high levels as with a moderate risk. Paper 2 delves into the interaction patterns or individual strategy, and finds that unconditionality is enhanced by disaster uncertainty, leading to more persistent cooperation. Paper 3 shows that inequality does not significantly affect cooperation, and when combined with disaster uncertainty, the effect of the latter is more salient. Moreover, disaster uncertainty fortifies the high level of unconditional cooperation and lowers the increased free-riding that characterizes the presence of inequality. In certain cultural contexts, a fair-share of cooperation between the rich and poor can emerge. All these studies give evidence and remind us that it is possible for collaborations with business actors on board, working for the sustainability agenda, to thrive in amidst all the disaster risks.

To get a better understanding of the insights that each study imparts, linking the themes of the different studies – disaster uncertainty, conditionality and inequality – can provide a simple framework in viewing the dynamics of cooperation (Figure 3). The different studies altogether show that cooperation does not happen in isolation but is an outcome of individual interaction patterns that emerge from the environment. Conditions in the environment, such as global disaster uncertainty and organizational inequality, shape the individual decisions and interaction patterns, which in turn give direction to the sustainability of cooperation. In the other direction, the outcomes of repeated interactions give feedback and affect the environment and interaction patterns as well. High levels of cooperation give some security to an unstable environment, and results to a positive cycle that sustains cooperation. Fairer contributions also results and dis-

mantles conditional and short-term oriented interactions. This simplification echoes the insights gained from other extensive frameworks emphasizing the links between the external environment, individual strategic actions, interactions, outcomes and evaluations (e.g. Ostrom, 2008, 2011; Bryson, Crosby, & Stone, 2006). It shows nonetheless that cooperation is an interplay of macro (e.g. disaster uncertainty), organizational (e.g. inequality) and individual (e.g. conditional cooperation) factors, providing a straightforward framework to aid in understanding the dynamics of cooperation. Using this framework, other factors can be added into the investigation, resulting to more insights that bring us closer to understanding the complexities of reality.

**Figure 3: Synthesis of Themes in the Studies**



The different papers focused on the relations between the variables in Figure 3 through altering and comparing the parameters in the experiments. In these experiments, the environment was the game itself; interaction patterns were the strategies used by the participants; and the outcome was the direction and level of contributions. Disaster uncertainty was introduced as a specific game or environment with different equilibria predictions, while inequality was introduced by changing conditions within the same environment without changing equilibrium. The effects of both types of changes were investigated not only from the resulting contribution levels, but also how one contributed in relation to other group members. Having repeated interactions allows feedback and learning possibilities that can influence the environment and interaction patterns. Although the studies do not fully investigate this feedback link, Paper 2 shows evidence of low conformity and matching of one's contributions based on the previous contributions of others (i.e. when there is a constant risk for disasters to happen).

In general, the evidences presented by the studies are robust as they mostly show consistent behaviour among participants exposed to different disaster and inequality conditions in their daily lives. There are certain areas where cultural differences give slight indication to matter, however, they are weak to be generalized since they are only based on two to three countries. Together, the findings build linkages that create a framework to help us understand cooperation among cross-sector collaborations engaged in sustainable development.

## Insights for Collaborations and Sustainability

The synthesis of the different studies leaves various general and specific insights for collaborations engaged in sustainability. On a more general note, it shows the inter-relatedness of the different levels of analyses and the different layers of society. The environment affecting individual behaviour is an obvious fact, but what is not clear is how it specifically affects our decision-making and the resulting cooperation. This dissertation makes an attempt to link the different levels, giving an understanding of the conditions needed to sustain cooperation and emphasising the importance of the



behaviour of the individuals involved. The environment influences interaction patterns that can result to the formation of popular behaviour or social norms, which in turn shapes behavioural outcomes. This linkage is important to keep in mind when designing and implementing sustainability and development programs. The latter often fails because it takes for granted that beneficiaries and other actors will behave according to the expectations of those who initiate the programs, ignoring conditions and linkages among factors influencing individual behaviour. Regardless if a collaboration project is created top-down or bottom-up, an important dimension to consider are the conditions shaping the collaboration and the factors in the environment affecting interaction patterns and the resulting collective behaviour. Therefore, the suggested framework provides a structure that can aid in identifying and locating factors influencing the effectivity of collaborations to serve as vehicles of global governance and its other contributions in the macro level.

This study also demonstrates that lab experiments is a useful way to understand sustainability because it allows the dynamics to be dissected and understood incrementally, and in the process, aids in identifying and addressing crucial mechanisms and factors. The experiments in this study did not fully represent nor mimic everything in the real world, but in its simplification, it was able to identify the effects of certain factors and isolate them when combined with other ones. This provides a foundation to examine other crucial factors specifically relevant to a particular collaboration. For instance, the participants in the studies made their decisions to cooperate simultaneously, and this may not be representative of collaborations involved in top-down development programs. Future studies can further probe on the effect of asymmetries in decision-making. Lab experiments can indeed provide us with knowledge in the social science (Falk & Heckman, 2009), which sustainability is a part of.

On a more specific note, the results of the studies also leave several insights to the possible fate of collaborations in the Anthropocene age, especially since it is not clear from the public goods game literature on what happens to cooperation when the risk of losing is repeated. The different studies mainly show a favourable answer to the overall question if collaborations can persist in an uncertain and unequal world. Cooperation can in-

deed sustain itself without dependence on sanctions, communication, and other institutional incentives. Creating conditions, such as providing ample information on disasters, can increase and encourage bottom-up cooperation, making us less dependent on top-down cooperation propelled by libertarian paternalism and high profile negotiations.

The knowledge that cooperation can thrive in the face of disasters, however, should not lead us to complacency, but instead make us more aware of our potentials. In the real world, people do not immediately realize that their individual survival is dependent on the survival of others, which might have been easier to realize in laboratory settings. There are a multitude of factors that are integrated in the dynamics of human cooperation in disaster situations, such as inherited memories, history, etc., that are not covered in this dissertation. These often overcome our rationality to cooperate (Ahn, Ostrom, Schmidt, Shupp, & Walker, 2001; Dillon & Tinsley, 2008; Tiedens & Linton, 2001; Tversky & Kahneman, 1974). We already witness unsustainable cooperation such as in climate change negotiations. Therefore, cooperation can still fail in the real world but the studies nevertheless demonstrate that the story does not need to end in these single or few instances of success or failure. The experiments enlighten us with the conditions where cooperation can persist in the presence of inequality and uncertainty, and the findings point towards a positive direction. We should be reminded though that the findings are not forecasts and assurance that cooperation will always be sustained, but instead shows possibilities that it can be obtained given certain conditions.

## Scope and Limitations of the Study

This dissertation has various caveats and limitations. First of all, it treats disaster as a result of a combination of endogenous (i.e. inadequate cooperation) and exogenous (i.e. the check) factors. In the real world, disasters can be caused by factors completely exogenous to the system. This study does not cover disasters of this nature.

Secondly, the experiments were conducted in the behavioural economics tradition with an abstract framing. Business scholars may have a different experiment tradition of contextual framing, which can question the lack

of context in the design. However, the purpose of the study is to uncover the effects, thus, it is better to be free from confounding framing effects that can distort the findings. Other studies have found that participants behave differently, depending on how the dilemmas are presented and games are framed (e.g. Brewer & Kramer, 1986). For instance, there would be a difference if a public good game is viewed as a Wallstreet game or a community game (Ross and Samuels, 1993), highlighting the advantage of having an abstract framing.

Thirdly, a majority of the participants are students, which is often an argument against the validity of the results. Chapter 3 discusses the reasons why student participation is not an issue for experiment studies. This is also not a problem as statistical tests on the data indicated that age and student-status had no effects on the findings.

Fourthly, the measures used to investigate emotions and other psychological factors in the experiments are quite limiting since they were only elicited after the experiment. Eliciting them before the experiment or every time there is a check would have primed the participants, or annoyed them with the repetition. This can be improved using physiological measures (e.g. skin conductance rate, pupil dilation, brain activity) in future studies.

Fourthly, there can be misconceptions that linking the macro and organizational levels to the individual level of analysis involves generalizations and speculations that reality will mimic lab findings. As mentioned earlier in the methodology, the purpose of using lab experiments is to aid in understanding the psychology of cooperation through the recreation of rules of interaction, test situations that are not possible in the real world, and investigate possible effects of particular factors in a sterile environment. Doing so can give valuable insights and implications about the psychology produced in the real world but does not claim to represent the real world.

Finally, the individual papers do not build on the cross-sector literature nor specifically address collaborations for sustainability. This is because they are written with a general science audience in mind, and the decision to connect to a wider audience is due to the inter-disciplinary nature of the study. Its shift in theoretical and methodological orientation came naturally as it builds more on the literature and methods in other fields. Thus, the link and integration to collaboration and sustainability is discussed in this

part of the dissertation. The cross-sector collaboration literature in Chapter 2 might not be apparent in the respective papers in Part II, but the review nonetheless trace what is lacking in the business literature and the need for an inter-disciplinary approach. The papers are also written independently from each other, thus, one can find several repeating themes among them.

## Directions for Future Studies

This dissertation hopes to open new pathways for further research. For business studies, it shows a different method and theoretical perspective in investigating collaboration and sustainability issues, from which future studies can build on. This will make the research field richer as it fills in the void in the behavioural dimension and bridges different levels into the investigation. For experimental studies, various specific trails can be taken from the crossroads left by the different studies in this dissertation. First, the different parameters covered in the studies can be further explored, for example, having sequential decision-making or having thresholds that change with the resulting cooperation (i.e. endogenized). Secondly, new variables, which can have a moderating effect, such as prior interactions, history, and collective memory can be also be explored. Thirdly, new designs can be integrated such as inter-generational models, allowing the entrance and exit of different players. Designs that cover cultural differences can also be undertaken. Fourthly, although a bit challenging to pursue, field experiments with real disasters can also be conducted to confirm the lab findings. Finally, new methods can also be embarked upon, to further explore the relation of cooperation and disaster uncertainty in experimental forefronts, such as those that bridging neuro-science and genetics into economic decision-making. This dissertation opens a new window in testing the multitude of nature and nurture factors influencing cooperation in the face of disaster.

## Concluding Remark

Going back to the South African proverb presented in the introduction, this dissertation finds that people prefer to go far and together, than fast and alone, in the face of disasters. The studies support this as they reveal that cooperation can be sustained in an environment of uncertainty and inequality, provided for example that people are aware and informed of the possibilities of disasters to strike. This gives hope that given proper conditions, on-going sustainability and development collaborations can thrive in a more challenging environment. Working together shows itself to be a dependable path to solving challenging problems, even in an environment characterized by disaster uncertainty and inequality.



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# Appendices

## Appendix A: Pre-Study Materials

### **1. Questions for semi-structured interview**

- What are your views on collaboration for development?
- Describe current and past collaboration experiences and projects.
- What have been the problems and challenges?
- How did you overcome problems in the collaboration?
- What are the benefits?
- How do you envision collaboration in the future?

### **2. Partial list of practitioners interviewed**

- Bindeshwar Pathak, Sulabh International
- Mats Karlsson, World Bank
- Mats Svensson, Sida
- Mai Flor, Asian Development Bank and Water Links
- Horacio Borromeo, BoP Asian Institute of Management
- Francisco Roman, BoP Asian Institute of Management
- Chay Dionco, BoP Philippines



1 very slightly or not at all	2 a little	3 moderately	4 quite a bit	5 extremely
<input type="checkbox"/> Upset	<input type="checkbox"/> Ashamed	<input type="checkbox"/> Determined	<input type="checkbox"/> Active	
<input type="checkbox"/> Hostile	<input type="checkbox"/> Inspired	<input type="checkbox"/> Attentive	<input type="checkbox"/> Surprised	
<input type="checkbox"/> Alert	<input type="checkbox"/> Nervous	<input type="checkbox"/> Afraid		

Despite the internal problem, the group decided to go on with the project. Knowing that you have not been satisfied with how some members behaved, how will you contribute to the group? (i.e. 1 = you will follow some members and not contribute to the project, to 5 = you will contribute a lot to the group to try to influence it):

1 Nothing	2	3	4	5 A lot
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An earthquake suddenly hit the country, and the houses built by the project collapsed due to the delay in the construction and use of cheaper materials and inferior technology. The investments that you made to the organization disappeared with the failed project. Again, please indicate how you would feel by writing the level of intensity that you will experience for the following emotions:

1 very slightly or not at all	2 a little	3 moderately	4 quite a bit
<input type="checkbox"/> Upset	<input type="checkbox"/> Ashamed	<input type="checkbox"/> Determined	<input type="checkbox"/> Active
<input type="checkbox"/> Hostile	<input type="checkbox"/> Inspired	<input type="checkbox"/> Attentive	<input type="checkbox"/> Surprised
<input type="checkbox"/> Alert	<input type="checkbox"/> Nervous	<input type="checkbox"/> Afraid	

Despite the devastation, the other actors decided to immediately continue with the project because the country and its people needed most help at that point in time. Knowing that you just lost your investments and that you have not been satisfied with how other members in the group behaved in the past, how will you act? Will you ...

- exit the project/group
- stay with the group and not contribute to the project
- stay with the group and contribute little to the project
- stay with the group and contribute moderately to the project
- stay with the group and contribute a lot to the project

Assuming that after the earthquake you did not lose as much investments as the other members and you decided to stay with the group, how much will you contribute?

1 Nothing	2	3	4	5 A lot
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Thank you very much for your participation. If you are interested in the results, please write the e-mail address where it could be sent: \_\_\_\_\_

**Please submit this paper in the boxes outside the auditorium or at the SuRe table.**

#### 4. Survey Results

There were 49 respondents, with the following profile:

- 71% were from the private sector, represented mostly by people working from big companies (29%), but there were also representatives from NGOs (14%), academia (10%) and the government (6%)
- 55% were males and 45% were females
- Most were between 31- 40 years old (33%) and 41- 50 years old (27%)
- A majority had 1 to 5 years of working experience (37%), but had no experience (31%) with cross-sector collaborations or partnerships; 20% had more than 10 years of experience

Perceptions on the role of business in development:

- A majority think that the role of business in development is to primarily engage in partnerships and collaborations (82%), followed by financing/invest (63%), management/operations (59%), then philanthropy/donation (27%). Other identified roles are innovation, sustainability initiatives, education, employment, and leading change.
- In general, there was a positive attitude on the acceptability and possibility of business earning profit from the poor, especially among males.
  - A majority (55%) think that it is *very possible* to earn a profit from doing business with the poor, while nobody thought that it is not possible to do so. Likewise, those who believe that it is possible to do so comprise mostly of males (33%), compared to females (22%).
  - A lot also (43%) think that it is *very acceptable* to earn a profit by doing business with the poor. Of the 43%, it was mostly males (27%) who think that it is very acceptable, compared to females (16%).
- 61% believe that it is very likely that there will be more environmental disasters, economic crises and political upheavals that will occur in the next five years.

## Behaviour during disasters:

- The respondents were initially quite generous in their contributions to the group (i.e. on the average 4.5 out of a 5-point scale) and had a positive attitude even if there was free-riding behaviour. However, after presenting the earthquake scenario, there was an increase in negative emotions; a decrease in the positive emotion; and a decrease in contribution. The contributions significantly decreased to 3.4 with the earthquake scenario, with five people (16%) opting to exit the group. The changes in emotions are significant as revealed by the Wilcoxon match-pairs signed-rank test ( $p=.033$  for the positive affect and  $p=.003$  for the negative affect). The increase in the negative mood is more apparent among females ( $p=.005$ ). The significant increase in the negative emotions among females went hand in hand with the significant decrease in their contributions, both in the asymmetric and non-asymmetric conditions. When asymmetries of vulnerabilities are presented with the earthquake scenario (i.e. they are on the more advantageous side), it appears that the participants were averse to inequalities as they contributed quite generously to the group (i.e. 4 of 5). The male participants were more inequality averse than the females, with their contributions not significantly changing.
- For the contributions, the measure used was a 5-point scale, with 1 contributing nothing and 5 contributing a lot. Since the data is not normally distributed but is ordinal and the samples are related (in pairs), the Wilcoxon test is seen as an appropriate choice of statistical test. For the emotions, the measure used was the I-PANAS-SF measure (10 items). The Cronbach alpha values, which show the internal consistency or reliability that the lower order scales (i.e. different specific emotions) represent the higher order scales (i.e. positive and negative affects), reveal that the representations are acceptable (i.e.  $\alpha = .701$  for the negative affect and  $\alpha = .792$  for the positive affect, where  $\alpha \geq .7$  is commonly regarded as acceptable). Nevertheless, a closer look at the lower-order scales show that the upset emotion contributes mostly to the negative affect.

## Appendix B: Sample of Instruction Sheets (40% treatment)

Welcome!

Thank you for participating in this study and contributing to research. It is about decision-making. For this study to be useful, it is important that you fully understand the instructions. So, it is essential to carefully read the instructions below. Before the study begins, there will be some exercise questions and trial rounds to make sure that you have understood the content of this instruction sheet. Your performance in answering them will not affect your final results and earnings. The purpose is to guide you in your decision-making and to only ensure that you have understood the instructions and rules.

No talking or any form of communication with the other participants is allowed during the study. If something is not clear with the instructions, or if you have some problems during the session, please do not hesitate to ask the facilitators.

In this study, you will have the opportunity to earn an amount of money that will be given to you in cash at the end of the session. The highest amount that you can earn is around 450 pesos.

### Instructions

The study consists of a specific number of rounds, but the number of rounds is not revealed. You will be randomly matched into a group of four people, and each group of four will remain together throughout the session. The members of the group will be anonymous. This means that you will not know who is in your group, nor will the other three members of the group know who you are.

In the beginning of each round, each member in the group will be given 20 monetary units (so you will get 20 units for each and every round). Of the 20 units, you have to decide how much you will contribute to a group project and how much you will keep for yourself. The group project always generates a profit of 60% and this will be distributed equally to all members of the group.

Thus, all group members will get an equal share of the group income, regardless of the amount s/he contributed. You can only state your contribution in whole numbers, between (and including) 0 to 20 (i.e. you can not contribute 10.5 units). Your income for each round is computed as follows:

- What is left of the 20 units that you did not contribute to the group becomes *your individual income for this round*. This will be added to your "individual account" after every round. For example, if you contribute 15 units to the project, 5 units will be added to your individual account.

$$\text{Your individual income for this round} = 20 - 15 = 5 \text{ units}$$

- The amount that you and the other members of the group contribute to the project will be multiplied by 1.6 and become the *group income for this round*. This will be added to the "group account" after each round. The group income will be equally divided among the 4 members, which becomes *your share of the group income for this round*. For example, if everyone contributes 15 units the group, the group income will be 96 units and your share of the group income for this round is 24 units.

$$\begin{aligned} \text{Group income for this round} &= 1.6 \times (15+15+15+15) = 96 \text{ units} \\ \text{Your share of the group income for this round} &= 96 \text{ units} / 4 \text{ members} = 24 \text{ units} \end{aligned}$$

- *Your income for this round* is the sum of your individual income and your share of the group income.

$$\text{Your income for this round} = 5 + 24 = 29 \text{ units}$$

*Your total income* for the study will consist of the *balance in your individual account* after the last round, plus your accumulated *share of the group income* which is one-fourth of the *balance in the group account*.

Everyone in the group risks losing their income if the *sum of the contributions of your group* do not meet the pre-set *threshold level* of 60 units. In this context, the threshold level refers to the minimum level of contribution that your group should reach, in order for the income of the members to remain intact. If your group does not meet the threshold level, everything that has been earned so far in the respective individual accounts and group accounts are lost and the income of everyone in the group will be reduced to zero.

In this study, there is a 40% chance in every round that the computer will check if the total contribution of the group reaches the required threshold level. Once again, if a check occurs, the following conditions prevail, which will be the case for everyone in the group:

- If the group's total contribution is *equal to or more* than 60 units, then the balance in your individual and group account will remain intact. The group income for this round and your individual income for this round will be added to their respective accounts. Thus, your current total income remains the same.
- If the group's total contribution is *less* than 60 units, then the balance in your individual and group accounts, inclusive of what you are supposed to earn in this round will be reduced to 0. Thus, you will lose your current total income.

In both cases, the rounds continue and same rules of the experiment apply after the threshold check(s). Keep in mind that the probability for a checkpoint happening in every round is 40%, thus, there will probably be rounds where there are no consequences for the group (i.e. to lose their earnings) even if the contributions do not comply with the required threshold level. How many threshold check(s) and in which round(s) they will occur are randomly decided by the computer.

Here are three examples of what can happen in a round. Note that you are given 20 units and the threshold level is 60 units:

**Example 1: Each member contributes 20 units to the group, then ...**

Members A, B, C, D receive:

- Individual income: 0 units = 20-20

- Share of the group income: 32 units =  $1.6 \times (20+20+20+20) / 4$

Income for this round: 32 units

The group's total contribution for this round is 80 units, which is more than the threshold level of 60 units, thus, if a threshold check occurs, the group members retain their income and income for this round will be added to the accounts.

**Example 2: Member A contributes 0 units & the other members contribute 20 units, then ...**

Member A receives:

- Individual income: 20 units = 20-0

- Share of the group's income: 24 units =  $1.6 \times (0+20+20+20) / 4$

Income for the round: 44 units

Members B, C and D receive:

- Individual income: 0 units = 20-20

- Share of the group's income: 24 units =  $1.6 \times (0+20+20+20) / 4$

Income for the round: 24 units

The group's total contribution for this round is 60 units, which is equal to the threshold level. If a threshold check occurs, the group members retain their income and income for this round will be added to the accounts.

**Example 3: Each member contributes 0 units to the group, then ...**

Members A, B, C and D receive:

- Individual income: 20 units = 20-0

- Share of the group's income: 0 units =  $1.6 \times (0+0+0+0) / 4$

Income for the round: 20 units

The group's total contribution for the round is 0 units, which does not reach the threshold level. If a threshold check does not occur, the group members retain their income and the income for this round will be added to the accounts. If a threshold check occurs, the balance in the individual and group accounts will be reduced to 0, including the corresponding income that they have earned for this round. Then ...

Members A, B, C and D receive:

- Individual Income: 0 units

- Share of the group's income: 0 units

Income for the round: 0 units

The following input screen will initially appear.

**Round 1**

Threshold level for this round: 60 units  
Probability of a threshold check: 40%

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How many units will you contribute to the group (0 to 20)?

Click "Next" to view the results of this round [Next](#)

When everyone has entered their contributions, a summary screen will appear which shows the results about the round:



**Summary**

There was no threshold check for this round.

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**Threshold and Contributions**  
 Threshold level: 60  
 Total contributions in this round: 50  
 - Your contribution: 10  
 - Contributions of other members (in random order): 10 15 15

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**Income for this Round**  
 Group's income for this round: 80  
 Your total income for this round: 30  
 - Your individual income for this round: 10  
 - Your share of the group's income for this round: 20

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**Account Balance**  
 Balance in the group account: 80  
 Your total income: 30  
 - Balance in your individual account: 10  
 - Your share of the balance in the group account: 20

Click "Next" to continue to the next round. [Next](#)

The information in the summary screen includes:

- whether there was a threshold check or not
- the *contributions to the group* in this round, which consists of *your contribution* and the *contribution of others* (in random order)
- the *group's income for this round*
- *your total income for the round*, which consists of *your individual income* and *your share of the group income*
- an update of the *balance in the group account* (inclusive of the group income in the current round)
- an update of *your total income* (i.e. inclusive of your individual income in the current round), which consists of the *balance in your individual account* and *your share of the balance in the group account*

The screen will appear after everyone in the lab has entered their contribution, thus, you might have to wait for the other participants to make their decisions before you will see the results. The consequences will be appropriately reflected in the result screen if a threshold check occurs.

In the second and succeeding rounds, the following screen will appear, wherein you will also get information on your current income in the *individual account* and your current *share of the group account*. Once again, you will be given 20 units and you have to decide how many units you will contribute to the group and how many you will keep for yourself.

**Round 2**

Threshold level for this round: 60 units  
 Probability of a threshold check: 60%

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**Current balance:**  
 Individual account: 10 units  
 Share of the group account: 20 units

How many units will you contribute to the group (0 to 20)?

Click "Next" to view the results of this round. [Next](#)

The computer will notify you when the study has ended and you need to answer the questionnaire that follows before being informed of your final earnings. Two units are equal to one peso. As mentioned, there will be exercise questions and trial rounds, which you need to answer before the session begins, to check if you have understood the instructions that have just been given. Your answers will not affect your final earnings for the study. You can start answering the exercise questions now by clicking the "Next" button on your screen.



Part II:  
The Papers