Paradise Wasted

Social entrepreneurship in Bali's solid waste management system

Master thesis

22 September 2017

Student: *Bram Broeder, 3406954*

Study: *MSc Sustainable Development*

Track name: *International Development*

Supervisor: *dr. Femke van Noorloos*

Host organization: *Indonesian Waste Platform*

Thesis credits: *30 EC*

Table of contents

Preface

My journey into waste management started six years ago. After I finished my bachelor in History, I started working in the waste management system of the municipality of Utrecht and was fascinated by the amount of stuff that people throw away. I was full of ideas on how to better separate the waste and how to improve the system. I had the ideas, but I did not have enough knowledge to initiate and implement changes. After travelling through Indonesia for 3 months, I was amazed by the rubbish in the environment and waste disposal habits of local communities. During these six years I kept working at the material recovery facility and waste boat in Utrecht, yet I also started a Master in Sustainable Development. When I did my research internship in Mozambique last year, I experienced how a local Mozambican set up an effective waste management system in the small village I was living and how this social entrepreneur managed to build a house out of plastic bottles. All these experiences made me decide to go to Bali in search for solutions for our waste problems. In Bali, I found incredible solutions that can be replicated all over the world. I found waste treatment methods that I had never could imagined possible. And I found inspiring people that are doing everything they can to solve Bali's waste problem. These people were very welcoming and happily explained their waste journeys to me. Their stories resulted in this Master thesis.

Thanks go out to all the people that made this journey possible and made time to do an interview or helped me in another way. Special thanks go out to Femke van Noorloos from Utrecht University, Nina van Toulon from the Indonesian Waste Platform, Jayma Lief from In the Heart of Change and Karin Hoek from PGO Support. And of course, to my brother Erwin Noz, who accompanied me on this beautiful journey.

Abstract

The tropical Island of Bali is facing serious waste problems. Due to tourism development, population growth and changing consumption patterns the waste flow has rapidly increased, yet, like in most developing countries, the local governments in Bali lack the financial means and organizational capacity to deliver proper waste management services. Therefore, all sorts of social enterprises are now seizing opportunities to fill the service delivery gaps in Bali's Solid Waste Management (SWM) system. These social enterprises propose all sort of inventive solutions for Bali's waste problem and are trying to change the business as usual.

Little is known about the functioning of social enterprises in SWM systems in developing countries. Even social entrepreneurship in general lacks empirical evidence. Therefore, this study aims to clarify what the characteristics and activities of the social enterprises involved in Bali's SWM system are and to analyze how different institutional, financial, social, environmental, political and technical aspects influence the functioning of these social enterprises. Through an assessment tool, the performance and functioning of 11 social enterprises that are focused on waste collection and treatment are analyzed. It was found that the social enterprises provide inexpensive small-scale solutions that are adapted to the local context and are more effective than current waste management practices. By showing the huge potential of social entrepreneurship for SWM systems, this study provides solutions for ineffective waste management practices in developing countries and helps tackling one of the most pressing issues of today's world.

1. Introduction

Solid waste management (SWM) is becoming a major challenge for developing countries and multiple studies already highlighted the complexity of the waste problems that developing countries face. The bottom line of these studies is that developing countries produce increasing amounts of waste as a result of rapid population growth, urbanization and changing consumption patterns, but do not have effective SWM systems to deal with these growing and increasingly complex waste flows (Henry, Yongsheng & Jun, 2006; Troschinetz & Mihelcic, 2009; Shekdar, 2009; Ngoc & Schnitzer, 2009; Asase et al., 2009; Wilson, Velis & Rodic, 2013; Guerrero, Maas & Hogland, 2013). This lack of effective waste management leads to economic, environmental and biological losses, and the worsening waste problems are a serious threat to human and animal health (Sharholy et al., 2008; Wilson et al., 2013).

Private sector involvement in SWM systems

Whereas developed countries often have a SWM that is arranged by the government, the public authorities in developing countries often do not have the organizational capacity and financial resources to provide efficient waste collection and disposal services (Ahmed & Ali, 2004, 2006; Joseph, 2006; Guerrero et al., 2013). Large quantities of waste are not collected, are dumped in the environment or are simply burned (Rathi. 2006; MacRae, 2012). Often the poorer parts of the population suffer the harmful effects of inefficient waste management (Zurbrugg, 2013). The main challenges remain to expand service coverage to everyone and eliminate uncontrolled dumping and burning (Wilson et al., 2013). In general, the literature on SWM in developing countries agrees that collaboration between all stakeholders is needed to create an effective SWM system and that there is still huge potential to enhance public-private partnerships and private sector involvement (Ahmed & Ali, 2006; Joseph, 2006; Bolaane, 2006; Sharholy et al., 2008; Chakrabarti, 2009; Troschinetz & Mihelcic, 2009; Willmott & Graci, 2012; Wilson et al., 2013; Guerrero et al., 2013). Private sector involvement can improve both the quality cost effectiveness of the waste management services that are delivered and areas that are served by a Public-Private Partnerships (PPP) have proven to be considerably cleaner (Ahmed & Ali, 2006). Additionally, governments are generally stuck in an inertia that prevents them from innovating and moving away from the traditional path and private sector involvement can bring the needed innovativeness to move away from outdated practices (Wilson et al., 2013). While private sector involvement can have major benefits for the effectiveness of a SWM system, this usually seems to be difficult to accomplish. The public sector often does not recognize the private sector as a valuable partner and perceives NGO's and CBO's as troublemakers (Ahmed & Ali, 2006).

Despite the lacking government support, several other actors - ranging from NGO's to recycling companies to community based organizations (CBO's) – have been trying to step in for the government and multiple studies show that these actors can play an important role in the waste management systems of developing countries (Rathi, 2006, Ahmed & Ali, 2004, 2006; Joseph, 2006; Henry et al., 2006; Guerrero et al., 2013; MacRae, 2012). The private sector is seizing opportunities to work alongside the public sector to fill service delivery gaps such as waste collection, sorting and processing. NGO's and CBO's educate local communities to create awareness and increase the knowhow about waste management, which can reduce improper waste disposal and enhance separation of waste at the source (Ahmed & Ali, 2004; Henry et al., 2006; Rathi, 2006; Bolaane, 2006). Additionally, these new stakeholders can foster innovation and bring in financial means necessary to buy equipment and build waste processing and recycling centers (Ahmed & Ali, 2004; Rathi, 2006). Especially small- and medium sized companies, microenterprises and NGO's introduce relatively cheap low-tech,

small-scale solutions that that can be more suitable for developing countries (Ahmed & Ali, 2004; Troschinetz & Mihelcic, 2009; Macrae, 2012). These alternative waste processing methods often focus on re-using, recycling and composting and such methods are preferred to more environmentally degrading processing methods such as landfilling and incineration for energy recovery (Troschinetz & Mihelcic, 2009; Lazarevic et al., 2010; Merrild, Larsen & Christemsen, 2011). Imported, expensive, large scale, high-tech solutions for waste management have not proven to be successful in developing countries and therefore we need solutions that are appropriate for the local contexts (Rathi, 2006; Sharholy et al., 2008). We should stop seeing SWM as the sole responsibility of governments and try to relieve the pressure on them by including other stakeholders (community, private sector) and experimenting with alternative waste treatment methods (reusing, recycling, recovery) (Guerero et al., 2013; Wilson et al., 2013).

Social Entrepreneurship

In the literature, the NGO's, CBO's, micro-enterprises and small-recycling companies that have entered SWM systems of developing countries have usually been grouped separately according to their legal status. Yet, this legal status does not seem to be a good characterization as it does not determine the further characteristics and scope of the activities that these stakeholders undertake. What many of the NGO's, CBO's, micro-enterprises and small-recycling companies have in common is their use of social entrepreneurship, which can be defined as "market oriented initiatives pursuing social aims in an innovative way" (Huybrechts & Nicholls, 2012; p. 42).

There are multiple reasons why we can regard these stakeholders as social enterprises. To begin with, these stakeholders are driven by a common social goal, namely solving a waste problem or improving a SWM system. They try to achieve their social goal by utilizing innovative technologies, processes and methods and recognize opportunities to do things differently. They search for inventive ways to sustain themselves and use market oriented activities to generate income that can then be reinvested into their organization. Their specific organizational and legal structure is chosen because the social problem can be most effectively addressed in this way, but is not a defining characteristic (Dees, 1998; Peredo & McLean, 2006; Zahra et al., 2009; Huybrechts & Nicholls, 2012). The criteria that make an organization a social enterprise are its social aim, innovativeness and market orientation. Organizations that utilize social entrepreneurship can be found in the small-scale recycling industry, micro enterprises, NGOs and CBOs, and the ones that do will be called social enterprises here. Instead of grouping them according to their legal status, it is argued that it is more useful to group them together under the broad concept of social entrepreneurship and name them social enterprises.

In recent years, the popularity of social entrepreneurship has rapidly increased due to the increased awareness of global issues, government failures, and the receding availability of funding (Huybrechts & Nicholls, 2012). Social entrepreneurship is regarded as a possible solution for societies social- and environmental problems and for the service delivery gaps that are left by governments. Social entrepreneurship can provide small-scale, low-cost solutions that are adapted to the local context and can help the public sector with innovating and becoming more cost-effective. As such, social entrepreneurship can provide solutions for the waste problems and ineffective SWM systems of developing countries.

Scientific relevance

Together with rising amounts of waste, increasingly complex waste flows and evolving waste processing methods, the range of stakeholders involved in SWM systems in developing countries has thus been growing in recent years. To create an effective SWM system it is important to understand who the stakeholders are and which responsibilities they have. While there has been some research into the role of the private sector in SWM systems, further research is needed to get more detailed understandings of the characteristics, activities and functioning of private sector stakeholders (Rathi, 2006; Guerrero et al., 2013). Additionally, it has become clear that it is necessary to take a holistic and integrative approach to SWM that simultaneously addresses institutional, legal, economic, technical, social and environmental aspects that influence the functioning of the system (Marshall & Farahbakhsh, 2013). As waste management systems are becoming more complex, there is a need for more (local) case studies that increase our understanding of current SWM systems in developing countries.

As explained, the focus in this study will be on private sector stakeholders that use social entrepreneurship (social enterprises) to provide solutions for ineffective waste management. Despite the recent popularity of social entrepreneurship in academic circles, it should be realized that this only started two decades ago. As such, Volkmann et al., (2012) concluded that "it is widely agreed that the theoretical examination of this phenomenon is in its infancy – and researchers point out the small number of publications and accessible empirical studies on the topic" (Volkmann et al., 2012; p.11). There is little known about the functioning of social enterprises and the ways they are trying to tackle waste problems and improve waste management systems. While there has been research into the role of the private sector in SWM systems, the use of social entrepreneurship within SWM systems has not been the core focus of any existing study. Therefore, this study will connect the concept of social entrepreneurship with waste management and will try to fill the gap in the literature by empirically researching social entrepreneurship. It will show the functioning of a wide variety of social enterprises in a SWM system of a developing country.

This study builds on the work of Zurbrugg (2013), who transformed the Integrated Sustainable Waste Management (ISWM) framework - which is the norm when SWM in developing countries is discussed - into an assessment tool. Zurbrugg (2013) explains that the assessment tool can be used by academia "to systematically assess and understand strengths and weaknesses of projects which are comparable to each other, and through this establish more evidence-based knowledge" (Zurbrugg, 2013: p.21). By adapting and simplifying the assessment tool of Zurbrugg (2013) it is shown that it can be used for a rapid assessment of a social enterprises. The resulting analysis of the social enterprises clarifies which role they play, what their activities are and which factors determine their success or failure. If we understand how social enterprises can provide solutions for ineffective SWM system, we can take try to replicate their example elsewhere. While it is impossible to provide a blueprint for an effective SWM system, it is possible to learn from effectively functioning social enterprises. By showing the huge potential of social entrepreneurship for SWM systems, this study provides alternatives and solutions for ineffective waste management practices in developing countries and helps tackling one of the most pressing issues of today's world. This will be done through a case study that describes the functioning of social enterprises within Bali's SWM system.

Waste management in Bali

Bali is a small touristic island in Indonesia that is suffering from serious waste problems as a result of inadequate waste management practices. Since the 1970's, the tourism sector of Bali has been rapidly developing and tourism is now by far the largest economic sector in Bali. While tourism strongly increased the prosperity of the local population, the tourists coming to Bali also produce large amounts of (plastic) waste. At the same time, the increase prosperity gave the local population the opportunity to consume new products. Whereas the Balinese before mainly produced organic waste that decomposed, nowadays they produce large quantities of plastic waste that needs different disposal methods (MacRae, 2012). Yet, large parts of the local population are not aware of this and still simply dump their waste in the environment, leading to litter throughout the island (Bruce & Storey, 2010). The increased waste flow has not been accompanied by the development of an efficient waste management system and the government fails to deliver the needed waste management services. As a result, Bali has been unable to cope with the increasing amounts of waste it produces and faces a serious waste problem (Bruce & Storey, 2010; MacRae, 2012). In his study on SWM in Bali, MacRae (2012) describes the situation as follows:

> *"*Although Bali is far from typical of tropical Asia, its condensed and intensified waste situation offers a unique laboratory that may provide insights and models capable of application in wider contexts*"* (MacRae, 2012, p. 72).

The high-degree of tourism and omnipresence of foreigners might make Bali atypical for tropical Asia, yet at the same time this fostered the awareness of the waste problem and the occurrence of social enterprises. If Bali does not start doing something about its waste problem, tourists will stop coming to Bali because of the pollution. The waste problem thus endangers the livelihoods of the local population and these negative economic effects create awareness among the locals. Similarly, there are many expatriates living in Bali who are disturbed by the amount of pollution and consequently want to do something about it. These two factors combined with the lacking government-led waste management system, resulted in the wide range of social enterprises that are now involved in Bali's SWM system. These social enterprises have widely differing activities and responsibilities and propose varying solutions for Bali's waste problems (MacRae, 2012; MacRae & Rodic, 2015). The widespread involvement of social enterprises in Bali's SWM system makes it into a laboratory that can provide solutions for the waste problems of developing countries. An analysis of the social enterprises in Bali's SWM can thus provide examples that can be replicated in areas that encounter similar waste problems (MacRae, 2012). This resulted in the following research aim, research question and sub-questions:

Research aim

The aim of this research is to clarify the characteristics and activities of the social enterprises involved in Bali's SWM system and to analyze how different institutional, organizational, financial, technical, social and environmental aspects influence the functioning of these social enterprises.

Research question

How can social entrepreneurship add to effective solid waste management and how do the characteristics and enabling aspects influence the functioning of the social enterprises involved in Bali's SWM system?

2. Social Entrepreneurship

The first section of this theoretical framework will explain the characteristics and drivers of social entrepreneurship. The second section will focus on waste management. The ISWM framework will be explained and the waste issues that developing countries face.
In the last two decades, the concept of social entrepreneurship has become omnipresent in business, academia and society at large (Peredo & McLean, 2006). But what does social entrepreneurship mean? Various authors have tried to define social entrepreneurship and this has led to a myriad of definitions that can be confusing at times. Since the focus of this research will be on social entrepreneurship in Bali's waste management system, it is important to understand the concept and its drivers and characteristics. Hence, the following section will give an overview of the academic literature on social entrepreneurship and will come up with a working definition for this thesis.

Some researchers argue that social entrepreneurship is not a new phenomenon and that social entrepreneurs can be identified throughout history. These social entrepreneurs were the past agents of change, only they were called by different names like reformers, visionaries or philanthropists (Dees, 1998; Bornstein & Davis, 2010). The term social entrepreneurship is still relatively new and before the late 1990's only little attention was paid to the concept of social entrepreneurship in academia. But after the turn of the millennium this started changing. Leading universities started giving courses on social entrepreneurship and several journals emerged that were completely devoted to the topic (e.g. Social enterprise journal, 2004; Journal of social entrepreneurship, 2010). A lively academic debate on social entrepreneurship unfolded and whole articles and books were devoted to defining and describing the concept (e.g. Dees, 1998; Peredo & McLean, 2006; Martin &Osberg, 2007; Bornstein & Davis, 2010; Volkmann, Tokarski & Ernst, 2012).Despite this recent popularity of social entrepreneurship in academic circles, it should be realized that this only began two decades ago and therefore the research on social entrepreneurship is still in its infancy (Volkmann et al.,2012). This infancy and the fact that it is still evolving are mentioned as reasons that there is still no consistent or standard definition of social entrepreneurship. Although further examination of the concept might prove valuable, it seems that social entrepreneurship is and will remain extremely difficult to define. The main difficulty is that "social entrepreneurship is a contextual and contingent set of activities subject to interpretive analysis and measurement" (Huybrechts& Nicholls, 2012: p. 33). Social entrepreneurship means different things to different people and this can be confusing at times. This prompted researchers to analyze the variety of definitions and find a common ground that connects all these definitions of social entrepreneurship (Zahra et al., 2009; Dacin, Dacin & Matear, 2010; Abu-Saifan, 2012). In their examination of the literature on social entrepreneurship Zahra et al. (2009) found 20 different definitions of social entrepreneurship or social entrepreneur, while Dacin et al., (2010) found 37 definitions.

Defining social entrepreneurship

How broad or narrow social entrepreneurship should be defined has been one of the key debates in the literature on social entrepreneurship and as we can see in Table 1. The scope of the definitions ranges from very broad and inclusive, to narrow and excluding. In its broadest understanding, social entrepreneurship refers to innovative activity with a social objective in either the for-profit or non-for-profit sector. When social entrepreneurship is defined more narrowly it generally refers to "the phenomenon of applying business expertise and market-

based skills in the non-profit sector such as when non-profit organizations develop innovative approaches to earn income" (Austin et al., 2006; p.2). While there has been on-going discussion about the exact definition of social entrepreneurship, there is general consensus about the characteristics and objectives of social entrepreneurship and social entrepreneurs (Volkmann et al., 2012). Almost 2 decades ago, Dees (1998) published his influential article 'The meaning of Social Entrepreneurship' wherein he argues that social entrepreneurship can be defined by 5 characteristics. According to Dees (1998):

> "Social entrepreneurs play the role of change agents in the social sector by:
> - Adopting a mission to create and sustain social value (not just private value),
> - Recognizing and relentlessly pursuing new opportunities to serve that mission,
> - Engaging in a process of continuous innovation, adaptation, and learning,
> - Acting boldly without being limited by resources currently in hand, and
> - Exhibiting a heightened sense of accountability to the constituencies served and for the outcomes created" (Dees, 1998; p.4).

Organizations and individuals can comply with these characteristics in varying degrees and the more an organization or individual adheres to these conditions, the more it fits into the concept of social entrepreneurship. Obviously, when someone is being more innovative in pursuing their social goal, it can be said that this person is being more entrepreneurial. The definition of Dees (1998) is one of the most commonly used definitions of social entrepreneurship and has functioned as the foundation whereupon other researchers have built. It is generally agreed that the most defining characteristic of social entrepreneurship is the underlying drive to create social value, either exclusively or at least in some prominent way (Peredo & McLean, 2006). This social goal is also what makes social entrepreneurship conceptually different from commercial entrepreneurship. In the latter, the motivation is money and profit making, whereas social entrepreneurship is fundamentally spurred by altruism and the will to address a social problem through the exploitation of opportunities (Martin & Osberg, 2007). The prominence of this social goal can vary and according to Peredo & McLean (2006) "there appears to be a continuum of possibilities, ranging from the requirement that social benefits be the only goal of the entrepreneurial undertaking to the stipulation merely that social goals are somewhere among its aims" (*Figure 1*) (Peredo& McLean, 2006; p.63).

Place of Social Goals	***Role of Commercial Exchange***	***Example***
Enterprise goals are exclusively social	No commercial exchange	*NGOs*
Enterprise goals are exclusively social	Some commercial exchange, any profits directly to social benefit ('integrated') or in support of enterprise ('complementary')	*Grameen Bank ('integrated'); Bangladesh Rural Advancement Committee printing press, cold storage, garment factory ('complementary'), Newman's Own*
Enterprise goals are chiefly social, but not exclusively	Commercial exchange; profits in part to benefit entrepreneur and/or supporters	*Missouri Home Care, Ciudad Salud*
Social goals are prominent among other goals of the enterprise	Commercial exchange; profit-making to entrepreneur & others is strong objective	*Ben & Jerry's*
Social goals are among the goals of the enterprise, but subordinate to others	**Commercial exchange; profit-making to entrepreneur & others is prominent or prime objective**	*'Cause-branding'; social-objectivities undertaken by corporations such as banks*

Figure 1: The range of social entrepreneurship (Peredo & McLean, 2006).

Since the central driver for social entrepreneurship is the social goal, typically an organizational structure is chosen through which the social problem can be most effectively addressed. Social entrepreneurship should thus not be characterized by a specific legal form and can be found within non-profit, business and governmental sectors. In fact, "socially entrepreneurial activities blur the traditional boundaries between the public, private and non-profit sector, and emphasize hybrid models of for-profit and non-profit activities" (Johnson, 2000; p. 1). Although social entrepreneurship can occur within governmental sectors, in most of the literature it refers to social entrepreneurship across the non-profit or business sectors, and this example will be followed here (Austin et al., 2006).

A second defining characteristic mentioned in the literature on social entrepreneurship is innovation. Social entrepreneurs typically create something new to reach their social goal, rather than replicating existing processes and structures. Innovativeness of social entrepreneurs should not be seen as being one inventive solution, but more as a continuous process of learning, creating and improving (Dees, 1998) Additionally, this innovativeness can take many forms and does not necessarily mean inventing something completely new (Peredo & McLean, 2006). Innovation here can simply mean replicating someone else's novelty or applying an existing idea in a new way or to a new situation (Dees, 1998). Social entrepreneurs search for opportunities and try to create social value through new products, services, processes or organizational structures (Martin & Osberg, 2007). Innovation can also refer to new organizational structures or models or new ways of thinking about societal problems (Huybrechts & Nicholls, 2012). Finally, social entrepreneurs look for innovative ways of sustaining themselves. They look into different options to get resources, which can range from pure philanthropic grants to commercial business methods, and as characteristic 4 of Dees (1998) states: resources currently at hand thus do not limit social entrepreneurs.

Before a working definition of social entrepreneurship can be given, the last thing that should be clarified is how social entrepreneurship, social entrepreneur and social enterprise are linked to each other. In the literature and its widespread usage, social enterprise often refers to non-profits or for-profits that use commercial strategies as a means to reach their social goal. Yet, some researchers justly noted that social enterprise is usually equated with social entrepreneurship and therefore decided to leave the relation between social entrepreneurship and social enterprises at an intuitive level (Peredo & McLean, 2006). At the same time, multiple authors argued that market orientation and a business-like way of doing things can be seen as another defining characteristic of social entrepreneurship (Zahra et al., 2009; Abu-Saifan, 2012; Huybrechts & Nicholls, 2012). Often, the search for resources of social entrepreneurs results in using some sort of commercial model to generate profit that then can be reinvested into the organization. Table 1 shows the degree to which commercial exchange can play a role and this can be as little as an NGO selling refillable water bottles. Besides trading in goods and services, social enterprises often use the employment of a paid workforce, instead of relying on volunteers like many traditional not for profits. The market orientation of social entrepreneurship is often accompanied by being performance driven with a relentless focus on achieving their social mission and a heightened sense of accountability (Huybrechts& Nicholls, 2012).

There is a thin line in what is considered a social enterprise and what not and the idea that social entrepreneurship involves market oriented actions only further dissolves this distinction. To avoid conceptual confusion, social enterprise here will not be seen as something distinctly different with other characteristics than social entrepreneurship. It is argued that it is more

useful to regard market orientation as another defining characteristic of social entrepreneurship and equate social enterprise with social entrepreneurship. Social entrepreneurship here than simply refers to the activities and processes undertaken by social entrepreneurs to develop their social enterprises.

Social entrepreneur refers to the individual, while social enterprise refers to the organization. The definition that will be used here for social entrepreneurship is:

> "Market oriented initiatives pursuing social aims in an innovative way" (Huybrechts & Nicholls, 2012; p. 42)

It is thus chosen to use a broad and simple definition that can include a wide variety of organizations and initiatives. This definition comprises the defining characteristics of social entrepreneurship, i.e. the social goal, innovation and market orientation. This definition is not all-encompassing though and should be applied with considerate flexibility. The 3 other characteristics that Dees (1998) mentions should be kept in mind. Social entrepreneurship certainly involves the recognition of opportunities, heightened accountability and not being limited by resources at hand, but here they are not seen as defining characteristics

What social entrepreneurship is not

Having established a working definition for social entrepreneurship, it can now be clarified what social entrepreneurship is not. To begin with, social entrepreneurship is not a discrete sector, such as the social economy. Instead it can take place in between and across existing sectors (Huybrechts& Nicholls, 2012). Social entrepreneurship is also not a new form of corporate social responsibility (CSR) and for-profit enterprises that engage themselves in some socially responsible activities or philanthropy generally fall outside the boundaries of social entrepreneurship (Zahra et al., 2009). Often the CSR of companies is just a marketing tool that can improve their reputational status (Brønn & Vrioni, 2001). The main goal of companies that engage in CSR remains profit making, while social enterprises at least have a prominent focus on their social goal. Additionally, CSR often does not involve innovative activities. Social entrepreneurship should also not be equated with social business, as social businesses are expected to earn their income solely through the market, while not relying on any philanthropy or public funding. The concept of social business thus overlooks the possibility of hybrid income structures that combine grants with market orientation. Furthermore, social businesses are not expected to make any profits from their activities. (Huybrechts& Nicholls, 2012).

Finally, since social entrepreneurship is characterized by some market orientation, it should not extend to philanthropists and activists that are not engaged at all in delivering innovative products and services (Abu-Saifan, 2012). As Zahra et al., (2009) argue, "not-for-profit organizations, social service organizations or NGOs ignoring the economic implications of their operations would generally also lie outside the boundaries of social entrepreneurship" (Zahra et al., 2009: p.521). In *Figure 2* we can see the hybrid spectrum in between traditional non-for-profit and traditional for-profit. Social entrepreneurship here refers to social enterprises and non-profits with income generating activities.

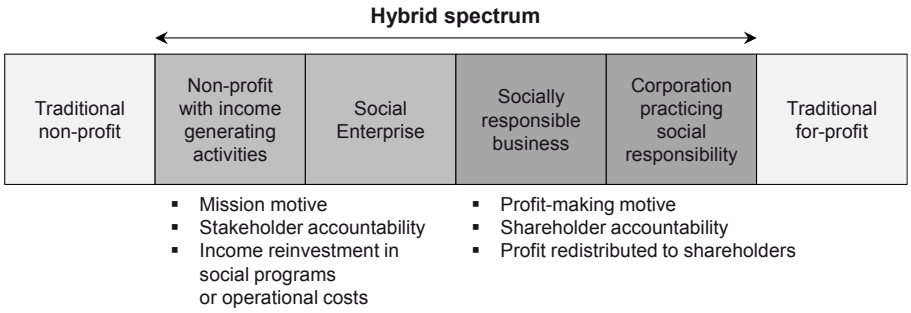

Figure 2: The hybrid spectrum of social entrepreneurship (Volkmann et al.,2012)

Drivers of social entrepreneurship

As explained there has been a sudden popularity of social entrepreneurship around the world since the end of the 1990's. This globalization of social entrepreneurship can be explained by a number of factors. To begin with, globalization can be appointed as an important driver of social entrepreneurship. Globalization has increased the global awareness of various environmental and social problems that exist around the world and some major global crises received widespread attention in politics and media (e.g. climate change, poverty, millennium development goals). Sustainable development became a "hot topic" in societies around the world and this fostered the demand for innovative solutions for social and environmental problems. Also, the disparity that exists between the developed and developing world in terms of welfare, resources and access to opportunities, has increasingly prompted people from the developed world to start fighting for social improvement in developing countries (Zahra et al., 2008). In addition, the rise in global connectedness made it easier for the general public to access information and facilitated the spread of new ideas and technologies. It created heightened awareness and more knowledge of opportunities to ameliorate adverse social and environmental conditions, in both the developed and developing world. The increased global connectedness, especially the internet, also created new entrepreneurial and technological opportunities to solve social and environmental problems (Zahra et al., 2008; Huybrechts & Nicholls, 2012).

Another important driver of social entrepreneurship has been the failure of markets, institutions and the state to address serious social problem. With neoliberalism spreading around the world since the 1980's, there has been a general retreat of the welfare state and diminishing role for the government. The provision of services by the government has been viewed as inefficient, ineffective and unresponsive (Dees, 1998) As a results, privatization and marketization have been encouraged and consequently more government services became privatized (Zahra et al., 2009). In many instances, Neoliberalism and privatization did not improve the situation in developing countries and actually made it increasingly difficult for parts of the population to afford social services that were previously provided for free (Huber&Solt, 2004). Many businesses started engaging in CSR activities, but these often focused on problems related to their business and their market solutions regularly did not provide working solutions for societies biggest problems (Zahra et al., 2008). The failure of governments, businesses and NGO's to address social problems and provide necessary infrastructure and social services, thus left opportunities for social entrepreneurs to fill these gaps. (Huybrechts& Nicholls, 2012). Indeed, social entrepreneurs can possibly develop innovative and more cost-effective ways of social service provision or find solutions for social problems that were overlooked (or

neglected) before by governmental agencies, businesses and NGOs. Especially in developing countries social entrepreneurs can play a crucial role. Governments and institutions in developing countries often do not have the organizational capacity and funds to deal with complex social and environmental issues such as poverty and environmental degradation. Corruption among governments can be widespread and resources are usually scarce. At the same time, social and environmental issues can be most visible and pressing in such developing countries and this then leaves opportunities and drives social entrepreneurs to address these problems (Zahra et al., 2009).

Finally, with the receding role of the state and the recent economic crises, the availability public funds for social services and social initiatives has been diminishing. With traditional sources of funding declining, non-for profits and other initiatives increasingly had to compete for funding or they had look for new ways to sustain themselves (Zahra et al., 2009). This prompted many NGOs and other social initiatives to start selling products or services or by forming new partnerships with government agencies or businesses (Huybrechts& Nicholls, 2012). The use of business-like strategies by social entrepreneurs decreased their dependency on donors and governments, and the scarcity of resources of non-for-profits thus fostered social entrepreneurship.

This section has shown that social entrepreneurship is a relatively new phenomenon that has huge potential to further develop in the future. While it proved hard to find a unified definition of social entrepreneurship, it was possible to come up with a working definition by analyzing the characteristics and definitions that are given in the existing literature on social entrepreneurship. This resulted in a definition of social entrepreneurship that includes the three main characteristics; the social goal, innovation and market orientation. Globalization, government failures, and the receding availability of funds have been identified as main drivers of social entrepreneurship. What should be kept in mind is that the field of social entrepreneurship is still evolving and there is a lack of empirical studies on social entrepreneurship (Volkmann et al., 2012).

New empirical studies can shed new light on the phenomenon and that is exactly what will be tried in this research on social entrepreneurship. As the following theoretical sections will show, social entrepreneurship has huge potential to solve the waste problems that developing countries face. Its agreed in the literature that communication and cooperation between all stakeholders in a SWM system is needed to develop solutions that are specifically designed for the local context. Multiple authors have suggested that private sector involvement and public private partnerships can be a solution for the malfunctioning and ineffectiveness of the SWM systems in developing countries. Because of their characteristics, social entrepreneurs and social enterprises are especially able to enter SWM of developing countries and reduce the burden that is placed on governments. Social entrepreneurship can help with innovating SWM systems by providing innovative and inventive waste collection and treatment options. Waste issues and service delivery gaps that are overlooked by governments and businesses can be addressed by social entrepreneurs. Waste problems can be very visible and this can prompt all sorts of individuals and small organizations to start looking for solutions They can provide small-scale, low-cost solutions that are adapted to the local context and can be an alternative for expensive, high-tech waste treatment equipment that is often not suitable for developing countries. To link social entrepreneurship to waste management in developing countries, first the ISWM framework and the different stakeholders, waste system elements and enabling aspects will be explained.

3. Waste management in Developing countries

In this chapter waste management in developing countries will be discussed. First, the waste problems and the deficiencies in waste management systems of developing countries are described. This will be followed by an extensive description of the ISWM framework, where the different stakeholders, the waste system elements and the enabling aspects will be discussed.

The waste problems of developing countries

Waste management has become an increasingly important issue in developing countries. Lacking waste management can result in serious environmental, health and socio-economic problems. Uncollected waste results in an unhygienic environment and forms a perfect breeding ground for diseases. When the waste is burned, this can cause serious respiratory problems. As a result, areas without an effective waste management system are more likely to suffer from infectious diseases, have higher instances of respiratory illness and have to deal with more food-chain contamination. Additionally, waste disposal sites are perfect breeding grounds for mosquitoes, which in turn can spread life threatening diseases such as malaria and dengue (The Ocean Conservancy, 2017). Often the poorer parts of the population suffer the harmful effect of inefficient waste management (Zurbrugg, 2013).

Not only can improper disposal of waste harm the public health, it can also endanger the lives of animals and lead to severe environmental degradation. It is estimated that on a yearly basis, about 8 million tons of plastic waste ends up in our ocean. This plastic waste circulates around the globe and accumulates in 5 oceanic gyres. Marine life can get entangled in our waste, but since the plastic in our oceans eventually break down into smaller pieces it also gets eaten by fish and other marine mammals. It thus ends up in food chains and is a huge threat to marine life (The Ocean Conservancy, 2017). Municipal solid waste is also estimated to contribute up to 5% of the global greenhouse gas emissions (Zurbrugg, 2013). Untreated waste from landfills or other disposal sites releases the methane gas into the atmosphere, while the burning of waste releases even more toxic substances. Waste accumulation in the environment can destroy the aesthetic value of an areas and can also negatively affect the economies of areas that rely on tourism activity (Marshall &Farahbakhsh, 2013). Rubbish can get clogged up in drains and water channels which can lead to flooding of urban areas.

The deficiencies in SWM-systems

There has been extensive research into the causes of the waste problems that developing countries face. Based on an extensive literature review, Zurbrugg (2013) summarizes the main factors causing deficiencies in solid waste management as follows:

- *Rapid population growth and changing lifestyles*
- *Lack of public awareness and collaboration*
- *Weak legislative framework, and weak enforcement*
- *Fragmented inefficient organizational structures*
- *Inappropriate or insufficient equipment and infrastructure*
- *Lack of finances or inefficient revenue collection*

Figure 3: The main factors causing deficiencies in solid waste management (Zurbrugg, 2013: p.83)

The rapid population growth and changing lifestyles in developing countries are inevitable and most likely will continue in the future. The rapid increase in waste that this brings along has to be dealt with and usually this is seen as the responsibility of the local governments. Yet, the government bodies often do not have the financial means and organizational capacity to deliver a proper waste management service. There is a large expenditure needed to deliver such services, while the government bodies lack financial support and trained personnel. Local population are unable or unwilling to pay for a waste management service and public awareness of waste issues is often low (Guerrero et al., 2013). Governments might still prioritize other issues and corruption can be widespread. As a result, large amounts of waste remain uncollected, are illegally dumped or randomly burned (Joseph, 2006). There seems to be a general consensus in the literature that weak governments are a major cause of the waste problems that developing countries (Wilson, 2007). Governments stick to their traditional way of doing and lack the capacity to innovate, which results in outdated and inefficient waste management services. Enforcement of the existing regulations and legislation tends to be weak. In most developing countries, the main challenges remain to expand service coverage to everyone and eliminate uncontrolled dumping and burning (Wilson et al., 2013). Because the public sector is often unable to deal with the increasing amounts of waste and fails to deliver all services needed for an effective SWM, a wide range of stakeholders now started participating in SWM systems of developing countries (Halla&Majani, 1999; Ahmed& Ali, 2004, 2006; Rathi, 2006; Chakrabarti et al., 2009). This inclusion of a wide of variety of stakeholder can improve both the effectiveness and efficiency of MSMM systems in developing countries (Sharholy et al., 2008). The next section will show how an ISWM framework can be used to do a holistic analysis of the stakeholders, the waste system elements and enabling aspects.

Integrated Sustainable Waste Management (ISWM)

As explained, this study will use an assessment tool that was based on the ISWM framework. Many SWM models have been developed in the last couple of decades and to put the ISWM framework into its context, a short history of SWM models will be given first. In the 1970's, 1980's and early 1990's most of the solid waste management models were aimed at optimization of a specific aspect of the SWM system, for example waste collection (Morissey & Browne, 2004). The models of the 1970's were unsuitable for long-term planning because they did not take the whole system into account and had several shortcomings such as overlooking recycling, focusing on one waste treatment option and considering only a single waste generating source. The models developed in the 1980's tried to overcome these limitations by looking at SWM from a systems perspective. These models focused on the linkages between the different elements of a SWM, instead of looking at them in isolation. Despite the improvements, the models from the 1980's still had serious flaws. They were mainly concerned with minimizing cost, focused mainly on the economic dimension and rarely considered the social and environmental dimensions of waste management. Additionally, they mainly addressed the issues with waste that was already generated and there was little attention for how to reduce or prevent the production of waste (Morissey & Browne, 2004).

In the course of the 1990's waste management models started including a more comprehensive range of sustainability criteria, waste flows, stakeholders and waste processing methods. NGO's and international agencies became disillusioned with technology-centered approaches that often failed in developing countries and started looking for alternatives (Van de Klundert & Anschütz, 2001; Wilson et al., 2013). Whereas at first the focus was mainly on landfilling, over time other more socially and environmentally responsible waste processing options – like

for example recycling, incineration etc. - were increasingly considered as alternatives (Morissey& Browne, 2004). The idea of sustainable development came to global prominence after the Our Common future report in 1987 and the Rio de Janeiro Earth Summit in 1992 and this had a great effect on SWM models. In the 1990's waste management models slowly started addressing the environmental, social and economic dimension of SWM in a more balanced way to reach sustainability (Diaz et al., 1996; Wilson et al., 2013). Since then the term 'integrated' was increasingly used in association with solid waste management and by the mid 2000's it had become widely accepted in the research community that focused on SWM. What all the SWM models that use the term integrated have in common is their systems approach, "separating out identifiable discrete entities ('items', 'elements' or 'units') to describe relationships among them" (Wilson et al., 2013, p. 53). SWM models thus started building upon the holistic notion of sustainability and this leads us to the ISWM framework.

The initial development of the ISWM framework can be attributed to Arnold van de Klundert of the Dutch NGO WASTE. Commissioned by the Dutch government, Van de Klundert developed the concept of ISWM between 1995 and 2001 as part of the Urban Waste Expertise Programme (UWEP). The framework includes the lessons that were learned from field research and pilot projects that were done in those six years. It was originally designed as an analytical tool and development framework for municipal managers and decision makers that want to manage waste problems and assess waste management services. Through the ISWM framework one can learn to understand waste problems and thereafter start looking for solutions, which is essential because failures of SWM can often be assigned to inadequate analyses of the problem. The ISWM framework introduced an unconventional way of looking at SWM, it considered aspects that were often overlooked in traditional SWM and was designed to counterbalance technology-centered approaches (Van de Klundert & Anschütz, 2001). According to the NGO WASTE the ISWM framework looks at:

> "institutional, social, environmental, political, technical and financial aspects, while emphasizing the critical role that different stakeholders - including waste pickers, women, micro- and small enterprises - play in waste management operations such as collection, treatment, recovery, reuse, recycling and prevention" (WASTE, 2017).

The ISWM framework recognizes three major dimensions of SWM: (1) the stakeholders, (2) the waste system elements and (3) the enabling aspects (*Figure 4*). The dimension of the stakeholders focusses on the stakeholders involved in SWM and how these stakeholders work together. Each stakeholder has certain interest and roles within the system, but they have to cooperate for the common interest. The range of stakeholders with an interest in SWM can differ and depends on the specific local context. The waste system elements can be described as the physical and technical components of waste handling. We should look at the complete flow of the materials, since a waste management system consist of all stages that manage the flow of materials. The waste elements therefore range from waste generation, collection and disposal to reducing, reusing and recycling. By giving equal weight to these elements an SWM system should try to build a stable service and value chain in waste management. Finally, the enabling aspects are institutional, social, environmental, political, technical and financial aspects that ensure sustainability in waste management.

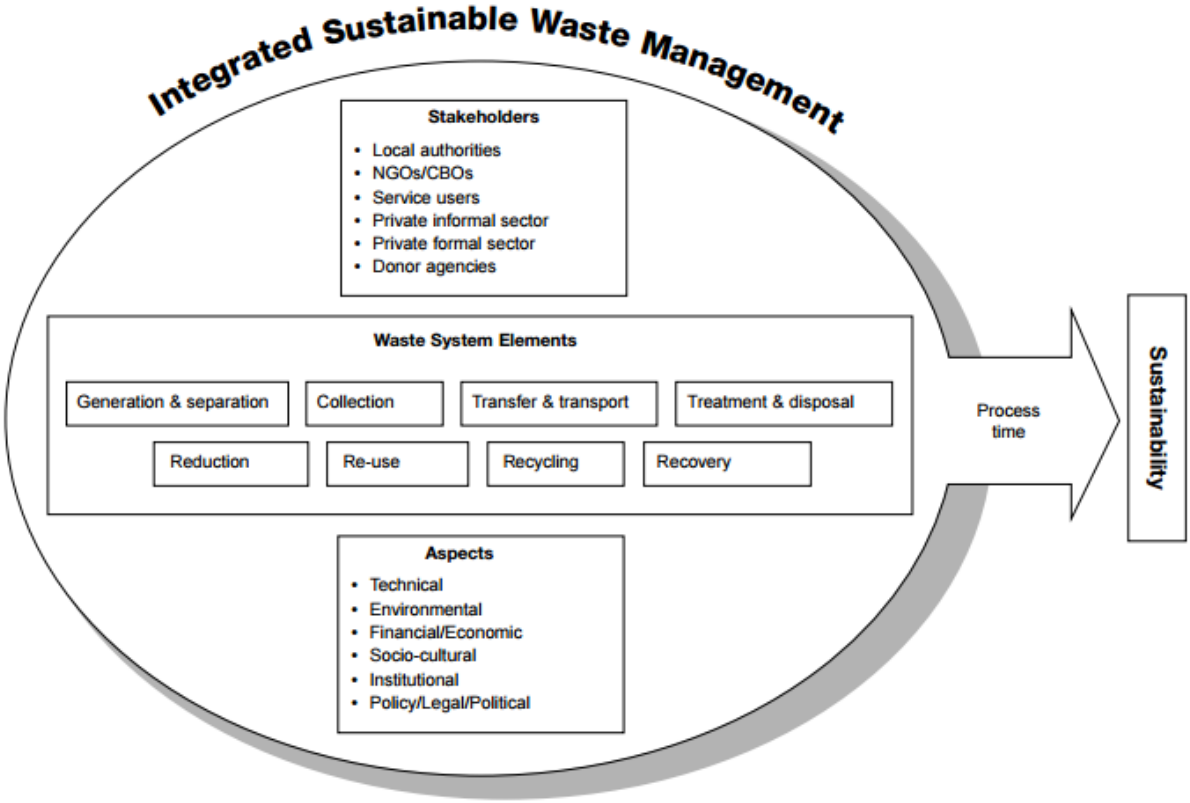

Figure 4: ISWM Framework (Van de Klundert & Anschütz, 2001)

To make the whole system work there is a synergy needed between these three dimensions and therefore ISWM strives for integration at different levels. Firstly, the various stakeholders should be integrated through cooperation and communication. Secondly, ISWM aims to integrate a variety of aspects, such as technical, financial and environmental. Thirdly, the possible waste collection and treatment methods should be integrated and adapted to local circumstances. Finally, the SWM system should be integrated into other urban systems (Van de Klundert & Anschütz, 2001). The ISWM framework has been further refined after its introduction in 2001 and became the norm in discussions and analyses of solid waste management in developing countries (Wilson et al., 2013).

The stakeholders in SWM-systems

To begin with, public sector agencies can be involved in every aspect of a SWM system. The public sector can take care of waste collection, transfer and separation, but they can also play a role in education initiatives or support organizations that foster sustainable SWM. They are responsible for implementing national policy and legislation related to SWM and they can formulate local waste management strategies or set-up recycling schemes (Rathi, 2006; Bolaane, 2006; Joseph, 2006). The private sector that is involved in SWM in developing countries can be referred to as everything that is not under state control and can thus include a wide array of stakeholders. There is often a group of waste pickers involved in the waste sector, who are very poor people that pick out valuable waste materials from streets and dumpsites to generate an income. These informal waste pickers sell their collected waste to stationary waste buyers, which are little shops that buy waste that they can sell with a profit afterwards. There are also itinerant waste buyers that travel through town to buy or barter unwanted waste which they can sell with a profit. The waste pickers and stationary or itinerant waste buyers sell their waste to the small businesses that recycle waste materials or to larger industrial recycling factories (Ahmed & Ali, 2004, Wilson, Velis & Cheeseman, 2006). The small-scale recycling industry is often self-sustaining and may have linkages to the public sector. The large-scale recycling industry are industrial factories that buy larger quantities of waste, which they process on site or that they make ready for shipment to other processing facilities.

Besides these small- and large-scale recycling companies, there can be micro enterprises active in SWM systems, who focus on creativity and innovation by searching for new waste collection and treatment methods or ways to reduce waste. These micro-enterprises look for profit by providing environmentally sound waste management practices or filling service delivery gaps, such as waste collection (Ahmed & Ali, 2004). In addition to the informal sector and private companies, there can be CBO's and NGO's involved in SWM. CBO's are usually set up by activist locals that want to deliver a social service, in this case better waste management. They can do this through small-scale operations, such as town- or beach clean-ups, or by creating awareness among local communities through educational initiatives. Similarly, NGO's enter SWM systems out of social or environmental concern and usually have a certain purpose that is not related to making profit. They educate local communities, introduce new recycling technologies, stand up for marginalized waste pickers or facilitate cooperation between different stakeholders (Ahmed & Ali, 2004, Joseph, 2006). Finally, there is the general public that should be educated about waste management and who can play an important role through source separation of waste (Rathi, 2006). In Table 1 an overview is given of the stakeholders and their activities.

Stakeholders	*Activities*
General Public	
- *Households*	- *Public awareness* - *Source separation* - *Willingness to pay for waste management services*
Public sector	
- *Municipalities* - *City corporations*	- *Collection, transfer& disposal of waste* - *Implementing national policy and legislation* - *Formulating local waste management strategies*
Private sector	
- *Waste pickers*	- *Poor people that pick out valuable waste materials to generate income*
- *Itinerant/stationary waste buyers*	- *Small shops or people that travel through town in search of waste* - *Collect, barter or buy valuable waste materials*
- *Large-scale recycling industry*	- *Industrial factories that buy large quantities of waste which they process*
- *Small-scale recycling industry*	- *Self-sustaining small-scale recycling companies*
- *Micro-enterprises*	- *Small companies that fill service delivery gaps by focusing on creativity and innovation*
- *CBO's*	- *Activist locals that want to improve SWM through all sort of initiatives.*
- *NGO's*	- *Enter SWM system out of social or environmental concern* - *Not for profit, but aim to solve a certain issue through all sorts of activities and initiatives*

*Table 1: Possible stakeholders in a SWM (*Van de Klundert & Anschütz, 2001; Ahmed & Ali, 2004; Wilson et al., 2006; Joseph, 2006; Bolaane; 2006; Rathi, 2006)

Because of the wide range of stakeholders and complexity of SWM systems it is difficult to make all stakeholders cooperate. Yet, stakeholder involvement and collaboration is essential for the functioning of a SWM system and improving this can have significant effects on the sustainability of a SWM system (Troschinetz & Mihelcic, 2009). Involving local communities can create the needed willingness and awareness, and can enhance the confidence of the public in the system (Bolaane; 2006, Henry et al., 2006) Another solution that is often proposed to improve the efficiency of a waste management system are private sector involvement or Public Private Partnerships (PPP) (Sharholy et al., 2008). This can improve both the quality cost effectiveness of the waste management services that are delivered. Areas that are served by a PPP have proven to be considerably cleaner (Ahmed & Ali, 2006). Additionally, private sector

involvement can also bring the needed innovativeness to move away from outdated practices (Wilson et al., 2013). Public authorities are increasingly pursued to involve or work together with the private sector and the community in SWM. The private sector should be given incentives to enter a SWM system, which can be done through government regulation. The involvement of the private sector depends on specific local conditions such as poverty levels and demand for services (Ahmed & Ali, 2004). Although, PPP can have major benefits for the effectiveness of a SWM system, this often seems to be difficult to accomplish. According to Ahmed & Ali (2006) 3 barriers against PPP can be identified:

- The most significant barrier against PPP are a lack of capacity to conceptualize and implement innovative approaches by municipalities. The public sector does not have the skills or incentive to change the traditional mode of service delivery and build partnership with the public sector and citizens. They also do not have fund for experimentation along this line.

- There is no felt need among municipalities to work with NGOs and citizens.

- Advocacy with municipalities for PPP is hardly possible by NGOs, CBOs or citizens due to lack of funds, skills and access (Ahmed & Ali, 2006: 788-789)

Governments are generally stuck in an inertia that prevents them from innovating and moving away from the traditional path. The public sector is isolated and neglects other initiatives, technologies and activities that are undertaken locally or internationally to improve waste management. Government officials do not get the opportunity to acquire new skills and knowledge and there is little room for innovation. The public sector often does not recognize the private sector as a valuable partner and perceives NGO's and CBO's as troublemakers. It is widely argued in the literature that coordination, communication and cooperation between all stakeholders can improve the effectiveness of SWM systems in developing countries (Joseph, 2006; Bolaane, 2006; Chakrabarti, 2009; Troschinetz & Mihelcic, 2009; Willmott & Graci, 2012; Wilson et al., 2013; Guerrero et al., 2013). Yet, because of the wide range of stakeholders and complexity of SWM systems it is increasingly difficult to make all stakeholders cooperate. Overall collaboration can possibly be improved by an independent organization that facilitates and organizes partnerships between stakeholders involved in SWM and functions as a knowledge platform (Ahmed & Ali, 2006).

In general, the literature on SWM in developing countries agrees that there is still huge potential for the private sector to enter SWM systems. More specifically, social entrepreneurship seems like a perfect solution for the service delivery gaps that are left by governments. Social enterprises and social entrepreneurs can introduce new technologies, processes and methods. They search for inventive ways to sustain themselves, try to establish new partnerships and recognize opportunities to do things differently. Above all, social entrepreneurs and social enterprises have the drive and motivation to relentlessly pursue a social goal, in this case effective waste management. In this research, the focus will be on the small-scale recycling industry, micro enterprises, NGOs and CBOs; the stakeholders that are marked in green in Table 1. These stakeholders are the ones that are most likely to utilize social entrepreneurship to solve waste management problems.

Waste system elements

Having discussed the stakeholders in a SWM system, a closer look will now be taken at the waste system elements. Figure 5 summarizes the stakeholders and which elements are their

main and occasional focus. Stakeholders can have different elements they focus on at the same time and since the responsibilities and activities of the private sector are still expanding, it is difficult to exactly state which stakeholder does what.

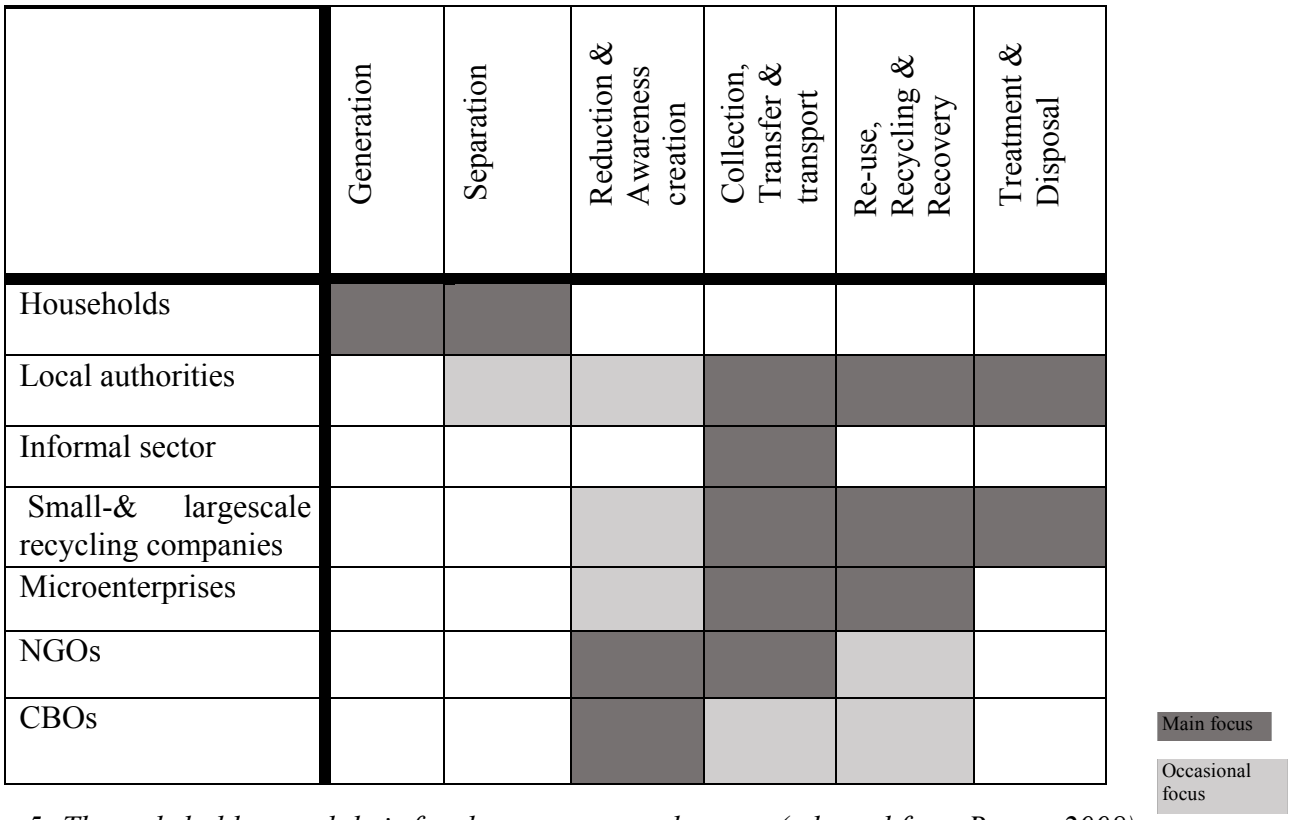

Figure 5: The stakeholders and their focal waste system elements (adapted from Rouse, 2008)

The Waste Hierarchy

To achieve sustainability, we should try and reduce the amount of material that is put through and comes out of the system by dematerializing the economy. Dematerialization can be simply referred to as the reduction of raw material inputs and reduction of waste outputs (Van Ewijk & Stegemann, 2016). A concept and policy instrument that is often used to dematerialize the economy is the "waste hierarchy". This hierarchy can be described as a priority order for (at least three) waste management options based on assumed environmental impacts (Hultman & Corvellec, 2012). In its simplest form the waste hierarchy consist of 3 components Reduce, Re-use and Recycle ("Triple R"). In *Figure 6* we can see the 5 stages of the waste hierarchy that will be used here. The preferability of each option is based on its environmental impacts and potential to save resources (Van Ewijk & Stegemann, 2016). To begin with, we should try to avoid as much waste as possible to make further waste management obsolete. Producers should incorporate the lifecycle of their products in their designs and the general public can reduce their use of materials in all sorts of ways. Awareness creation amongst the public is of vital importance to create an effective waste management system as it can improve all subsequent stages.

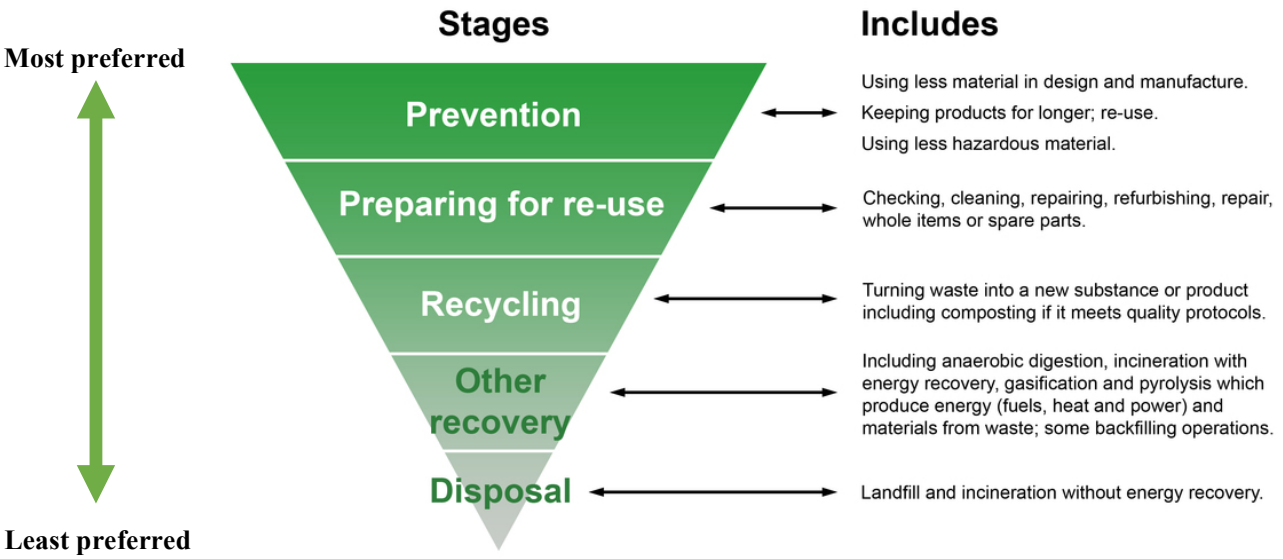

Figure 6: The waste hierarchy

The next preferred stage of the waste hierarchy is re-using. Reusing means that products are used multiple times in its original form. This way, the lifecycle of a product can be extended without any extra emissions or environmental impacts. If the waste cannot be reused, the next option is to try recycling the products. Recycling involves remanufacturing or reprocessing products so that the materials can be turned into a new substance or product that can be used again. Composting of organic waste can also be referred to as recycling. The environmental impacts that the remanufacturing or reprocessing brings along should be considered. The next favorable option is recovery of energy or materials from the waste. This can be done through a variety of methods. Recovery methods can be environmentally harmful and to minimize this potential strict regulations and monitoring mechanisms should be in place. When none of the above options is possible, the final option is to dispose of waste by landfilling it or incinerating it without energy recovery. Due to the negative environmental impacts, this is the least preferred option (Hoornweg & Bhada-Tata, 2012; Papargyropoulou et al., 2014).

Generation

To get a better idea of what happens with waste after it is produced, a closer look will now be taken at the waste value chain (*Figure 8*). It all begins with the generation of waste. What types and what amount of waste is generated depends on the lifestyles, income levels, climate and level of industrialization of a specific country. The producers of waste in SWM are usually households, commercial facilities, schools, offices and health care centers (Zurbrugg, 2013). In developed countries people typically generate between 1,43 and 2,08 kilograms per person, per day (kpd). In developing countries this is significantly lower between 0,3 and 1,44 kpd. When a country develops, this thus usually increases the waste generation (Troschinetz & Mihelcic, 2009). Besides the fact that developing countries generate less waste, the composition of the waste is also different (*Figure 7*). The most obvious difference is that the organic component in the waste flows of developing countries is usually a lot higher (up to 80%), while the waste flows in developing countries consist over a higher percentage of packaging material (paper). Waste prevention and minimization can reduce the amount of waste that is generated by redesigning products and changing patterns of production and consumption (Hoornweg & Bhada-Tata, 2012). Examples are refillable water bottles that can reduce the amount plastic bottles and alternative bags that can reduce the use of plastic bags.

There is also a wide range of biodegradable and compostable alternatives for single–use plastics (Song et al., 2009)

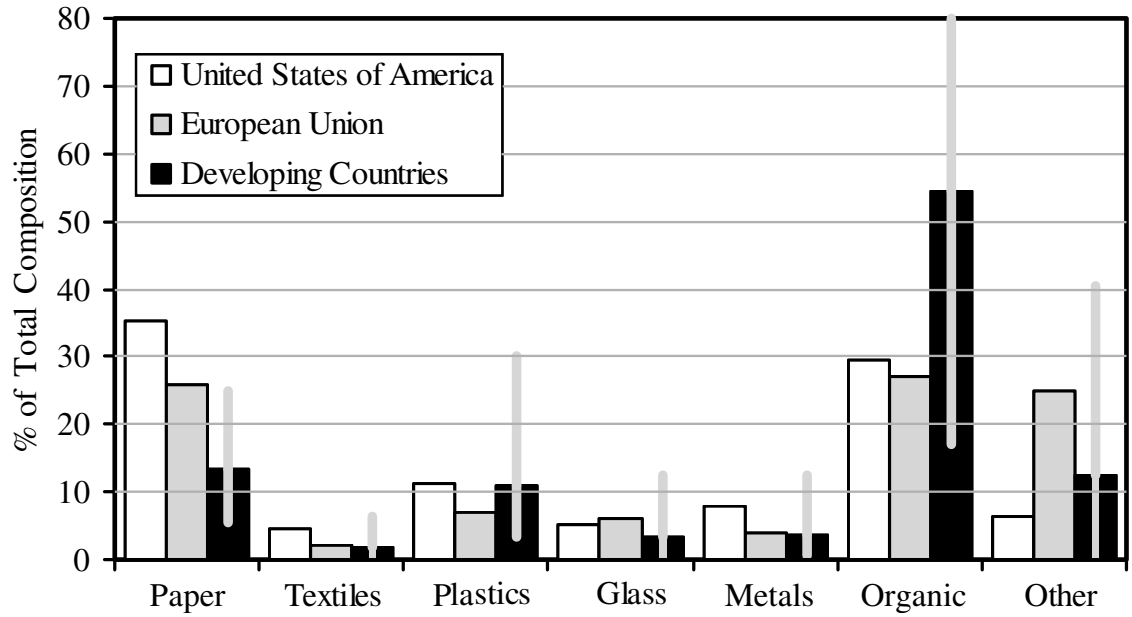

Figure 7: Comparison between solid waste composition of developed countries and developing countries. The vertical bars show the possible range in developing countries (Troschinetz & Mihelcic, 2009: p. 918)

Collection

After the waste is generated, it obviously needs to be collected. Collection, transfer and transport are the foundation of any SWM system. Waste collection can be referred to as 'the collection of solid waste from points of production (residential, industrial commercial, institutional) to the point of treatment or disposal' (Hoornweg & Bhada-Tata, 2012: p.13). Collection can be an extremely difficult task in developing countries. The areas where the waste is most visible or that has households or businesses that are willing to pay are first served. Often (poorer) parts of the population or certain (rural) areas are not served by regular waste collection services. Polluter pays principles are inappropriate, due to lack of funds amongst local communities. If waste is not collected, it is illegally dumped or burned, with the resulting impacts (Wilson et al., 2013). Overall collection rates are generally below 50% in developing countries (Hoornweg & Bhada-Tata, 2012). The collection and transport of waste is usually inefficient and highly labor-intensive (Chakrabarti, 2009). According to Guerrero et al., (2013), collection transfer and transport practices can be affected by:

- Improper bin collection systems
- Pour route planning
- Lack of information about collection schedule
- Insufficient infrastructure
- Poor roads
- Number of vehicles (Guerrero et al., 2013: p. 221)

Collection is traditionally executed by the public authorities and their support is usually necessary to create an effective collection system. Improving the infrastructure generally remains the responsibility of governments and this can significantly improve the efficiency of

the collection system (Guerrero et al., 2013). Collection can usurp up to 90% of a municipalities budget for SWM and nowadays collection can be the responsibility of multiple stakeholders. There is the informal sector that usually plays a vital role, but also NGO's, CBO's and companies are increasingly dealing with the collection of waste. Sharholy et al., (2008) found that affordable waste collection services could be extended by organizing the informal sector. Another option that can improve the efficiency is involving micro-enterprises and NGO's (Ibid.) Increasing the value of the waste can increase collection rates as it gives people and companies more incentive and more resources to collect waste (The Ocean Conservancy, 2015). More research is needed to further clarify the role of the private sector in collection and transport (Rathi, 2006).

Separation

The waste can be separated both before (source separation) and after (secondary separation) it is collected. Source separation is the most preferable and effective and the general public can make a big difference by doing this. Waste is usually separated into 'dry' waste (recyclables) and 'wet' waste (food waste, organics), with the possible addition of a third residue category (Hoornweg & Bhada-Tata, 2012). If the non-organics are separated from the organics it is easier to recycle, re-use or recover energy from the waste flows. Unfortunately, in developing countries there is currently little source separation of the organic compostable material from the other non-organic recyclable materials (Sharholy et al., 2008). Collection of separated waste is costlier and is more difficult to organize (Hoornweg&Bhada-Tata, 2012). If there would be more source separation, the large amount of organic waste in waste flows of developing countries could be relatively easily processed through composting. According to Guerrero et al. (2013), the three most important components that can foster source separation are:

- **Awareness.** The efficiency on the separation of waste depends on the awareness of citizens and municipal leaders on the impacts of waste management systems in the city.

- **Knowledge.** Decision makers at the municipality are prone to set up waste separation programs when they are familiar with new and appropriate technologies as well as good practices for the management of waste.

- **Equipment**. The availability of equipment and machinery to manage and recycle waste seem to be key factors that promote separation of waste at the household level (Guerrero et al., 2013: p224).

Secondary separation takes place at Material Recovery Facilities (MRFs) where the recyclables are segregated from the other waste residue and then transferred to a recycling company. At landfills in developing countries there is often an army of informal waste pickers active that rummage the waste for recyclables that they can sell. Secondary separation is less efficient then source separation as recyclables from mixed waste can be contaminated (Hoornweg & Bhada-Tata, 2012)

Reuse

If the waste it collected and separated it should be checked if it is possible to be reused. If the waste is reused in its original form this is called conventional reuse. This usually involves cleaning the waste first and checking if it can be repaired or is still working. The reuse of plastic bottles or glass (beer) bottles is a good example of conventional reuse. In developed countries, take-back and refilling schemes have worked, but in developing countries such process are

generally considered as a niche activity and are not considered as a feasible large-scale strategy (Hopewell, Dvorak &Kosior, 2009). Reusing can also refer to creative reuse or upcycling. This involves transforming a product into an alternative product with a different use, without breaking down and reprocessing the product. The possible applications of waste reuse are endless and can range from using plastic bottles as bricks to making glasses from old glass bottles to using a discarded tire in a playground. In developing countries, a driver for reusing are the possible financial benefits. Reusing might involve some fabrication, but generally the environmental impact of reusing is very low.

Recycling

The treatment and disposal of waste remains a major issue for governments in developing countries (Wilson et al., 2013). Many developing countries do not collect data on waste disposal and this makes it difficult to create a coherent picture There are nowadays many treatment options that can be used to prevent waste from going into landfills, but how widespread the usage of these methods is in developing countries, is hard to estimate (Hoornweg&Bhada-Tata, 2012). The most environmentally preferred treatment option is recycling. Recycling here refers to converting waste products into raw materials that then can be used again to make new products. Recycling can return valuable materials back into the economy with little environmental impacts and greenhouse gas emissions (only from processing). Especially plastics can be recycled in a large variety of ways, where the difficulty of the processes depends on the type of plastics that is recycled (Hopewell et al., 2009).

Some recycling can be done through small-scale, low-tech operations which are especially suitable for developing countries. Large-scale, high-tech recycling plants are more difficult to establish in developing countries due to high operation and installation costs. Also, an extensive collection service and large incoming flow of waste is needed to make such operations worthwhile and profitable. Therefore, large-scale recycling can usually only be found in the proximity of larger cities in developing countries. The market for recycling is strongly dependent on the price of the commodities. If the prices are low, it may be less lucrative to recycle the waste. Plastic, paper, glass and metals are the main non-organic materials that are suitable for recycling. The role of governments in recycling is still relatively small, while the informal and private sector usually play a large role (Sharholy et al., 2008). The recycling sector is largely dependent on the number of recyclables that are retrieved by informal waste pickers and a system of “middle-men” that transport the waste to places where it gets recycled (Hoornweg & Bhada-Tata, 2012). Also, community participation can strongly improve recycling and is the least costly option to make recycling work (Sharholy et al., 2008).

Considering that more than 55% of the waste flow is organic in developing countries, there are huge possibilities to expand composting practices (Troschinetz & Mihelcic, 2009). Composting can be done at home (‘home composting’) and thus not necessarily have to be collected and transferred to treatment sites. It does not require any expensive or sophisticated technology and composting can provide a valuable material for the agricultural sector (Sharholy et al., 2008). Composting is regarded as the best treatment method for organic waste and should be preferred above anaerobic digestion, where organics are used to generate energy (Sharholy et al., 2008). Currently, composting practices are rarely undertaken formally in developing countries. The awareness and knowledge about the uses and making of compost is often lacking and markets for the sale of compost are small (Hoornweg & Bhada-Tata, 2012).

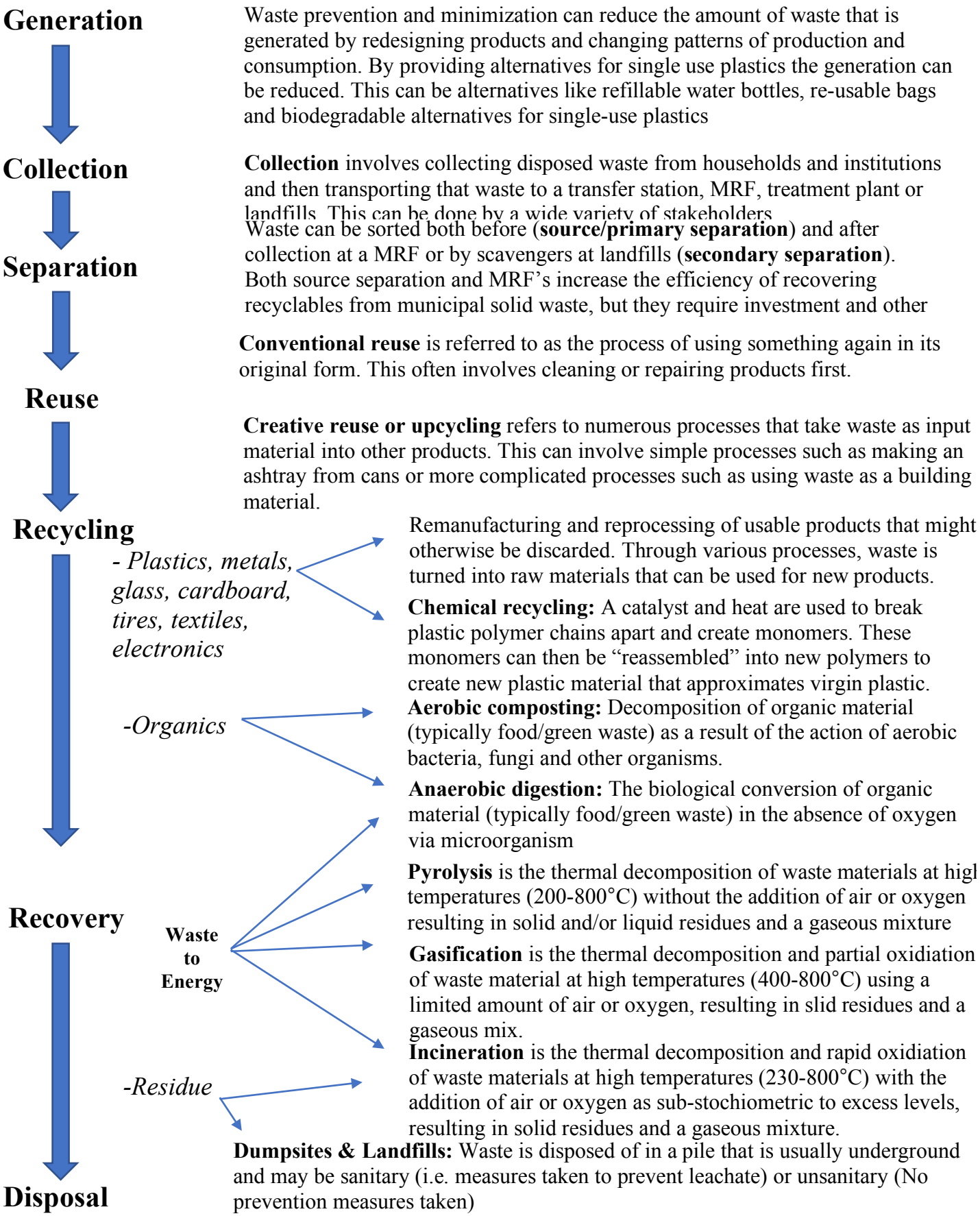

Figure 8: Waste value chain (adapted from The Ocean Conservancy, 201: p. 25; added Sharholy et al., 2008; Troschinetz & Mihelcic, 2009, Hoornweg & Bhada-Tata, 2012; Wilson et al., 2013).

Recovery

Recovery refers to process whereby waste is used to generate electricity or heat. In *Figure 8* we can see the 4 most common Waste to Energy (WtE) methods. Incineration can reduce the volume of the waste up to 90 % and at the same time generate needed electricity (Hoornweg & Bhada-Tata, 2012). Incineration is the most widely used WtE method, yet there are few cases were incinerators have been installed successfully in developing countries (Sharholy et al., 2008; Hoornweg & Bhada-Tata, 2012; Wilson et al., 2013). If they are misused or not properly monitored, incinerators bring along societal and environmental risks (air pollution and ash residues). All the outputs from the thermal processes that are used to recover energy from the waste thus have to be managed and monitored carefully to ensure its sustainability (Ocean conservancy, 2017).

Incinerators and other WtE plants are costly endeavors, that are difficult to maintain and operate (Wilson et al., 2013). They need a lot of initial investment and the operating costs are high. It has been argued that sophisticated, high cost equipment for waste treatment is not suitable for developing countries where funds and expertise are usually absent. In addition, the waste in developing countries is usually 'high in organic content and subsequently moisture, thus possibly rendering waste unsuitable for thermal processing without pre-treatment or the use of support fuel' (Wilson et al., 2013: p.60). The conventional waste treatment techniques of developed countries do not seem to work as well in the developing world (Henry et al., 2006; Chakrabarti, 2009). The energy balance of recovering energy through waste is less positive then the energy balance of transforming materials through recycling (Troschinetz &Mihelcic, 2009). Recovering energy from waste is preferred to landfilling though, if sufficient pollution control measures are taken (Hoornweg & Bhada-Tata, 2012). Additionally, there are some small-scale methods to recover energy from waste. Pyrolysis machines where waste is turned into a crude oil can be a possible small-scale, low-cost alternative (Belanger, 2013). Also, in developing countries the use of biogas fuels for cooking is widespread. Through anaerobic digestion, biomass is turned into biogas that can be used as fuel for stoves. It should be realized that these biomass stoves are often inefficient, emit greenhouse gasses and cause indoor air pollution that can seriously harm human health (Bhattacharya &Abdul Salam, 2002).

Landfilling

In developing countries, open dumping or landfilling is still by far the foremost way to dispose of waste. Although it is the least environmentally preferred option according to the waste hierarchy, it is the most feasible and affordable way to organize waste disposal. Proper landfilling is usually lacking in developing countries and in most often it is just open dumping on a vacant plot of land. With no leachate prevention and few control measures, such dumping sites are polluting surrounding waterways and groundwater reservoirs and endangering public health. Usually, landfilling progresses from an open-dump to a controlled dump, to a controlled landfill and finally to a sanitary landfill. Sanitary landfills have taken leachate prevention measures and in the best-case scenario even landfill gasses are captured to produce energy (Hoornweg & Bhada-Tata, 2012). In an ideal situation, only the waste that cannot be recycled reused or recovered and the residues of other waste treatment processes should go to landfills. Unfortunately, in developing countries there are few sanitary landfills and all sorts of materials that should not go to a landfill are dumped. Despite its downsides, landfilling will probably remain the most widely adopted practice in developing countries. To reduce their environmental impacts, control measures that can lead to sanitary landfills should be promoted (Sharholy et al., 2008)

Enabling Aspects

Having explained the stakeholders and the different waste system elements, what remains is an explanation of the enabling aspects. Throughout the sections above, already multiple factors that can influence the effectiveness and functioning of a SWM have come to the fore (e.g. *Figure* 3), but here these will be discussed more systematically. As explained there are 6 different enabling aspects (institutional, social, environmental, political, technical and financial aspects) that influence the performance of a waste management system. Based on their in-depth analysis of the literature, Guerrero et al., (2013) summarized the factors that influence the different aspects of a SWM system (Figure 9). Only one or two authors are mentioned for every factor, although the factors often have been described by multiple authors. Guerrero et al., (2013) ordered the factors that influence a SWM into the different enabling aspects. Zurbrugg (2013) further developed this by translating these factors that influence the enabling aspects into an assessment tool for SWM projects. In his research, Zurbrugg (2013) shows that his assessment tool is well suited to assess existing projects. Here, his assessment tool will be

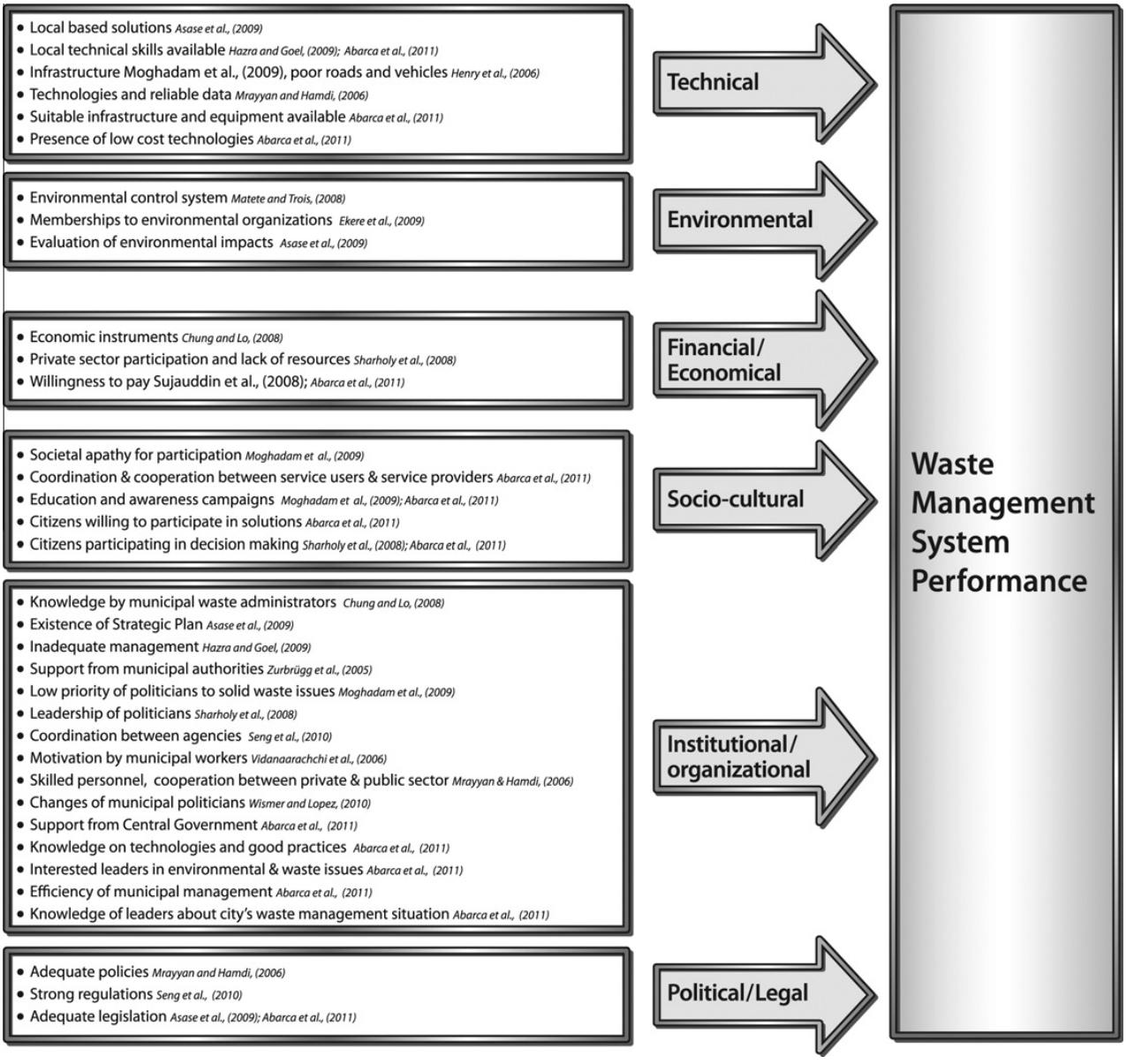

Figure 9: Factors that influence the aspects of a waste management system (Guerrero et al., 2013: p.228)

adjusted to a more simplified form that can help assessing the social enterprises in Bali's SWM system.

In his Phd thesis, Zurbrugg (2013) developed a set of tools that he then used to assess 4 different waste management projects in different developing countries. Because there is a wide variety of methods that can be used to do such assessments, Zurbrugg (2013) first did an extensive review of various assessment methods to be able to develop a set of tools. Zurbrugg (2013) summarized the aim of his doctorate as follows:

> "The objective of this thesis is to provide support, with a set of assessment tools and procedures, for better planning, design, implementation and continuous adaption of waste projects in low- and middle-income countries" (Zurbrugg, 2013: p.3)

His reasons for developing such an assessment tool were twofold. Firstly, the assessment tool can help with analyzing the performance, the underlying causes and the impacts of a certain project or activity. Secondly, the assessment tool can help with evaluating and comparing different projects and show the possibilities for improvement. The assessment tool can be used by academia "to systematically assess and understand strengths and weaknesses of projects which are comparable to each other, and through this establish more evidence-based knowledge" (Zurbrugg, 2013: p.21). Zurbrugg (2013) assumes that we can learn from the failures and successes of existing waste management projects. If the mistakes made by others can be avoided and the factors that lead to failure can be mitigated, this will automatically make projects more successful. On the other hand, effectively functioning waste management projects demonstrate factors that lead to success that can possibly be replicated elsewhere. The success factors can possibly be used in the design of new projects or used to enhance the performance of existing projects (Zurbrugg, 2013). For this reason, Zurbrugg used the lessons that have been learned in practice, to come up with 6 different success factors that are structured according to the aspects of an ISWM framework. The success factors Zurbruggs assessment tool assumes are:

- *"**Supported by government and legislation*:** The extent to which government endorses and supports the project and how it coincides with national laws, regulations, standards and codes.
- ***Enabled through an effective organizational structure**:* Which is clearly defined in its goals and objectives, has a strong forward-looking leadership and operates under the principles of quality control, accountability, transparency, and equity. Here sound partnership with other solid waste stakeholders and networking is considered decisive to build on strengths and opportunities. In-house capacity to fulfill the quality of service envisaged is reflected by the skilled, motivated and continuously trained staff.
- ***Embedded in a financially sound setup:*** Involves a viable business model and business plan, access and the capacity to mobilize investment capital and mechanisms to recover capital and operational costs through reliable revenue sources.
- ***Technically appropriate**:* Where the project operates with locally proven technologies suited to the local context, ideally built in the region with local materials and skills, and with a reliable service chain to ensure rapid and effective maintenance and repair. Flexibility of the technology to cope with changing conditions is another feature of a suitable technology.

- ***Environmentally sound:*** Where project activities monitor emissions and comply with environmental regulations. Environmentally sound operations also strive to reduce energy and natural resource consumption, minimize emissions to water air and soil, avoid other nuisances, and safeguard workers and adjacent resident's health - independent of legislation.
- ***Socio-culturally accepted and beneficial****:* Involves the endorsement and support of the project by the community as well as their motivation and willingness to participate and contribute to the process and objectives of the project. This also comprises recognized and valued benefits for the community, not only in terms of improved cleanliness but also with regard to employment opportunities and local social and economic development" (Zurbrugg, 2013: p.89).

The assessment tool helps to systematically analyze the performance of solid waste management projects. It can expose the strengths and weaknesses of a project and what should be changed to reach the success factors. The assessment tool can be used in different ways; for an in-depth analysis of qualitative data, but also for a rapid assessment through a questionnaire. If multiple similar cases are assessed the tool makes comparison possible and this can increase the confidentiality of the results. Not all the success factors are equally important for the success of a project. The relative importance of each factor depends on the local context and the scope and focus of a waste project, and can also change over time. In *Figure* 10 we can see how Zurbrugg (2013) graphically depicts the assessment tool and what the different aspects include.

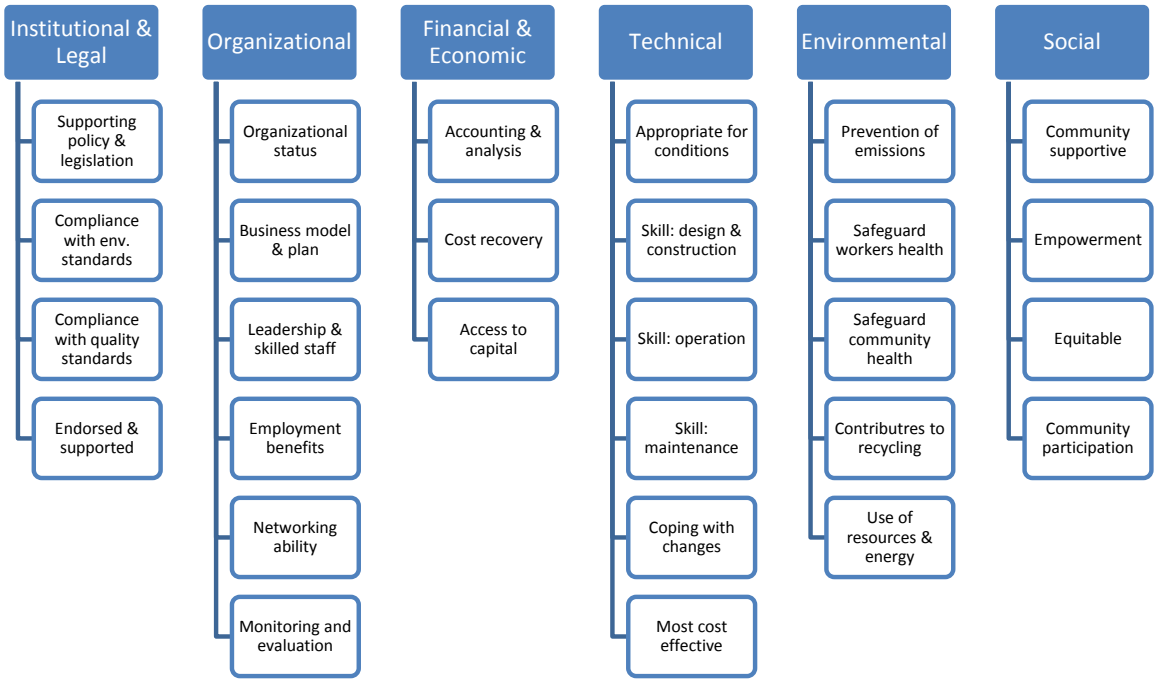

Figure 10: The enabling aspects that ensure sustainability (Zurbrugg, 2013: p.104)

In this study, the assessment tool of Zurbrugg (2013) will be used to analyze and evaluate 5 different social enterprises. To make this possible for a relatively large amount of organizations, the assessment tool is shortened and simplified over here. The same 6 aspects as Zurbrugg (2013) will be used, only they are determined through a different list of questions. This list of questions can be found in following chapter that describes the methods of this study.

4. Methods

To acquire the primary data for this study, 11 weeks of onsite field research were done in Bali. Both qualitative and quantitative methods were used to get a more coherent and holistic idea of the role of social entrepreneurship in Bali's SWM system.

Research aim

The aim of this research is to clarify the characteristics and activities of the social enterprises involved in Bali's SWM system and to analyze how different institutional, organizational, financial, technical, social and environmental aspects influence the functioning of these social enterprises.

Research question

How can social entrepreneurship add to effective solid waste management and how do the characteristics and enabling aspects influence the functioning of the social enterprises involved in Bali's SWM system?

Sub-questions

1) What are the characteristics of the social enterprises involved in Bali's SWM system?
2) What are the activities of the social enterprises involved in Bali's waste management system?
3) How do the social enterprises involved in Bali's SWM system generate income?
4) How is the collaboration between the social enterprises involved in Bali's SWM and how is the collaboration with other stakeholders?
5) How do the different enabling aspects influence the functioning of the social enterprises?
    a. How do the social enterprises cooperate with the government? Are there any effective public-private partnerships?
    b. How do the social enterprises sustain themselves? How do they get funding or income?
    c. Do the social enterprises use technically appropriate infrastructure?
    d. Do the social enterprises have effective organizational structures? Do they have sound partnerships with other stakeholders?
    e. Is the social enterprise accepted and supported by the local population?
    f. Do the social enterprises reduce their negative environmental impact? Do they reduce a significant amount of waste from improper disposal?
6) How can social entrepreneurship improve the effectiveness of Bali's waste management system and what determines the success of solid waste management projects?

Research description

Sub-question 1 will be answered in the chapter 6. The characteristics of the social enterprises that will be analyzed in Chapter 6 are:

- The year it was founded
- The legal entity
- The size
- The spatial focus
- The social goal

Chapter 7 will answer sub questions 3 and 4. The different activities of the social enterprises that are described in Chapter 7 are:

- Separation
- Collection,
- Composting
- Reuse
- Recycling
- Recovery

The different income models that are described are:

- The sale of products
- The sale of services
- Outside funding

Sub question 4 will be answered in chapter 8. The focus will be on collaborations of the social enterprises:

- Public-private partnerships
- Collaboration with other social enterprises and NGO's
- Collaboration with the business sector
- Collaboration with education institutions
- Collaboration with the informal sector

Sub question 5 will be answered in chapter 9 and 10. In chapter 9 a rapid assessment of the performance of 11 social enterprises on the following enabling aspects will be done:

- Organizational
- Institutional/legal
- Financial
- Technical
- Social
- Environmental

In chapter 10 a more in-depth analysis of 5 social enterprises will be done on the basis of these enabling aspects. The 5 social enterprises that were chosen as case studies are:

- Bali Compost Crafters (BCC)
- Merah Putih Hijau (MPH)
- Peduli Alam
- Saraswati Paper
- Niskala

In the conclusion, sub-question 6 will be answered. On the basis of the previous sub questions, the potential of the social enterprises to add to improve waste management systems in developing countries will be discussed. Also, the success factors and weaknesses of the social enterprises in Bali's SWM system will be discussed so that we can learn from the lesson they provide.

Host organization

In the preparation stage, the Indonesian Waste Platform(IWP) was contacted and asked if they want to function as a host organization. The IWP was founded in 2016 by two Dutch women that wanted to do something about the ever-increasing waste problem in Indonesia. The IWP describes itself as "*a network – promoting and facilitating cross-sector collaborations for solutions on the waste problems in Indonesia" (IWP, 2017).* According to the IWP, a large problem of Indonesia's waste management system is the lack of cooperation and coordination. There is no clear overview of the stakeholders and of who is doing what and this is needed to facilitate cooperation. Therefore, the IWP is currently trying to set up an Indonesian Waste Monitoring & Database, which basically means creating an overview of the large variety of stakeholders involved in Indonesia's waste management system. Also, they have a Facebook page with more than a 1000 members (including many stakeholders from Indonesia's waste management system), where they share knowledge about waste management. The existing database of the IWP, combined with the data found on the Facebook pages and websites of the social enterprises made it possible to make an initial overview of the social enterprises involved in Bali's SWM system.

Three meetings with the founders of the IWP were held in the Netherlands, and one meeting was arranged in Bali. Although we largely operated by ourselves in Bali, the current study helped the IWP with their database by identifying and mapping the stakeholders in Bali. The extensive network of the IWP was used to get into touch with different stakeholders in Bali. Many of the social enterprises already knew the IWP, and by mentioning the IWP, the social enterprises were more willing to do an interview. It showed to the respondents that we were serious and might be able to have something to offer to them.
As such, our ties with the IWP were of mutual benefit and fostered the research process in Bali.

Research partner

The field-research was done together with another master student from Utrecht-university; Erwin Noz. In the preparation stage of this research, this collaboration was established and it worked out really well. In the interviews, we stood stronger as a team and could complement each other in asking the right questions. We could help each other in the research process and discuss possible angles and insights. Also, when we were stuck or demotivated we could help each other to see things differently and stay positive. In total, we were 2 months together in Bali; Erwin was there 1 month before me, while I stayed 3 weeks longer. Our two master theses complement each other; Erwin's thesis is focused on prevention of and education about waste, while this thesis is focused on the treatment and disposal of waste.

Semi-structured interviews

In the field, mixed-methods were used, since triangulation can help with verifying the results and can increase the confidence of the research (Rothbauer, 2008) The methods that were used included semi-structured interviews, participatory observation and a survey.
The primary form of data collection that was used in this research was interviewing. Semi-structured interviews were chosen because this qualitative method gave the possibility to collect the in-depth knowledge about the social enterprises that was needed to assess their performance in the different enabling aspects. Although we had an interview schedule, a semi-structured interview gives the flexibility to adapt the questions and redirect the interview. Redundant questions could be left out and if certain questions popped-up during the interview or something needed to be clarified, the interview could be redirected.

This study focuses on South-East Bali. This is the area where the large majority of the tourism activity is happenings and where most of the Balinese live. Additionally, there were no social enterprises found that lying outside of the focus area. After arrival in Bali, all identified social enterprises in the research area were contacted by email or text message and it was asked if it was possible to meet them for an interview. In total, 35 different social entrepreneurs or social enterprises were interviewed. It was tried to create a complete overview of all the social enterprises involved in Bali's SWM system and the only criteria that was upheld was that the social enterprise needed to have some relation to waste. Through perseverance, we managed to interview the majority of the identified social enterprises and only 6 had to be left out due to inability to reach or talk to them. It is possible that some social enterprises were overlooked, but this possibility was minimized through the use of snowball sampling. The respondents of the semi-structured interviews were asked if they knew other organizations that might be interesting for us, which helped identifying new stakeholders and arranging new interviews. In the survey, we asked the respondents once more if we overlooked any of the social enterprises involved in Bali's SWM system to do a final check. Through all this, we thus tried to include as many social enterprises as possible and make the included social enterprises as representative as possible.

Most of the interviews were held with the owners or founders. The interviews were recorded with permission of the respondent and notes were taken to create a preliminary overview of the interviews content. The interview was usually divided into 2 sections (Annex II) The first section focused on the characteristics and functioning of the social enterprise. This was used to assess the performance of a social enterprise in all different aspects. The second section focused on the general characteristics of Bali's waste problem and the historical context. This helped to get more of the context wherein the social enterprises operate and which barriers they encounter. With a few of the organizations a follow-up interview was planned, because more data was needed. With other social enterprises, the subsequent meeting involved visiting their facility or an activity, to get a better idea of their functioning.

Participatory observation

Part of this research was done through participant observation, which basically meant involving myself in the social enterprises. Bali is a relatively small island and most of the social enterprises were based within 1 hour drive from my home base. As such, it was possible to visit the facilities, activities and meetings of various social enterprises. This was done to get more understanding of the functioning of the social enterprises. A few examples are:

- Participating in multiple meetings of a social enterprise (MPH) wherein they discussed the agenda, the functioning and plans.
- Participating in multiple beach clean-ups and other clean-up activities (trashwalk with Sampah-Jujur).
- Helping ecoBali at their material recovery facility to get an idea of the separation process and the conditions at the facility.
- Visiting the site of Bali Compost Crafters to see how this functions and Bali's biggest landfill to get an idea of the scale of the problem
- Attending a town-hall meeting of Project Clean Uluwatu, where they explained their current situation and future plans and where people could give input or feedback.

Three social enterprises also held a fundraising in the time I was there. The first organized a concert, the second organized a surf competition and the third a music jam with an auction. The income that was generated in the events was used to support the social enterprise and at the same time the events were held to create awareness. These fundraisings were interesting

opportunities to see how the social enterprises collect their funds. Also, they were used to network, as often multiple social enterprises were present at these events. There were also two waste related festivals held in Bali in the time I was there; The sustainable design festival and sustainable solutions festival. At the sustainable design festival, multiple social enterprises that are included in this research gave a short presentation of 15 minutes. At the sustainable solutions festival, there was a market where the social enterprises presented themselves and sold their products. Both of these festivals were very good opportunities to gather information, network and get in touch with the social enterprises. These examples aim to show the involvement of the researcher in the social enterprises and how valuable information could be collected through participatory observation.
Participatory observation was also done by being present in Bali, experiencing the waste problem and seeing the improper disposal habits of the local population and the extravagant consumption habits of the tourists.

Questionnaire

In the final stage of the on-site research, a questionnaire was send to all the waste related social enterprises involved in Bali's waste management system that were identified.
This questionnaire specifically focused on the cooperation between the social enterprises and the aspects that foster or hinder this cooperation (Annex III). Through the survey large amounts of data about the cooperation were collected that were easily comparable. Additionally, it helped to confirm and clarify the data that was collected through the semi-structured interviews. The self-reporting questionnaire was done by convenience in a non-representative sampling and was sent to 45 different social enterprises. Since not all social enterprises responded to the survey, 2 weeks after the first email a kind reminder was send if they wanted to fill in the survey. In the end 22 social enterprises responded to the survey.
The questionnaire consisted of both closed questions that and open questions that demanded more respondent input. The survey was especially useful to get an exact idea of who cooperates with whom and to see which enterprises are generally known.

Data Analysis

The data of the questionnaires was analyzed through excel. A statistical analysis was not necessary, since the number of questionnaires (N=22) was too small.
All the semi-structured interviews that were done were first transcribed. Then, they were analyzed through open coding with the use of NVivo software. This way, it was possible to distract the needed detailed information about the social enterprises from the interview.
After all the interviews were transcribed and some first analysis done, it was decided which social enterprises would be used a case studies. Due to time-limitations and lack of data it was impossible to do an extensive analysis of all the social enterprises. Therefore, the most interesting social enterprises were chosen as case-studies and described in-depth. The specific case-studies were chosen because their diversity gives a good representation of the social enterprises in Bali's SWM system that are focused on collection recycling, reusing and recovery. Additionally, the specific social enterprises were chosen because they gave a good idea of the diversity of organizations that can be typified as social enterprises. Another important criterion was that the collected data had to be sufficient to use the developed assessment tool. For some social enterprises, data was missing and they were deemed unsuitable for an in-depth analysis. Some organizations had to be completely left out because they did not fit into the definition of social entrepreneurship due to the lack of market orientation.

The social enterprises that were chosen as case studies were analyzed thoroughly through the use of an assessment tool that was based on the work of Zurbrugg (2013). Zurbrugg (2013) provides a long list of questions that can be used for the assessment of a waste management project. Answering all these questions requires detailed data that takes a long time to collect and is not always easily accessible. Zurbrugg (2013) managed to do this for 4 projects in 4 different countries for his PhD. In this study, the assessment tool of Zurbrugg (2013) will be used to analyze and evaluate 5 different social enterprises. To make this possible for a relatively large amount of organizations, the assessment tool is shortened and simplified over here. The same 6 aspects as Zurbrugg (2013) will be used, only they are determined through a different list of questions. The 6 success factors that will be assessed in the analysis of the social enterprise are:

- Supported by government and legislation (institutional and legislative aspects)
- Enabled through an effective organizational structure (organizational aspects)
- Embedded in a financially sound setup (financial and economic aspects)
- Uses technically appropriate infrastructure and equipment (technical aspects)
- Environmentally sound project (environmental aspects)
- Socially inclusive, accepted and supported (social aspects) (Zurbrugg, 2013: p.98)

The following list of questions and measurable concept were used to analyse the performance of the social enterprises:

Enabling aspect	Focus	Measurable concepts
Case description	- What is the problem that is addressed? - How was the social enterprise started and developed? - What is the aim of the social enterprise - What are the activities of the social enterprise? - What are the future plans of the social enterprise	-Problem statement -Start-up -Aim -Activities -Future
Organizational	- What is the legal status of the social enterprise? - How many employees has the social enterprise? What do these employees get paid and do they get any other benefits? - How important is the leadership of the management or founders of the social enterprise? - Is it possible to upscale the operations of the social enterprise in the future? - Does the social enterprise cooperate successfully with other stakeholders from the private sector?	-Legal status -Employees& wages -Leadership& Management -Scalability -Partnerships
Institutional & Legal	- Does the social enterprise cooperate with the government or other public institutions? - Is the social enterprise supported by the government or other public institutions?	-Public Private Partnership
Economic	- How does the social enterprise sustain itself financially? o What kind of income generating activities has the social enterprise? o Does the social enterprise have a viable business model?	- Income - Business Model -Financially sustainable

	○ Is the social enterprise financially self-sustaining? Can it become financially self-sustaining in the future?	
Technical	- Does the social enterprise use appropriate technology for the local conditions? ○ Does the social enterprise use low-cost technology? ○ Can the technology be used by unskilled local employees? ○ Can the technology easily be replaced? Are their local materials available to repair the technology?	-Appropriate technology
Social	- Is the social enterprise accepted and supported by the local communities? Does the social enterprise involve local communities? - Does the social enterprise provide employment opportunities for the local population? - Does the social enterprise provide employment opportunities for marginalized groups?	-Community Participation - Social embeddedness
Environmental	- Is the social enterprise environmentally sustainable? Does the social enterprise take measures to minimize its environmental impact? - In how far is the social enterprise reducing the amount of waste that is being burned, illegally dumped or going into a landfill? - Does the social enterprise decrease the amount of waste going into the landfill, being dumped or burned?	-Environmental impact -Waste reduction
Conclusion	Final verdict: - What are the success factors? - What are the weaknesses?	-Success factors

Figure 11 depicts the measurable concepts that will be used for the analysis of the social enterprises:

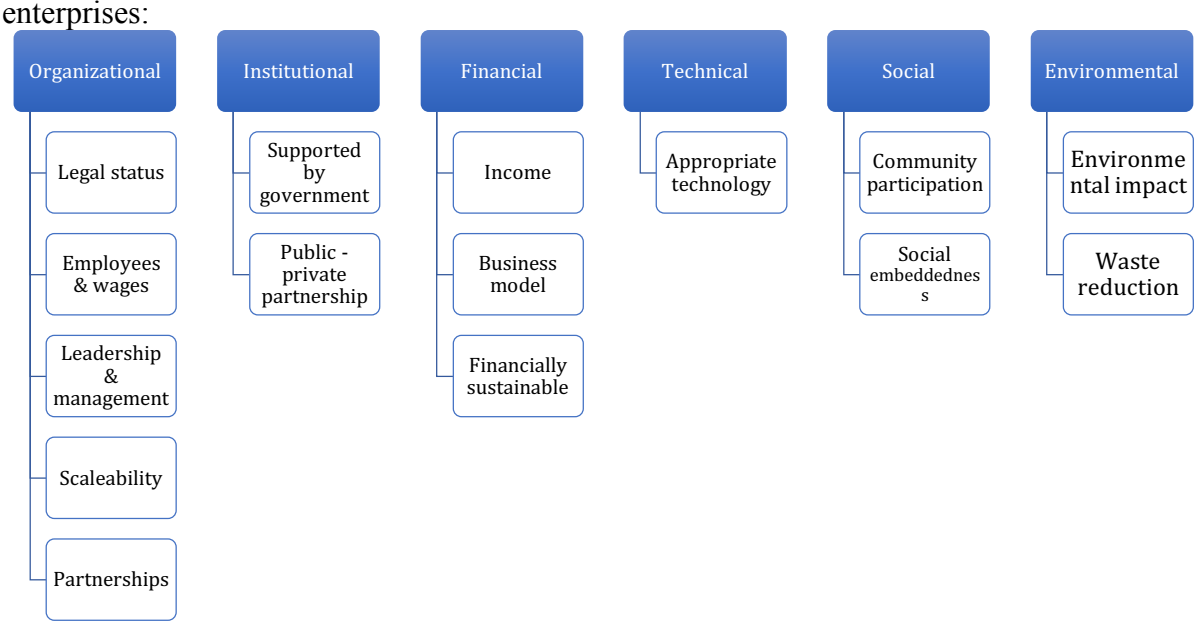

Figure 11: The measurable concepts used in the assessment tool.

Limitations

The first limitation of this study is that not all social enterprises involved in Bali's SWM system were interviewed. This was due to a lack of response or unwillingness to meet from the social enterprises side. 4 of the 6 social enterprises that did not respond were completely Indonesian and it is possible that the language barrier was a reason for them not responding. Therefore, in this thesis there may be a small bias towards foreign-led organizations, but it should also be noted that many of the social enterprises in the target group were foreign-led or had some foreign involvement. Additionally, it is possible that social enterprises were overlooked because they are operating in isolation and did not have a website or Facebook page. There might thus be a bias towards organizations that are more visible for foreigners like us and towards larger social enterprises, since individual social entrepreneurs can more easily be overlooked. Yet, because the large majority of the identified organizations were interviewed, it seems that there is no reason to believe that the non-representativity of the sample leads to a distorted picture of the social enterprises in Bali's SWM system.

The second limitation of this study is that it uses self-reported data. It was often impossible to independently verify the data that was given by the social enterprises and therefore the information given by respondents had to be taken for granted. The respondents might have wanted to give a positive image of their social enterprise, and therefore some sensitive information might have been left behind. The descriptions that the respondents gave of their social enterprise might thus be biased. In some interviews, not all the necessary information was collected of a social enterprise. If this was the case, an email was send to the social enterprise wherein we asked for clarification or for a follow up interview. In some instances, this could be corrected through the use of secondary sources. Unfortunately, this limitation could not always be solved in this way. Only 11 weeks were spent in Bali, and time can thus also be regarded as a limitation. There were more social enterprises then expected which meant we had to keep expanding the scope of our research, without having any extra time. It was sometimes difficult to plan all the interviews around each other and doing a second interview was sometimes not possible due to time constraints.

Another limitation of this research was the language barrier. The language barrier made it difficult to read studies, policy documents and other documents about the topic that were in Indonesian. The Balinese are fluent in Balinese and Indonesian and due to tourism activity and the omnipresence of foreigners, large parts of the Balinese population also speak some English. Yet, not all the Balinese involved in Bali's SWM system spoke sufficient English. This made it more difficult to get into contact with organizations that were completely Indonesian. The language barrier did not result in any significant problems at the interviews and therefore it was not deemed necessary to arrange a translator.

A further limitation of this research is that no interviews were conducted with the government. The opinion of the government about their functioning, public private partnership and private sector involvement could thus not be asked personally. Unfortunately, it was difficult to get to interview the government due to the language barrier and because we were in Indonesia on a tourism visa, which made it a risky endeavor to contact the government. By asking the social enterprises how they cooperated and felt about the government, it was tried to correct this limitation.

5. Regional framework

Indonesia

The republic of Indonesia is a large archipelago between the Indian and the Pacific Ocean. With its more than 17.000 islands and almost 2 million km^2 it is the number 15 on the list of largest countries. Indonesia has an estimated population of just over 260 million which makes it number 4 on the list of most populated countries (World Factbook, 2017). But when it comes to marine pollution, Indonesia is number 2 in the world, only topped by China. As the second-biggest marine polluter in the world, Indonesia annually discards 3.22 million metric tons of waste in the ocean, which accounts for 10% of the worlds marine pollution (The Conversation, 2017a). In response to this disturbing fact, the Indonesian government joined the UN's 'Clean Seas' campaign and announced that it will pledge up to 1 billion US dollar a year to drastically reduce the amount of waste ending up in the ocean. Eleven ministries agreed to a national action plan that will start in 2017 and will give a more comprehensive framework to start tackling Indonesia's waste problem (The Conversation, 2017b). This way, Indonesia is supposed to have reduced its marine pollution by 70% in 2025 (The Guardian, 2017)

Waste Law No. 18/2008

Although this can be seen as an ambitious target of Indonesia's government, it has not always been this way. Since 1999 the government of Indonesia has been applying decentralization. The local and regional governments were given the authority to determine their own waste management policies and manage their resources (Meidiana & Gamse, 2011). This meant that waste management had to be largely financed by local governments, who were lacking the financial means to do so. Only a few provinces installed waste policies and often the enforcement thereof was low. Until 2007, there were some national waste-related laws (e.g. on hazardous waste, environmental management), but there was no overarching national waste policy that regulated solid waste management (Meidiana& Gamse, 2010). This prompted the national government to issue Waste Management Law No. 18/2008 in 2008. This law describes "public service principles, waste management, an incentives and disincentives mechanism, funding scheme, shared responsibilities among waste authorities, private sector participation, community-based waste management and penalties for disobeying the law" (Meidiana & Gamse, 2011: p. 21). The tasks of the government are described as follows:

a) Developing and increasing the public awareness on waste management;
b) Conducting research, developing technology for reducing and handling of waste;
c) Facilitating, developing, and conducting efforts to reduce, handle, and utilize waste.
d) Carrying out waste management and facilitating in providing the facility and infrastructure for waste management.
e) Encouraging and facilitating the enhancement of the benefit of waste management outcome.
f) Facilitating the application of specific local technology that developed in the local society in reducing and handling of waste.
g) Conducting coordination amongst government institutions, society, and industry towards an integrated waste management (Waste Management Law No. 18/2008).

The law further regulates the decentralization of waste management. Sharing responsibilities basically means that the role and responsibilities of local governments are increased. While the national government stipulated the policies and strategies on a national level, local governments have to further refine and implement these (Meidiana & Gamse, 2011). Local governments are pursued to deliver environmentally sound treatment of waste by enhancing

landfill practices and experiment with alternative waste treatment options (article 22 & 44). Waste should be considered as having an economic value and reusing and recycling should be promoted (Article 20). Additionally, local governments are pursued to set up partnerships with waste management businesses and involve the general public (Article 27 & 28). Waste-related organizations need to have a legal entity if they want to take action in waste management (Article 37).

Although Waste Management Law No. 18/2008 was a step in the right direction and indicates that the government is trying to improve waste management, Meidiana & Gamse (2010) argued that implementation of the law by local governments has generally not been successful. The enforcement of the waste law has been weak and financial shortages remained a major issue for local governments. The waste budget of local governments mainly has to come from collection fee, which is usually not sufficient to cover all the costs. Private sector participation is usually low and infrastructure for waste management lacking. The level of service coverage by the government in both collection and treatment has remained low and few landfill sites have been improved (Meidiana & Gamse, 2010; Ocean Conservancy, 2017). Table… summarizes the possibilities and challenges for effective solid waste management in Indonesia.

Potentials	**Challenges**
1. Waste Law No. 18/2008 accommodates greater role in MWM for local government.	1. Enactment of Waste Law No 18/2008, forced Local government to propose plan and implementation for open dumping closing at the latest 1 year and 5 year from the waste law enactment (May 2008)
2. Community participation has been actually practiced although indirectly. It can be improved into direct involvement such as waste separation.	2. Landfill developer is obliged to build waste separation system
3. Incentives and disincentives scheme including in Waste Law can encourage law enforcement	3. MDGs achievement target in waste sector is 70% community is provided by MWM by 2015
4. New recycling policy in 3R can increase the possibility in waste reduction, material recovery and revenue	4. Low public awareness in separating waste
5. High organic content waste is a source for composting treatment.	5. Low priority in the local government's annual budget allocation
6. Projected plastics consumption increase can be potentials in achieving added value from the waste since it can be a material input for recycling plant and incinerator in the future.	6. Low private sector participation 7. Lack of infrastructure 8. Though the enactment of Waste Law, there is no policy on Solid waste management since most municipal waste is solid waste

Figure 12: Potentials and challenges for SWM in Indonesia (*Meidiana & Gamse* p. 208)

Despite its unsuccessful implementation, Waste Management Law No. 18/2008 does show that the Government of Indonesia promotes private sector and community involvement. Furthermore, they promote recycling and reusing and other alternative ways of waste treatment, while landfill practices need to be enhanced. As such, Waste Management Law No. 18/2008does provide opportunities for social enterprises to enter into waste management systems in Indonesia. Although it is not widespread, there sure are some successful examples of effective private sector involvement in Indonesia (Ocean Conservancy, 2017).

Waste generation, composition and treatment

As most developing countries, Indonesia's waste flow has a high percentage of organic components. Table … shows the differences between the waste composition of 1989 and 2006 in Indonesia. In between 1989 and 2006 the per capita waste generation tripled. The percentage of organic waste decreased, while the percentage of paper and plastic strongly increased. This

is a typical pattern of a low-income country that is developing. Probably this pattern developed likewise in the last 10 years.

Year	Waste generation (kg/cap/day)	Composition (%wet weight basis)						
		Organics	Paper	Plastic	Glass	Metal	Textile/leather	Inert/other
1989*	0.4	87	2	3	1	4	N.A	3
2006**	1.12	62	9	14	2	2	4	7

Figure 13: Waste composition in 1989 and 2006 (Meidiana & Gamse, 2010: p. 201)

As we can see in *Figure 14,* most of the waste in Indonesia is disposed of in landfills. While this might not be the best treatment option, more worrisome is the amount of waste that is buried, burnt and disposed in rivers, as these methods have huge negative environmental impacts. While organic waste is still the largest waste flow in Indonesia, only a relatively small fraction of this is composted. Also, only a small portion of the waste flow is recycled (other). This means that there are still plenty of possibilities to increase composting and recycling practices (Meidiana & Gamse, 2011). According to the Ocean Conservancy (2015), there are also possibilities to improve waste treatment through Gasification and MRF based recycling in Indonesia. Incineration is seen as less promising for the waste flow and context of Indonesia (expensive and unsuitable for waste flow). Additionally, collection rates in Indonesia are still low, with only 56% in urban areas and 5% in rural areas. The leakage points within the collection system should thus be closed by expanding collection services (Ocean Conservancy, 2015).

Method	Amount(Million ton/year)	Percentage (% of total method)
Transported to landfill	11.6	69
Buried	1.6	9.6
Composted	1.2	7.15
Burnt	0.8	4.8
Disposed in river	0.5	2.9
Others	1.1	6.55
Total	**16.8**	**100**

Figure 14: Household waste treatment in 2006 in Indonesia (Meidiana & Gamse, 2010: p. 202)

Hopefully, the pledge of the Government of Indonesia to devote 1 billion dollar a year to waste management will result in more financial means for local governments to implement the policies and strategies from Waste Law No. 18/2008 and will help to expand their service coverage.

Bali

Bali is a small tropical island in Indonesia with a land area of 5.635 km² (twice the size of Luxemburg). As a result of rapid population growth Bali now inhabits around 4,1 million people (BPS, 2017). At the same time Bali is visited by more than 4 million tourists every year, which has led to economic prosperity but also has environmentally harmful side effects (BPS, 2017). Tourist consume various types of packaged products and consequently produce large amounts of waste. At the same time, the increased prosperity of the local population gives them the opportunity to consume new products. Whereas the Balinese before mainly produced organic waste that decomposed, nowadays they produce large quantities of plastic waste that needs different disposal methods (MacRae, 2012). Yet, large parts of the local population are not aware of this and still simply throw their waste in the environment, leading to litter throughout the island (Bruce &Storey, 2010). In addition, Bali's SWM is inefficient and the government fails to deliver the needed waste management services. For these reasons, Bali has been unable to cope with the increasing amounts of waste it produces and faces a serious waste problem (Bruce &Storey, 2010; MacRae, 2012). Tourism is by far the largest economic sector in Bali. For many of the Balinese tourism activity is their main source of income and if the tourists stop coming to Bali because of the widespread pollution, this endangers the livelihood of the local population. The main tourism areas lie within the red circle of *Figure 15* and this area will be the focus of this research.

Figure 15: Map of Bali

It is estimated that Bali produces around 15.000 $m^3$of waste per day, where roughly 11.000m^3comes from households and 4000m^3 from markets, offices, hotels, shops etc. (Kristianto, 2016). The per capita waste generation per day is higher in Bali (estimated above 2 kpd) than in the rest of Indonesia due to the higher standard of living and tourism activity. Different estimations have been made of the composition of Bali's waste. Bruce & storey (2010) found through a household survey in Southern Bali that the waste flow consists of 40-60% organics, 20-30% plastics and 10-25% paper. Another source argues that the waste flow consists for 70% of organics and 30% of non-organics, of which 13% are plastics (Kaddafi, 2012). Probably the reality lies somewhere in the middle and it can be assumed that the

percentage plastics and paper in Bali's waste composition is somewhat higher than in the rest of Indonesia, while the percentage of organic waste is lower. Additionally, Bruce & Storey (2010) found that 70% of the households did not receive any regular municipal collection service, because they only collected from main roads. As a result, 90% of the respondents burned their plastics or dumped them into a river, practices that can be widely due to a lack of penalties and social stigma (*Figure 16*). Besides lacking collection services, another problem is that many of the Balinese look down upon people that are involved in the waste management industry. The majority of the people working in the waste industry therefore come from the neighboring islands of Bali (Bruce &Storey, 2010; MacRae, 2012).

Figure 16: Observed burning of waste

Bruce & Storey (2010) pointed out that there is also a large informal waste sector in Bali. There are poor waste pickers ('Pemulung') who collect valuable materials from whatever waste they can find by driving around or scavenging on landfills. These pemulung sell their waste to middlemen waste collectors ('Pengepul') that in turn sell the recyclables to small processing factories and depots ('Pengilingan') (Bruce & Storey, 2010). This informal waste sector is important as it processes large quantities of waste, yet they receive little support from the government. There is a lack of coordination and as they only focus on valuable recyclables, the remaining waste is not dealt with (Bruce & Storey, 2010; MacRae, 2015). Another small-scale decentralized concept for waste management that has rapidly grown in Bali in recent years are waste banks (Bank Sampah). Waste banks are small depots where people from the surrounding neighborhoods can bring their non-organic waste, in return for a small monetary compensation (the value of the waste). These waste banks sell the waste to 'middleman' so that it can eventually be recycled. Waste banks are usually run by poor people and the concept is so successful because the financial return gives people an incentive to bring their waste there. The concept was originally founded in Java and is now supported by the ministry of environment (Temesi Recycling, 2017)

Due to the decentralization in Indonesia, the provincial and municipal governments in Bali now have more control and ownership of the waste management system (Bruce & Storey, 2010). Two important government agencies involved in Bali's waste management system are the Provincial Waste Management Unit and the Dinas Kebersihandan Pertamanan (DKP) of the different regencies. The DKP's are the municipal cleanliness and landscaping agencies. The DKP takes care of the government led waste collection service, but is also responsible for maintaining the roadsides, pruning trees and mowing the lawns. Bruce & Storey (2010) argued that "decentralisation, while opening the door for greater local ownership of initiatives, has in fact resulted in a distinctly uneven and largely ineffective solid waste management regime at the local level" (Bruce & Storey, 2010: p.182). According to them, government agencies have given too little serious attention to waste management.

The following section will present some of the research that has been done into solid waste management projects in Bali. These examples will help to understand the waste management landscape and can shed some light on the functioning of both the public and private sector in

Bali. The examples show both successes and failures and provide valuable lessons for the social enterprises that are the subject of this study. All the sites of the projects that are here described where visited during the field research for this study and with BaliFokus, Bali Recycling and Rumah compost an interview was held. This makes it possible to give a short update of the functioning and current state of the projects.

Bali's biggest landfill the Suwung

Bali has 5 legal landfills spread over the island (*Figure 17*). The largest landfill the "Suwung" is located on the south-east coast and is part of the protected forest area "Tahura". It has been operating since 1984 and is the property of the provincial government. The Suwung is the waste disposal site for the Denpasar, Badung, Gianyar and Tabanan regencies (Eden, 2007). Denpasar is Bali's major city and inhabits almost a million people (BPS, 2017). Badung regency holds Bali's main tourist areas (*Figure 15*). These are the two areas that produce the majority of Bali's waste flow. While the Suwung is designed to handle 800 tons per day, it is estimated that by now the Suwung receives 1150 tons per day (Arif, 2016). While in 2007 it was reported that the landfill was 5m high (Eden, 2007), in 2016 Arif (2016) observed that the landfill reached up 15 Meters high, and my own visit to the landfill confirmed this. The Suwung has clearly reached its maximum capacity and there is no more land to use around the Suwung, but due to a lack of alternatives, the dumping goes on (Bruce & Storey, 2010; Herder & Larsson, 2012). The Suwung is not a sanitary landfill, it is a dump site that has not yet taken any leachate measures and does not cover its waste with dirt (Eden, 2007). Already in 2007, it was observed that leachate was leaching toxic substances into the surrounding mangrove forest and bay. (*Figure 18)* (Time, 2008).

Figure 17: Legal landfills in Bali (as identified by the Role organization)

Figure 18: View on surrounding mangrove forest and bay from Suwung

Since 2007, the Suwung received attention in media and academic circles as it was the first Clean Development Mechanism(CDM) project that was proposed in Indonesia (Agamuthu & Tanaka, 2014). In 2003, the four regional waste management authorities that dumped at the Suwung (made a 20-year agreement with the private company Navigat Organic Energy Indonesia (NOEI) to generate energy out of organic waste (MacRae, 2012). The idea of this PPP was "to use revenues from electricity and carbon credits, to transform the site into a viable commercial source of income in an environmentally friendly and acceptable manner" (Eden, 2007: p. 2).

This was supposed to be done through a combination of Gasification, Landfill gas and Anaerobic digestion(GALFAD), where the engineering and consultancy was for a large part done by a Japanese company (Mitshubitsu) (CDM-PDD, 2007). The energy would be derived through:

1. The pyrolysis-gasification of dry organic waste (€8 million).
2. The recovery of landfill gas extracted from the landfill (€3million)
3. The recovery of biogas extracted from the anaerobic digester, fed with high moisture content organic waste (€9 million) (CDM-PDD, 2007: p.2).

This way the project would reduce greenhouse gas emission by capturing methane gas from the landfill and by generating electricity, that otherwise would have been generated through the use of fossil fuels (CDM-PDD, 2007). The CDM proposal of NOEI was approved in 2007 and they started getting funding (partly from the Worldbank) to buy the expensive equipment and start operating soon (MacRae, 2012). Yet, in 2010 three years after approval, MacRae (2012) found that neither of the three plants had started producing electricity. Arif (2016) reports that as of April 2016 the four regions stopped working together with NOEI and are going to terminate the contract. The GALFAD plant never delivered the promised amount of energy or processed the promised amount of waste and it is estimated that the whole operation costed around 30 million. Yet, for terminating the contract that was officially until 2023, NOEI is going to ask for a €1,5 million compensation (Arif, 2016). When visiting in April 2017, the whole GALFAD plant was already demolished (*Figure 19.)*. While some regarded the project as promising, the GALFAD project have proved to be a costly failure due to the inherent flaws of the project such as inappropriate technology that is too large, unsuitable for the waste flow and difficult to repair; high operation and transport costs; and the dependence on CDM funding (MacRae, 2012; Herder & Larsson, 2012). The case of NOEI is in line with the often-made assumption that imported large-scale, high-tech solutions do not work in developing countries and shows that PPP are not necessarily a successful solution for SWM.

Figure 19: The demolished Galfad plant of NOEI.

Intermediate-scale

In Bali, there has been a division between proponents of large-scale, high-tech industrial waste processing methods on the one hand and proponents of small-scale, low tech, community-based solutions on the other. Those in favor of industrial waste-to-energy solutions emphasize the logics of economies of scale, which is needed for the magnitude of Bali's waste problem (MacRae, 2012). On the contrary, those in favor of community based approaches point out the environmentally degrading effects of industrial solutions and state that these hinder the efforts of effective small-scale solutions (GAIA, 2010). The example of NOEI shows that despite the logic of industrial approaches, these have not worked so far in Bali and are not viable in the short term (MacRae, 2012). Instead, MacRae (2012) argues that the waste management

solutions that have proved feasible are "intermediate in scale, between the 'industrial' and 'community' models" (MacRae, 2012, p. 78). Such successful intermediate solutions use similar technologies that combine recycling with composting and do not need large amounts of investment to start functioning. They can get income in many different ways. Some intermediate solutions depend on government subsidy and donor funding, while others managed to become self-sustaining by selling their services and products (MacRae, 2015). Moreover, MacRae (2012) argues that one should not only focus on technical and economic factors and also include the complex interplay of social-cultural dimensions to get to the core of the problem and understand why specific solutions work. While MacRae (2012, 2015) does not name these intermediate solutions as examples of social entrepreneurship or social enterprises, many of the organizations that use these intermediate solutions can actually be typified as social enterprises. As such, the articles of MacRae (2012, 2015) show that the methods and design of the social enterprises can possibly provide a solution for Bali's waste problem.

An intermediate scale solid waste management project in Bali that has been described by both MacRae (2012) and Zurbrugg et al., (2012) is the 'Gianyar waste recovery project' (Temesi) that is based next to the landfill in Ubud area. As part of his doctorate, Zurbrugg (2012) used his assessment tool for the Temesi project and he describe this project as follows:

> *"The Gianyar Waste Recovery Project, which focuses on this bio- degradable organic waste, aims at providing a sustainable system for integrated solid waste management, comprising waste separation and subsequent composting of the organic fraction. Based on a low cost, low tech and low risk approach, the project targets not only an improvement of the local situation but also likes to act as a model for replication in developing nations"*. (Zurbrugg et al., 2012: p. 2128).

In 2008 the Temesi project got approved for CDM funding and in this year, they finished their MRF that could process 30 tons of organic waste per day through aerobic composting (*Figure 20*). In the two following years, they further expanded their facility, so that in 2010 they could process 60 tons per day. To launch the project, $150.000 was invested, while the expansion costed another $180.000, which makes the project significantly cheaper than the GALFAD project at the Suwung. They financed the start-up of the project through outside funding, but the project was supposed to become self-sustaining through the sale of recyclables and compost.

Figure 20: Aerobic composting at Temesi

The success factors of this project are its involvement and cooperation with the local government authorities and its strong leadership. Additionally, the low cost, low tech and low risk approach make it suitable for replication elsewhere (Zurbrugg, 2013). The project managed to embed itself in the local community and provides an example of a successful public private partnership (MacRae, 2012). Its dependence on outside expertise and CDM funding can be regarded as weaknesses of the project (Zurbrugg et al., 2012; MacRae, 2012). When visiting

in May 2017 the Temesi Project was still functioning. Yet, the landfill that resides next to the project is still steadily growing because the incoming waste flow is too large for the project to handle. The Temesi project can thus be seen as a successful intermediate scale solution that utilized social entrepreneurship to develop and sustain itself.

Another interesting intermediate-scale project described by MacRae & Rodic (2015) is Rumah Copost in Padangtegal. The village of Padangtegal is based in Gianyar regency and inhabits the Monkey forest, one of Bali's main tourist attractions. The idea of Rumah Compost is to provide a collection service for households and businesses and promote source separation. They pick-up the segregated waste, where the recyclables are sold and the compost is used in the Monkey Forest. The start-up of the project was financed through the village funds that were collected through the Monkey Forest (+ € 65.000), and now external funds were thus needed. Important success factors of this project have been the strong leadership of the project managers, as well as the financial means to set-up and sustain the project (MacRae & Rodic, 2015). The facility of Rumah Compost was visited and manager of Rumah Compost interviewed in March 2017. Rumah Compost is still operating successfully and continually searching for ways to innovate and expand their service coverage. Although the circumstances in Padangtegal are special, Rumah Compost does provide an example of a successful government-led waste management project that uses social entrepreneurship.

Small-scale solutions

Finally, there are two small scale solutions in Bali that have been described in the literature that are worth mentioning. Firstly, there is the NGO Bali Fokus that was started in 2000 and has done some small-scale projects that focus on agricultural and industrial waste. Their approach is based on community ownership and empowerment and their focus has been on training facilitation and consultation (MacRae, 2012). While they are depended on outside funding, in 2017 they are still functioning and have become a well-known presence in Bali's waste management system. Secondly, there is Bali Recycling (BR), a small social enterprise started in 2010 that focuses on the recovery of recyclable materials. BR collects the waste from some large hotels and expat villas around the area of Ubud that are not serviced by the government collection. BR charges their customers a fee for this collection, who are willing to pay because this way their waste is properly dealt with. BR recycles as much of the waste as possible and also tries to find solutions for non-valuable waste. Besides the collection fee, BR sustains itself through the sale of recyclables to Java, which is viable because the collected waste flow consists of plenty recyclables (MacRae & Rodic, 2015). For the current study, the owner and founder of Bali recycling was interviewed and he stated that they are going to be shutting down Bali recycling in the nearby future. He explained that they had difficulties sustaining themselves through the collection fee and sale of recyclables as they did not have enough clients and large enough flow of recyclables to sell. What made them profitable again is their sale of upcycled glasses. The weakness of the model is that they depend on the willingness to pay and do not provide a solution for the poorer parts of the population and their disposal habits. BR is only focusing on the dry waste and, the organization could not grow and their experience is that the government is not helpful. While in principle the business model they use is viable, it has its weakness and is not a definite solution.

Bali's waste problem has become inescapable in recent years. The decentralization policies of the national government have not proven to be successful yet, as the regional government agencies fail to deliver efficient waste management services. Additionally, imported large-scale, high-tech solutions have failed, while small and intermediate scale solutions can be a viable and feasible alternative. By now, Bali's waste problem has been noticed by all sorts of

micro-, small- and medium-sized social enterprises. They are now actively trying to tackle Bali's waste problem through a wide array of methods. Because of various reasons, these actors entered Bali's SWM system and they are becoming increasingly important stakeholders. There already has been some research into the role of CBO's, NGO's and recycling companies in Bali's SWM system and valuable lessons can be learned from these studies. MacRae (2012) stated that the characteristics and causes of Bali's waste problem may be somewhat special, but Bali's "condensed and intensified waste situation offers a unique laboratory that may provide insights and models capable of application in wider contexts" (MacRae, 2012, p.72). Likewise, the wide variety of social enterprises in Bali can thus give insight into the factors that make them successful and in how social entrepreneurship can add to effective solid waste management.

6. The characteristics of the social enterprises

The following chapters will present the results of the field research that was done in Bali. *Table 2* shows all the 35 organizations that were interviewed for this research. What these social enterprises have in common is that they all came up with solutions to tackle Bali's waste problem. As explained this research will focus on the social enterprise that have collection and treatment as their main activities. These social enterprises are depicted in the first column and are marked green. My research partner Erwin Noz focussed on the social enterprises in column 2 that have waste prevention and education as their main focus. The third column shows the organizations fell outside of the scope of this research. Some of these organizations were already described in previous research and shortly discussed in the regional framework (Bali recycling, Bali Fokus, Temesi recycling and Rumah Kompos). Other organizations could not be described as social enterprises because they were traditional NGO's or CBO that depended solely on outside funding and lacked income generating activities (IDEP, Coral Triangle Center, Trash Hero, Ecobricks, PPLH and Project Clean Uluwatu). While all 35 organizations helped to increase our understanding of Bali's waste problem and the role of the private sector in Bali's SWM system, the following analysis will focus on the social enterprises in column 1.

	Collection & Treatment	*Waste prevention & Education*	*Other*
1.	**Bali Compost Crafters (BCC)**	Keep Bali Clean	Bali recycling
2.	**Merah Putih Hijau (MPH)**	Malu Dong	ROLE Foundation
3.	**Peduli Alam**	Green-books	Temesi recycling
4.	**Saraswati Paper**	Bottle for Botol	Bali Fokus
5.	**Niskala**	Green School / Kembali	Bookgreener
6.	**ecoBali**	Bye Bye Plastic Bags	Ecobricks
7.	**Sampah Jujur**	Making Oceans Plastic Free	IDEP
8.	**Indosole**	Avani	Coral Triangle Center
9.	**Gringgo**	Social Impakt (Nazava)	Trash Hero
10.	**Pit's Solution**	Refill Bali	Project Clean Uluwatu
11.	**Positive Impact Forever**		Plasticpollutionsolution
12.			PPLH
13.			Rumah Kompos
14.			Bali Sustainability Hub

Table 2: Organization in Bali's SWM system

Start-up

Most of the social enterprises were founded in the last 5 years. As shown in *Table 3,* there were three social enterprises founded in 2013, two in 2014 and one in both 2016 and 2017. The 4 other social enterprises have all been founded before 2010. Saraswati Paper was founded in 1995 to tackle Bali's waste problem and this shows that back then there were already visible waste issues. Yet, the fact that the majority of the social enterprises was founded recently suggests that there has been more attention for Bali's waste problem in the last years. Another possibility is that only recently social entrepreneurship has been opted as a possible solution, which is in line with the literature that argues that social entrepreneurship is a recent phenomenon.

Name of SE	**Legal structure**	**Employees (Volunteers)**	**Start-up**	**Spatial focus**	**Prominence of Social goals**	**Collaborations**
Bali Compost Crafters	Company (NGO)	**4 (1)**	2013	Southern Bali	Chiefly social, but not exclusively	DKP Badung, Udayanna Univeristy, Project clean Uluwatu
MPH	CBO (NGO / Company)	**4 (--)**	2016	Restricted to village (Pererenan)	Exclusively social	Gringgo, PPLH, Role Foundation
Peduli Alam	NGO	**5 (3)**	2008	Restricted to village (Amed)	Exclusively social	Trash hero, Ecobricks
Saraswati Paper	Company	**>20**	1995	Southern Bali Ships products worldwide	Social goals prominent among other goals	Eco-Bali
Niskala	CBO (Company)	**2 (3)**	2017	First focus on Denpasar, then try island-wide	Chiefly social, but not exclusively	EcoBali, BCC, Avani
ecoBali	Company	**23**	2006	Southern Bali	Social goals are prominent among other goals	Pit's solution, Bye Bye Plastic Bags Niskala
Sampah Jujur	Company	**2 (--)**	2014	Restricted to village (Ubud /Sayan)	Exclusively social	REpal, Kembali
Indosole	Company	**5 + Java factory crew**	2009	Bali, Java & New York Ships/sells worldwide	Social goals prominent among other goals	MPH
Gringgo	Company	**8**	2014	Denpasar	Social goals prominent among other goals	DKP Denpasar, MPH, PPLH
Pit's solutions	Company	**2**	2013	Southern Bali	Chiefly social, but not exclusively	ecoBali
Positive Impact Forever	Company	**1**	2013	Southern Bali	Social goals prominent among other goals	IDPM, Alila Hotels

Table 3: *The characteristics of the social enterprises.*

Legal entity

The large majority of the social enterprises focused on treatment and collection are registered as companies or planning to become a company. In total 8 of the social enterprises are already registered as a company, while Peduli Alam is the only organization that is currently registered as an NGO. Two of the organizations did not have their legal entity sorted out yet and can currently be regarded as CBOs. An interesting finding of this research is that the legal entity of a social enterprise can change over time, since a specific legal entity is chosen because the social problem can be most effectively addressed in this way. This is shown by the fact that MPH is still pondering if it is going to be an NGO or a company. Similarly, BCC is currently a company, but they are thinking about becoming an NGO because this can have tax advantages and makes it easier to get outside funding. The legal entity does not determine the activities and cannot be regarded as a defining characteristic. The fact that the organizations involved in Bali's SWM system have different legal entities and that this can change over time, confirms the idea that it is more useful to describe the organizations here as social enterprises.

What should be noted here is that Waste Management Law No. 18/2008 is supposed to promote private sector involvement in SWM systems. Yet, in the interviews many of the social enterprises complained that it was extremely difficult to set up an NGO in Indonesia and this is probably a reason why most of the organizations chose to become a company. Additionally, the Indonesian law also makes it difficult to legally employ volunteers, as they need to have a work permit, which is difficult and costly to arrange. The Indonesian national government could improve the functioning of the social enterprises if they would make the legal structure a bit more flexible.

Size

This study includes micro-, small- and medium-scale social enterprises. In a Worldbank report, the different sizes of companies in Indonesia have been described as:

- Micro enterprises have 4 employees or less
- Small enterprises have 5 to 19 employees
- Medium enterprises have 20 to 99 employees
- Large enterprises have 100 or more employees (Kushnir, Mirmulstein & Ramalho, 2010).

This standard to determine the size of an enterprise will be used here. In Table 3 we can see the number of employees that the different social enterprises have. The number of volunteers is placed between brackets, yet this changed regularly so this should not be regarded as a definite number and was thus not included in defining the sizes. There are 6 social enterprises that can be defined as microenterprises, as they have 4 employees or less. There are 2 social enterprises that can be defined as small-sized, and also 2 that can be defined as medium-sized. Of one social enterprise (Indosole) the exact number of employees could not be clarified. Indosole has 5 employees working in administrative functions in Bali and New-York, yet the number of people they employ in their factory in Java was not specified. On their website, they do have a picture of the crew that is working in their factory in Java and since this are more than 20 people, it can be assumed that Indosole is a medium-sized enterprise.

The 3 medium sized companies have all been operating longer than the other social enterprises (1995, 2006, 2009). These social enterprises started as microenterprises and have been developing throughout the years to a medium-sized enterprise. The only exception is the

NGO Peduli Alam, who has been operating since 2008 and, despite growing over the years, still is a small-enterprise. Peduli Alam specifically stated that they reached their grow limits. What differs Peduli Alam from the 3 medium-sized social enterprises is that it still largely depends on outside funding and does not have a viable business model, which the others do have. Additionally, Peduli Alam still depends on volunteers while the three other companies only have employees. As such it can be concluded that a viable business model and effective organizational structure are necessary to upscale the operations of a social enterprise. While MacRae (2012) argued that the most successful models are intermediate in scale, these are not easy to set up and it might be more feasible to gradually work from a microenterprise towards a medium-sized enterprise. Micro-and small-scale enterprises might be more appropriate because they require little initial investment, manpower and planning. They can easily experiment with their idea and search for the optimal format. Over time they can then upscale their operations to enlarge their environmental impact.

In the literature on social entrepreneurship it is argued that social enterprises usually rely on employees, instead of on volunteers (Huybrechts & Nicholls, 2012). This statement can be partly confirmed. Indeed, all of the social enterprises have a paid workforce. However, 5 of the social enterprises also rely on volunteers, and as became clear from the interviews these volunteers play an important role. The social enterprises in this research rely on employees, yet volunteers often still play a significant role.

Spatial focus

As shown in *Table 3,* some of the social enterprises only operate on a village level while others ship their products all over the world. Five of the social enterprises explained that they were currently focusing on a specific locality or city (MPH, Peduli Alam, Niskala, Sampah Jujur, Gringgo). Peduli Alam to the area around the village of Amed and they are not planning to widen their scope. However, their model is replicable and there has already been interest from outsiders to do so. Similarly, MPH is doing a pilot village and after this is functioning on its own it will try to replicate the model in another village. The model of Sampah Jujur can also be replicated elsewhere. These social enterprises cannot upscale their operations in their specific locality, but their model can be replicated elsewhere. Both Grinngo and Niskala initially started focusing on the city of Denpasar, yet in due course hope to expand their scope to other regions in Bali

Four social enterprises are focused on Southern Bali (BCC, ecoBali, Pit's solutions, Positive Impact forever. BCC is based next to Bali's biggest landfill were waste from southern Bali comes in. They will not try to widen their scope, but will try to upscale their operations by processing more. Additionally, their model is very replicable and can be used at almost every landfill. EcoBali collects waste from different areas in southern Bali. Ecobali will also not try to broaden its scope as the travel time to collect waste will be too much then. On the other hand, their model is replicable and they hope to open a new ecoBali facility in the nearby future. The upcycled glasses of Pit's solutions are sold throughout southern Bali. Similarly, the hotels where Positive Impact Forever tries to implement a zero-waste program are spread over Southern Bali. Both these social enterprises can possibly upscale their operations and their models can be easily replicated.

The two remaining social enterprises ship their products all over the world. Besides collecting paper and selling products in Bali, Saraswati Paper produces paper for companies throughout the world. Indosole produces their footwear in Java, has offices in Bali and New

York and their products are sold by retailers all over the world. Their international focus makes it more difficult to replicate the models of these two social enterprises. It can be concluded that spatial focus of the social enterprises is widely differing, ranging from the village level to the international market. Many of the social enterprise exemplified that their model was very saleable and replicable, yet funds and manpower prevented them from doing so. The medium-sized social enterprises in Bali show that a viable business model and effective organizational structure are needed to be able to upscale a model.

Social Goal

All the social enterprises in this study have as their goal to find solutions for Bali's waste problem. Yet, the prominence of this social goal can differ. In Chapter 2, the range of social entrepreneurship (*Figure 1)* was shown, that will be used here to determine the place of the social goal in a social enterprises endeavors. None of the social enterprises falls within the extremes of this range (no commercial exchange and social goal subordinate to other goals). As depicted in *Table 3,* there are 3 social enterprises that are exclusively social and invest all their profits directly back into the enterprise. It is not surprising that the NGO Peduli Alam and the CBO MPH are exclusively social, but that the company Sampah Jujur is also exclusively social is somewhat peculiar. All the income that is generated from selling waste to recycling companies is reinvested to experiment with their precious plastic and 3d printing machines.

There are three social enterprises that are chiefly social, but not exclusively because the owners of the enterprises take some money to sustain their own livelihood (BCC, Niskala, Pit's solution) Often, the money that is taken out of the social enterprise is very little, but still it is not exclusively social. For the remaining 5 social enterprises, the social goal is prominent among other goals. These social enterprises are aiming to grow their business and start making some profit. Unfortunately, making serious profit is not easy to do when focusing on waste and it should be realized that the social enterprises do not make their owners rich. The two social enterprises that were most focused on making profit were Indosole and Saraswati Paper. These 2 social enterprises focus on the international market and this makes profit making more feasible then when only focusing on Bali. This focus on profit making seems to pay off as both companies have grown considerably and already exist for a longer time. In general, it was found that the social enterprises were really trying to do something about Bali's waste problem. The social enterprises were generally found to be trying to address their social goal and where not focusing on waste because of the marketing value.

7. The activities and income sources of the social enterprises

In this chapter, the activities of the social enterprises and the ways that they generate income will be described.

The Activities

This section will show what the activities are of the social enterprises and which solutions they propose the improve the effectiveness of Bali's SWM system. The social enterprises are involved in every waste system element, ranging from waste reduction to waste recovery. They educate local communities, implement separation strategies, run collection services, make compost and recycle, reuse and recover waste. In *Table 4* the activities of the social enterprises are summarized.

Separation

Social enterprises are involved in every waste system element, ranging from waste disposal. To begin with, social enterprises can play a role in educating local communities about the importance of responsible waste management. This can be done through educational programs at schools, but also by educating local communities about the need for source separation. Local communities rarely separate their waste in Bali due to a lack of awareness, Source separation is extremely important for the further functioning of SWM systems and has been recognized by the social enterprises in Bali. MPH came up with a color-coded separation strategy that where the organics are separated from the non-organics (*Figure 29)*. Peduli Alam only picks up non-organics and just writes on their bins what should be in there (Plastic, paper etc). EcoBali provides its customers with a green bag for paper and a red bag for plastic, glass and metal. While these simpler separation strategies can be easily implemented Gringgo decided to give a more detailed overview of the products that can be recycled. Gringgo created a website and app that show an overview of the products that can be recycled. The five main categories are plastic, metal, glass, paper and others. In these categories, the different waste products that can be recycled are shown with a picture and name (e.g. colored plastic bag, clear aluminum cans, laptop etc.). And a click on the picture gives the product description and the estimated price per kg. Although this detailed separation strategy is more complicated, it does show people that their waste is worth money and gives them an incentive to separate their waste.

Collection

The promotion of source separation makes it possible for the social enterprises to collect the waste separated. Although waste collection has traditionally been the responsibility of the public authorities, in Bali different sort of social enterprises are involved in waste collection. EcoBali runs a collection service that collects waste from households, offices, restaurants, hotels, school and other businesses (*Figure 21)* They request a fee for their collection service and thus only serve people that are willing to pay a fee for

Figure 21: Ecobali recycling

the collection of their waste. Many of their customers are foreigners that settled in Bali and want to make sure that their waste is disposed of properly. On the other hand, MPH and Peduli Alam installed a waste collection service on a village level. They try to serve the poorer parts of the population by not requesting any fee for their collection service.

Composting

By introducing separation strategies and collecting it separated, the social enterprises can more easily recycle the non-organic waste and make compost out of the organic waste. The waste flow in Bali still consists largely of organic materials and this is clogging up the landfills. Both Peduli Alam and ecoBali promote home composting. EcoBali even provides composting bins with ready-made systems for households to make their own compost (*Figure 22*). Positive Impact Forever installed composting systems at the Alila hotels that then could be used in their gardens. Sampah Jujur has multiple composting piles that are used to serve the vegetable gardens of its neighboring restaurant Bambu Indah. MPH collects the organic waste from households and makes compost out of it at their facility. BCC tries to prevent as much organic waste as possible from going in to Bali's biggest landfill by making compost. Not only does the compost making solve the waste problem, the social enterprises are finding new purposes for the compost by providing it as fertilizer to local farmers or using it to grow organic vegetables.

Figure 22: Compost bin made from upcycled Tetra-pack

Recycling, Recovery and Reuse

The social enterprises are using for innovative treatment methods to reuse, recycle or recover waste. MPH and Positive Impact Forever are both developing a pyrolysis machine to turn plastic waste into oil that then can be used as fuel. Sampah Jujur has developed precious plastic machines that can be used to recycle plastic waste. The plastic is shredded and then turned in to filament, which can be used to 3d print new products. Saraswati Paper employs local Balinese women to recycle paper in a traditional way.

Peduli Alam is trying to find all sorts of creative uses for waste and their upcycling of plastic sachets into bags provides a livelihood for local woman. Indosole is collecting discarded tires and turning these into footwear, by cutting tires into foot soles that are then used to fabricate shoes and sandals. Pit's solutions is searching for methods to treat non-valuable waste. It is upcycling glass bottles into elegant drinking glasses. Additionally, pit's solution is focusing on three types of non-valuable plastics; plastic with an aluminum layer, Styrofoam and Mika. These 3 types of plastics are getting more and more used by the food industry in Bali, yet cannot be recycled. Therefore, Pit's solution is experimenting with new treatment methods, like making bricks out of it or using a heat press to turn it into roofing material. It can be concluded that the social enterprises are finding inventive ways to reuse or recycle waste. They are using inexpensive, small-scale technology that is appropriate for developing countries. The recovery of energy from waste is more difficult to accomplish on a small scale, yet there are social enterprises experimenting with it.

Name of SE	Stated Mission & Objective	Activities	ISWM Elements	Income source
Bali Compost Crafters	Prevent organic waste from going into the landfill and set up a working example	Composting	Recycling	-Compost sales -Searching for external funding
MPH	Improving Bali's growing plastic and waste management issues	Collection service, Composting. Educational program	Collection, Recycling, Recovery Reduction	-External donors -Fundraisers -Sale of recyclables
Peduli Alam	Provide simple solutions with easy access and educate local community	Collection service Educational Program	Collection, Reuse Reduction	-External donors -Bag sales
Saraswati Paper	Do something about the ever-increasing trash problem	Paper Recycling	Recycling	-Paper sales (in shops and to other businesses) -Tours at facilities
Niskala	Address the waste problem in traditional Balinese ceremonies	Waste management service for ceremonies	Recycling	-Waste collection service -External donors
ecoBali	Promote responsible waste management, create green knowledge and eco products towards achieving zero waste.	Collection service, sorting at Material Recovery Facility(MRF), educational programs	Collection, Separation, Recycling Reduction	-Fee for collection service -Sale of recyclables -Sale of waste related products in Eco store
Sampah Jujur	Make trash recycling transparent	Trashwalks Buying and selling recyclables Precious plastic machines/3dprinting	Recycling,	-Sale of recyclables, water bottles and t-shirts
Indosole	Preventing tires from polluting the environment	Making footwear from discarded tires	Reuse	-Sale of footwear
Gringgo	Make recycling easy through trash-tech solutions	Trash tech solutions, recycling info, map of waste banks (organizing informal sector)	Recycling	-External Donors -Consultation services
Pit's solutions	Recycling of non-valuable waste	Recycling & upcycling non-valuable waste	Recycling, Reuse	-Sale of upcycled glasses -External donors
Positive Impact Forever	Zero waste program for hotels	Sustainability assessment for hotels and businesses	Recycling, Reduction	-Consultation services

Table 4: The activities and income models of the social enterprises

The Income sources

As shown in *Table 4,* the social enterprises use different income models to sustain themselves. To begin with, all the social enterprises try to sell products or services to generate a reliable source of income. Some of the social enterprises generate income by selling recyclables to recycling companies (MPH, Sampah Jujur, ecoBali). There are also social enterprises that try to increase the value of waste by upcycling and recycling it themselves. Both BCC and MPH turn organic waste into compost that they try to sell. Saraswati paper turns waste paper into new paper which they sell in their two shops or turns it into packaging products that can be sold to companies. Peduli Alam sells upcycled bags it

makes out of plastic sachets and other upcycled products in their shop. Indosole sell footwear made from tires, while Pit's solution sells the upcycled glasses that it makes from discarded glass bottles. It is also possible to generate income by selling products that can prevent people from generating waste or helps them discarding it. Sampah Jujur sells refillable water bottle that can be used to reduce the number of plastic bottles we consume. EcoBali sells foldable bags that people can easily be take everywhere so that they don't need to use plastic bags and they sell net bags set that can be used to put in your groceries and prevents people from using plastic bags to put in their fruits and vegetables. Additionally, Ecobali sells their composting bins (*Figure 22)*. Not only do the social enterprises sell products, they also sell services. Positive Impact Forever gets paid by hotels for its consultancy services that help with implementing a zero-waste program. Gringgo tries to sell a finance and operation management computer program that can give governments, recyclers and waste collectors insight in their functioning and can help with improving their effectiveness. EcoBali has a steady income flow through the fee it requests for collecting waste, while Niskala gets paid for the waste management service they provide for weddings.

For some social enterprises, the sale of products or services is enough to sustain their organization (Saraswati Paper, Indosole, ecoBali, Positive Impact Forever) and this can be regarded as an important success factor. Yet, other social enterprises could not solely rely on the sale of their products or services and therefore also depend on outside funding. Peduli Alams is still dependent on outside funding which they mainly get from companies in France. Gringgo managed to get two grants from NGOs that saw the potential of their trash tech solutions. Pit's solutions and Niskala get donations from expats and affluent Balinese that see the value of their operations. Compost making takes a lot of time and the compost itself is not worth a lot of money. This was found by BCC and therefore they are now trying to get funding from development organizations, governments in western countries or businesses that want to do a good thing. MPH organized a fundraising event where they auctioned all sorts of coupons and products. Another inventive strategy is to use fundraising websites to raise many from whoever is passionate for the cause. Both MPH and Niskala are doing this. Social enterprises can also use their own website to give people the possibility to donate money (Peduli Alam, Gringgo, MPH). Such income generating strategies can be effective as it makes it possible to appeal to a wide array of organizations and people.

It can be concluded that most social enterprises use hybrid income models to sustain their operations. Only few social enterprises can completely rely on the sale of their products or services and these enterprises usually have a lower environmental impact (Saraswati Paper and Indosole. Most of social enterprises still rely on outside funding and these social enterprises had more difficulties sustaining themselves. The dependency on outside funding makes their business model vulnerable, because other more pressing issues (poverty, diseases etc.) are often prioritized and funds for developing issues are decreasing. The social enterprises that were depended on the sales of compost had difficulties to sustain themselves because they produce a product that is worth little money. Similarly, running a collection service requires continuous investment of money, and because the local populations are often unwilling to pay a fee, it is more difficult to sustain such operations. Because the social enterprises are struggling to sustain themselves, profit making is usually not a realistic aim. The lack of funds was often mentioned by social enterprises as one of their main limitations. It prevented the social enterprises from scaling up their operations and if they had more funds available they could more effectively pursue their social goal.

8. The collaborations of the social enterprises

Since the literature often mentions that collaboration between all stakeholders can improve SWM systems in developing countries, the collaborations between the stakeholders in Bali's SWM system will be described in this chapter. This chapter will clarify how the social enterprises cooperate with each other, how the social enterprises cooperate with the government and how they cooperate with other stakeholders.

Collaboration of social enterprises, with other social enterprises and NGOs

Since all social enterprises have the same goal, it can be expected that cooperation between the social enterprises is omnipresent. There is indeed widespread cooperation between social enterprises and NGOs involved in Bali's SWM system. MPH is using the expertise of Gringgo to optimize their community based waste management system and two employees of Indosole are volunteering for MPH. Niskala uses the recycling services of ecoBali and BCC, while ecoBali sells the upcycled glasses of Pit's solutions. BCC is helping Project Clean Uluwatu to improve their composting practices. Sampah Jujur is selling waste to Re>Pal, who makes pallets out of plastic waste. This list can go on for a while if all the connections between the 35 organizations in *Table 2* are described. In general, the social enterprises were happy about their partnerships with other social enterprises and stated that it was beneficial for the functioning of their organization. They could share resources and knowledge and through a cooperative effort increase their impact.

In February 2017, Bali's biggest beach clean-up was organized by the NGO Bye Bye Plastic Bags and this was a huge success. In this beach clean-up, most of the social enterprises were involved and this endeavor showed what can be done if a large amount of social enterprises make a common effort. Additionally, there are waste related event, such as the sustainable design and sustainable solutions festival, where the social enterprises showcase themselves. Through such events the social enterprises get to know each other. In the survey, the social enterprises where asked which other organizations they knew. In *Figure 23* we can see that there are significant differences between the familiarity of the social enterprises.

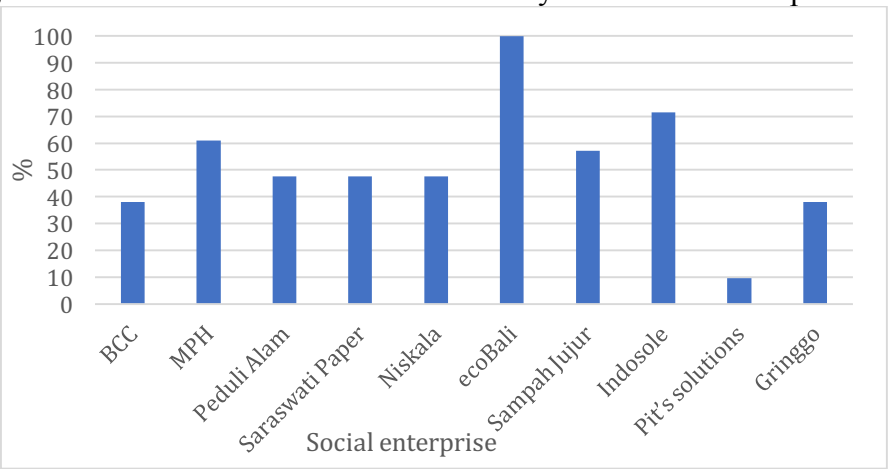

Figure 23: Known by how many of the other social enterprises? (%)

EcoBali was known by all 22 respondents that filled in the survey. They have managed to set up partnerships with various other organizations and have become a well-known presence in the 10 years that they have been operating. On the other hand, Pit's solution was only known by 1 respondent (ecoBali). This does not come as a surprise, as the owner of Pit's solutions stated in the interview that he liked being on the background and was not looking for further

collaborations. It was more surprising that the majority of the respondents did not know Saraswati Paper, which exists for 22 years. Additionally, less than 40% of the respondents did not know Gringgo and BCC, while Peduli Alam and Niskala were only know by a bit less than 50% of the respondents. It can be concluded that there are many organizations that do not even know of each other's existence and this suggests that there is still room to improve the communication, coordination and cooperation between the social enterprises.

There has also been friction between social enterprises. In the past, ecoBali tried to cooperate with Bali Recycling (see regional framework), yet due to personal differences this cooperation came to a halt after a bit more than a year. Similarly, Peduli Alam cooperated intensively with Trash Hero Amed (an NGO that organizes beach clean-up), but after a bit more than a year they decided to both go separate ways. However, not only friction was found, through the survey it was asked wit which other organizations the social enterprises wanted to cooperate. Both Sampah Jujur and Bali Compost Crafters indicated in the survey that they wanted to cooperate with ecoBali in the future. Interestingly, there was mutual interest and ecoBali clarified that it would like to collaborate with exactly these two organizations.

While most of the social enterprises have partnerships with other social enterprises, the interviews, participatory observation and survey clarified that there are certainly possibilities to further enhance the cooperation between the social enterprises. The social enterprises have complimentary activities and could enhance each other's functioning, yet often they are not aware of this. In the survey, the respondents were asked what hinders the cooperation between the social enterprises and some interesting findings came out of this. The barrier that was most often mentioned by the respondents was lacking coordination and communication. The social enterprises are focused on fostering their own organization and do not have the time to keep track of the progress and activities of all other social enterprises. Funding was also mentioned as a reason multiple times. Some social enterprises do not have financial means to devote to communal projects. There can also be competition between organizations to get funding or publicity. Some of the respondents also mentioned that ego was a factor that hindered cooperation. With this the respondents meant that some social enterprises think that they have the best solution for the waste problem and therefore these self-acclaimed champions want to take the spotlight. Finally, distance and different approach were also mentioned. Some of the organizations are located more than an hour drive away from each other and have a different focus area, which makes it more difficult to cooperate.

The respondents of the survey were also asked if a network that promotes and facilitates cross-sector collaborations can help improve Bali's waste management system and all of the stakeholders agreed that such an organization would be useful. This confirms the idea that a common platform that benefits all social enterprises has huge potential to improve coordination, communication and cooperation. Actually, there are already developments made in this area. The IWP (host organization) tries to create a database for the whole of Indonesia and unfortunately, they do not have the capacity to coordinate properly in Bali. Yet, recently the Bali Sustainability Hub has also been founded and this organization is trying to create a collaborative culture in Bali. Currently, they are developing a platform where all organizations will be showcased so that they are easily accessible for the outside world. The Bali Sustainability Hub surely has the potential to play a coordinating role, yet as became clear it will not be an easy endeavor to unite all these social enterprises.

It can be concluded that the collaboration within Bali's SWM system is not optimal yet. While it seems obvious that the social enterprises try to cooperate as much as possible to reach their common goal, in practice this is more difficult to realize due to the various reasons. If the social enterprises do manage to set up a partnership, this usually enhances the performance of the social enterprise.

Public private partnerships

Only 3 of the 11 social enterprises in *Table 3* managed to set up a successful PPP. MPH reached out to the village government and found that they were very welcoming and supportive to the social enterprise. The local government seemed willing to change and is actively participating in the project. What probably created the support is that the social enterprise would bring in the necessary funds and would give the ownership of the project to the local government. Gringgo started cooperating with the DKP of Denpasar, but how this cooperation is functioning was not clarified in the interview. BCC was welcomed by the DKP of Badung, who gave them a spot next to Bali's biggest landfill. However, the government is not actively involved in the BCC project and has not shown any willingness to learn from the example of BCC.

Although these three social enterprises show that it is possible to collaborate with the government, it seems that they are exceptions. Other social enterprises clearly stated that they tried to cooperate with the government, but that it was very difficult to set up a PPP and that government was not very welcoming to them. Ecobali for example stated that they try to involve the government in conversations and plans, but this not leading to anything and it felt like there was no willingness from the governments side to collaborate. The same was found by Peduli Alam when they wanted to set up a cooperation with the government. Although, the initial reception that BCC got from the government was very positive, after BCC installed themselves next to the landfill, there was little interest from the governments in BCC's model. The government was not keen on changing their traditional way of doing things and lacked financial resources and manpower to experiment with alternative approaches. The fact that the previous PPP with NOEI at the Suwung has proven to be a disaster might have caused the disinterest in BCC. However, the example of BCC again shows that it is not easy to set up an effective partnership with the government.

It has to be noted here that not all social enterprises tried to set up a cooperation with the government, because they expected it to be a hassle and not directly beneficial for the functioning of their social enterprise. It seems that cooperation with the government is not directly necessary for a successful social enterprise, but PPP surely has the potential to benefit both the social enterprise and government. Having the support of the government can be seen as a success factor, while not having the support is not directly a weakness for a social enterprise. Multiple social enterprises stated that the SWM system of Bali's capital city Denpasar was more effective than the SWM system of other regencies because the government of Denpasar actively tried to improve the system. This shows that the attitude of the government can make a big difference.

It can be concluded that there is little initiative and willingness from the governments side to set up active partnerships with the social enterprises. Although the examples of the 3 social enterprises show that it is possible to set up a PPP, this seems to be more of an exception since other social enterprises found it difficult to set up a PPP. Moreover, the example of BCC confirms that the idea that the government lacks the funds and manpower to implement

innovative approaches. Finally, there is not always an incentive for social enterprises to set up a partnership with the government.

Collaboration with other stakeholders

Besides collaboration with the social enterprises and governments, there is wide array of other stakeholders that the social enterprises are cooperating with. To begin with, the social enterprises are cooperating with the business sector. ecoBali has set up an inventive collaboration with Tetrapack, where they collect the Tetrapack drink cartons and ship them to java to get recycled. Saraswati papers produces paper for companies around the world that want to do something about their CSR. Positive Impact Forever worked for "Alila Hotels and Resorts". He initiated a zero-waste program in 4 of Alila's luxurious properties in Bali.

Other social enterprises are collaborating with educational institutions. BCC is cooperating with the Udayana University and has a facility at their campus. Pit's solution does workshops at the tourism high school where he makes cement bricks with plastic inside them (*Figure 24).* The other social enterprises are more focused on young children. MPH, Peduli Alam and ecoBali all have an educational program at primary schools where they do presentation, hand out educational material and teach the children how to separate waste.

Figure 24: Students of the tourism high school making cement bricks with plastic inside them

There are two social enterprises that involve the informal sector in their operations. Sampah Jujur has a market stall where people can bring their waste in return for money. There are also informal waste pickers coming to Sampah Jujur because they pay higher prices than other recyclers. More importantly, there is Gringgo, who is actually trying to organize the informal sector by making an online map where all the different waste banks, bins and waste disposal places are in Denpasar. They employ informal sector workers to pick up sorted waste. Gringgo is a very promising and futuristic model for developing countries, that might be able to improve the effectiveness of the informal sector. The example of Gringgo suggest that there are possibilities for social enterprises to further involve the informal sector. While the other social enterprises recognized the huge importance of the informal sector waste pickers, they were not actively trying to enhance their situation.

9. The performance of the social enterprises

This research has shown the variety of social enterprises that are involved in Bali's SWM system. The social enterprises have widely differing characteristics and propose different solutions for the waste problems. The case studies described the performance of 5 social in the different enabling aspects. This chapter will give a rapid assessment of all the 11 social enterprises that is based on the interviews and other available data of the social enterprises. In *Figure 25* we can see the performance of the 11 social enterprises for the enabling aspects that were used in the assessment tool. Green means a strong performance, orange means that performance is mediocre, while red means that the performance is bad in a certain aspect.

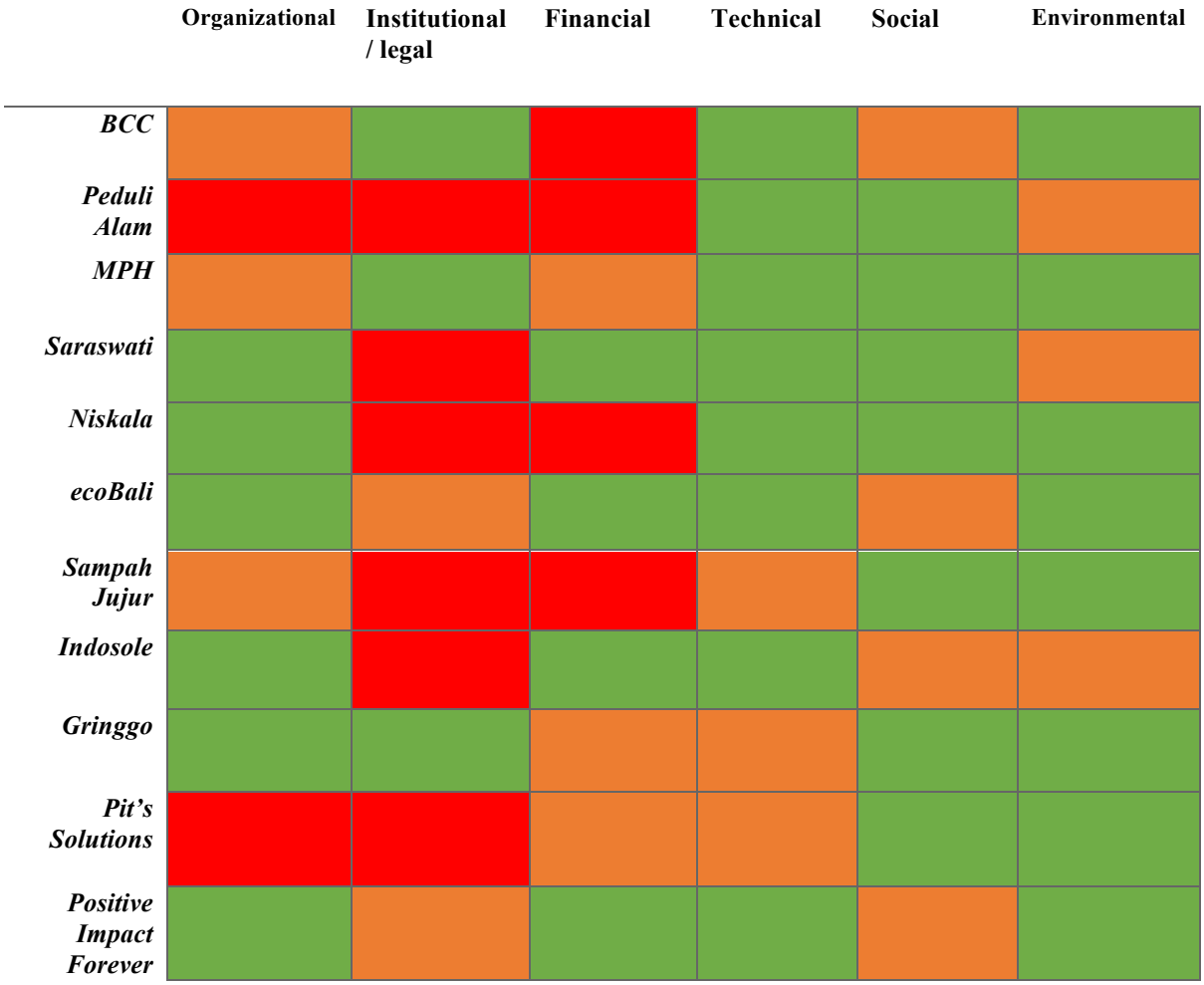

Figure 25: The performance of the social enterprises on the different enabling aspects.

Institutional & legal

The first thing that stands out is that the institutional/legal aspects are the main weakness of the social enterprises. Only three social enterprises managed to get the support of the government and set up a public private partnership. There are two social enterprises that are trying to involve the local governments in their operations and while they have been talking, this has not lead to any collaboration. The other social enterprises have no connection with the government and do not receive any support. There is little initiative and willingness from the government side to involve the private sector, while should be the case according to the waste law implemented in 2008. Since the social enterprises can function without the support of the

government this is not a necessary for a successful social enterprise. On the other hand, the 3 PPP's that were established have proven to be beneficial for both the government and the social enterprise. Having the support of the government can be seen as a success factor, while not having the support is not directly a weakness for a social enterprise.

Financial

The second notable weakness is the bad performance of the social enterprises in the financial aspects. Multiple social enterprises stated that their financial situation was their main limitation and prevented them for further expanding and increasing their impact. Most of the social enterprises could not sustain themselves through only the sale of products or services and therefore still dependent on outside funding and used hybrid income models. However, these social enterprises had more difficulties in sustaining themselves as outside funding is usually not a reliable source of income. If a social enterprise does manage to sustain itself through the sale of products or services, this has proved to improve its functioning and development. Having a viable business model and being able to generate sufficient income is thus an important success factor for the social enterprises.

Organizational

Multiple factors should be considered when assessing the organizational structure of a social enterprise. As we can see the only NGO in this analysis has a bad performance on the first three aspects. Most of the social enterprises involved in collection and treatment chose to become a company. This seems to be the most effective legal entity of the social enterprises. In this study, it was found that strong leadership has driven the success of the social enterprises. The leaders are usually driven by the will to tackle the waste problem, and this makes them motivated to use all means necessary to reach his goal. This dependency on the strong leadership makes the social enterprises vulnerable, because if the leader falls away the whole social enterprise might collapse. The strong leadership of the social enterprises thus is an important success factor, yet at the same time it is a weakness. The social enterprises in Bali's SWM system have very saleable and replicable models. The main limitations that prevented the social enterprises from upscaling were the lack of funds and the lack of manpower. The scalability of the project is very important for the effectiveness of a social enterprise, because this makes it possible to increase its environmental impact. If a social enterprise cannot grow or is not replicable, its effectiveness is limited. Another important success factor are partnerships. This can be partnerships with other social enterprises or partnership with the business sector. Such partnerships can enhance the effectiveness of the social enterprise as it can provide extra manpower, income or knowledge. The final factor that should be considered is if the social enterprises rely on volunteers. If a social enterprise still largely relies on volunteers, this can be seen as a weakness since this manpower can easily fall away. As *Figure 25.* shows only two social enterprise were considered to have a weak organizational structure, because of their lack of partnerships and reliance on volunteers and strong leadership. Additionally, for 3 social enterprises the organizational structure was considered mediocre because of their reliance on volunteers or strong leadership. The other social enterprises all had an effective organizational structure. It can be concluded that it is very important for a social enterprise to have a well-functioning organizational structure. A strong foundation is needed to be able to effectively address the social goal and if this is missing the social enterprise is vulnerable.

Technical

The failure of the WtE project at the Suwung shows that it is important to use appropriate technology for the local context and this has been recognized by the social enterprises. The majority of the social enterprises that are described here favored low-tech, low cost technology

that could easily be used by local employees. The social enterprises are relatively small and do not have a large budget to afford expensive high-tech equipment There is often little use of machinery, since labor costs are still low in Bali and machinery is not always more efficient (e.g. for waste separation). There were three social enterprises that used technology that was more complicated, yet did not limit the functioning of the social enterprises and therefore these were assessed as mediocre. It can be concluded that the appropriate technology was a success factor of the social enterprises.

Social

Even though many of social enterprises that are described here were founded by foreigners, they generally were well-embedded in the local communities. The social enterprises provide employment for the local population, and sometimes even for marginalized groups (women). This obviously gave them support from the local communities. Additionally, local communities start realizing that the tourists do not like a dirty environment, and this makes them support organizations that want to do something about this. Areas and people that were previously not served by a collection service, were of course happy that the social enterprises started picking up their waste. On the other hand, some of the social enterprises complained about the laziness of their Balinese employees and stated they were not doing their work properly, while others were disappointed in the understanding of the separation strategies. In such cases this limited the effectiveness of a social enterprise Community participation can improve the functioning because the local population is needed for the operations of the social enterprises (e.g. source separation). Interestingly, one social enterprise (e.g. Niskala) used the Balinese religion as a means to create awareness and get the support of the local population. Another social enterprise embedded itself in the local community by giving the village ownership of an inventive waste management system that was designed by the social enterprise (e.g. MPH). This can be seen as inventive ways to embed a social enterprise in the local community and get the needed support. Although not all social enterprises were so well-embedded in the local context, the majority had the support of the local communities. Four social enterprise were assessed as mediocre because they did not employ Balinese people or because they were competing with the informal waste sector. Yet there was no resistance from the local communities against these social enterprises. It can be concluded that the support of the local community is an important aspect that can foster the success of a social enterprise. Community participation helps increasing the effectiveness and functioning of the social enterprises.

Environmental

The social enterprises take their environmental impact sufficiently into account. They aim to solve Bali's waste problem, and having a negative environmental impact is thus contradictory to their purpose. Most social enterprises try to avoid waste from going into landfills, while they promote recycling and composting. The environmental aspect here also referred to the amount of waste that a social enterprise prevents from going into the landfill. Therefore, the performance of three social enterprises was assessed as mediocre here. One of these social enterprises did not sufficiently promote recycling and was sending their waste to the landfill due to a lack of alternatives (Peduli Alam). Another social enterprise was assessed as mediocre because it only processed a small amount of (paper) waste, while another one focused on a niche waste product (tires), which is not the most pressing issue in Bali. It can be concluded that most social enterprises take their environmental impact sufficiently into account and prevent (or have the potential to prevent) significant amounts of waste from going into the landfill or being dumped. The environmental performance does not directly determine the success of a social enterprise and should not be regarded as a success factor. It only determines the effectiveness of a social enterprise in solving Bali's waste problem

10. The functioning of the social enterprises

In the previous chapter, the general findings about the 11 social enterprises that are included in this research are described. This section will give in-depth descriptions of 5 social enterprises to increase our understanding of the functioning of the social enterprises in Bali's SWM system. As explained, these specific social enterprises were chosen because they show the diversity of the social enterprises involved in Bali's SWM system and because they were deemed the most interesting for further analysis. To begin with, Bali compost crafters was chosen because it provides an alternative solution for the Suwung; Bali's biggest landfill that was described in the regional framework. MPH was chosen because it shows how we can involve the local community in waste management. Peduli Alam was chosen because it was the only NGO and because it shows how we can improve waste management in remote areas. Saraswati Paper was chosen because it has managed to sustain it operations for over 22 years. Finally, Niskala was chosen because it shows how we can use Bali's religious tradition to promote effective waste management practices. These 5 social enterprises will be analyzed through the use of the assessment tool that was described in the Methods section

Bali Compost Crafters

Problem description

Bali's southern peninsula ('the Bukit') is a large limestone rock pushed out of the ocean. It is a dry area with a rocky surface and this makes it more difficult to grow something in the Bukit. The Bukit has some outstanding tourism assets (Uluwatu temple, beaches, surfing) and consequently the area has seen some major tourism development in recent years. This brought along demand from people wanting to grow gardens around their hotels or villas. For a garden with blooming flowers and fruit trees you need a fertile top soil layer, which was often absent. Robert, an American guy living in the Bukit with a background in organic farming, was already making his own compost in his backyard by collecting some cow manure from his neighbours and mixing this with his own green waste. Robert managed to grow a rich garden and people started knocking on his door asking how he did it, whereupon he explained them secret of compost and regularly gave them some of his leftover compost.

The start-up of BCC

About 5 years ago, Robert explained the opportunity to his friend Oliver who was thinking about quitting his job in the corporate world:

> *"He said look, I might have this idea you know, I have been making compost and lots of people like it. And there is no one managing the green waste situation here, there is no one really promoting separation at the source. So all this green waste is getting clogged up with all the other recyclables making them harder to recover and clogging up the dump systems and putting pressure on the waste management resources, both at the village level and on the regional level".*

They decided to put their heads together and Oliver came over from New Zealand for a month and stayed with Robert so they could explore the possibilities of selling compost. They concluded that there was definitely demand for compost from both the tourism industry and the agricultural sector, that was relying on subsidized chemical fertilizer. This prompted Oliver to move to Bali 4 years ago? and together they started Bali Compost Crafters (BCC). The initial phase of BCC basically meant Robert teaching Oliver how to make compost in the tropics. They collected bags of manure and truckloads of rice straw from their neighbours and started hand building piles of compost at the back of the house. At the same time, they were trying to find the right machinery to mechanize the process. They bought a tractor, started fabricating some other machinery (e.g. aerator) and eventually imported a small wood chipper from California that shreds trees and branches into woodchips (*Figure 26*).

Figure 26: Shredder a the BCC facility next to Suwung

The Udayana University and the DKP

It took around a year to get this machine here, but by then they still did not have a large enough area to use as a main production site. Land is expensive and this made it difficult to find the needed 5 ares of land to produce a product that is worth little money. Therefore, they decided to reach out to the Udayana University that has a huge campus in the Bukit. The reception BCC received there was really positive. The university had an agricultural department that wanted to share their knowledge and had a long-term goal of building a green campus. But most importantly, the university gave BCC a 10-year contract for an area of 10 ares which they could use as their main production site. In return BCC would share their knowledge of the composting process with the students.

Now that they found a big piece of land for the production, the other aspect that had to be solved was the supply of the materials i.e. how are they going to collect organic waste. The initial idea was to drive around with a truck and collect from people who were landscaping or from hotels and villa complexes that needed their green waste removed. Soon they realized that this was inefficient and that the transport costed way too much. BCC asked themselves the question how they were going to supply themselves with a big flow of green waste. The answer was relatively simple. No one was really taking care of the green waste going into the government owned landfills. The immediate pay-off is not evident (such as with recyclables) and it takes a long period to produce the compost (3 months up to a year). So, the biggest flow of green waste possible was largely ignored, while this is an area where one can really make a difference. BCC decided to contact the Badung government and the people that were really receptive to them were the people from *the DKP,* the municipal cleanliness and landscaping agency. The DKP is responsible for maintaining the roadsides, pruning trees and mowing the lawns and this means some of the loads of the DKP are pure green waste, which is exactly what BCC is looking for. The DKP understood that the green waste is 70 to 80 % of the materials that are clogging up their dumps, while this should not be going there in the first place.

At first, the DKP gave BCC a site at a small recycling facility in Renon, where they could place their wood chipper and intercept some of the green waste that would else go into the landfill. But then about 2 years ago in 2015, BCC had to move from their site at the Renon facility and they managed to convince the DKP to give them a small site next to Bali's biggest landfill, the 'Suwung' (*Figure 27*) Both at the Renon facility and the Suwung the DKP already had installed a rudimentary composting facility. This is a manual system where they hand trim of the leaves and small branches of the green waste, put this into very small mulchers, then they make piles, wet them down and the resulting compost gets used for public projects. These rudimentary composting facilities can process 1 to 2 tonnes of green waste a week, whereas BCC can handle 20 -25 tonnes

a week with their machine. By mechanizing the process BCC can thus process more than 10 times as much waste as the manual facility can with a lot more manpower.

Figure 27: Cows grazing at the Suwung

So, by acquiring a site at the Suwung, BCC gained access to the biggest flow of green waste in Bali and from now on had an unlimited supply. The rudimentary composting facilities of the DKP could only process a tiny fraction of the green waste going into the landfill and there was thus more than enough left for BCC. By now, most of the drivers of the DKP know BCC and when they first drop by at the BCC site, to see if they can use it. BCC checks if it is good quality and if it is, they pay the drivers a small fee for the waste. BCC was hoping that by showing the possibilities of mechanization and a model that can actually make money, the government would see the opportunities and start investing in a similar model. So far, their example did not have the desired effect on the government, mainly due to a lack of funds on the governments side, but hopefully this will still happen in the future.

Current situation & future plans

So where does BCC currently stand? As explained, they found their two main partners in the Udayana University and the DKP. BCC has their wood chipper installed on their small site right next to Bali's main landfill. Here they collect their green waste, shred it and then they send it to their main production site at the Jimbaran university campus. On the university campus, BCC moved from their 10 are area to a new 10 times bigger 1 hectare area on which they also hope to build a community garden and class rooms in the future.
The initial idea of Bali Compost Crafters was to become a small company with a social conscience that sustains itself through the sale of compost and provides a model that can be replicated by the government or businesses with more money to spent. Yet, in the process described above, the owners of BCC started realizing that no one is picking up on the idea and that they should actually be the ones providing a large-scale solution for the green waste going into landfills. After BCC obtained their site next to the Suwung, they became aware of how big the problem really is and that they are still "just a mouse scratching at a pile". For every truck they pull aside, there is another 20 trucks with green waste driving past them. More than 3000 tonnes of organic material still go into the Suwung every week. If all this green waste would be processed properly it might be enough to fertilize the whole Bukit, which then closes the loop of the operational model.

The idea now is to make BCC a not-for-profit and forget about making profit as a company, to scale the model and to use this as an example. Therefore, with the help of a volunteer, they are exploring the possibilities to raise money from whoever is passionate for the cause, ranging from major international donors to small tourism businesses in Bali. These funds will then be used in two ways. Firstly, to increase the scale of the compost they can produce by buying new machinery, so they can process serious tonnages of green waste every day and make a meaningful difference in what is going into the landfill. Secondly, they want to raise funds to promote education and awareness through their links with the university and farming community.

Until now, BCC has mainly functioned as a company producing compost and diverting green waste from going into the lands, while the educational part has not really come to fruition yet. Nonetheless, there surely are future possibilities to educate university students and to promote the importance of waste separation at source. Additionally, the university has been sharing knowledge and technology with small farmer collectives through the Udayana Community Development Program (UCDP). BCC is cooperating with the UCDP and it seems that the farmer collectives want to use the compost of BCC for farming, to replace chemical fertilizers. If BCC will eventually start supplying farmers in Bali with their compost, it will reinforce their message and close the loop. The green waste will then ultimately be put back in the right areas of Bali and used by people who can use it the most sustainably.

Organizational aspects

As explained, the initial idea of BCC was to become a private company that produces and sells compost. Over the years the plans of BCC developed, their social goal became more prominent and they got the feeling that they could really make a difference. There focus was more on setting an example and doing good, then becoming a profitable business. This change of approach made them decide to become an NGO has its advantages (taxes, funding). They are in the process of becoming an NGO, but they explain that setting up an NGO in Indonesia a time consuming and complicated endeavour. Meanwhile BCC was offered to register under the Universities NGO, and this is what BCC is probably going to do. Oliver explains:

> *"So long term what I see the structure of all there is, is on one side we have the yayasan1, the non-profit, as the waste management education community development research arm. And Bali compost crafter purely as a company who buys the raw material of the waste management firm and makes compost out of it and sells it"*

As we can see, the legal structure of BCC is not a defining characteristic since it can possibly change over time and even be dual. Bali Compost Crafters has shown the capability to grab the opportunities that arise and adapt itself to the prevailing circumstances.

BCC has two full-time employees that take care of the collection, shredding and transport, earn well above the minimum wage. Every now and then they hire part time employees or get help from 1 or 2 volunteers. The two owners of Bali Compost Crafter take whatever money is left, which is not much and sometimes might even amount to nothing at all. The perseverance of the two owners of BCC has driven the initiative and without their strong leadership, BCC will fade away:

BCC has two important partnerships with the DKP and the University, and is very open for setting up new partnerships. Currently, BCC is doing a side project where they are re-doing the composting facility at Project Clean Uluwatu (PCU), an NGO focussing on keeping the legendary surf spot of Uluwatu clean. BCC will also start cooperating with approached by Niskala, who approached them to pick up the organic ceremonial waste. BCC already shared some ideas and resources with the Role foundation, and in the future they hope to partner up with EcoBali.

The concept of BCC is very scalable. According to one of the owners: *"you could give me 10 new chippers tomorrow, 5 new trucks, 20 guys and I can put them all to work"*. They have an unlimited supply of green waste and 1 hectare of grounds where they can make the compost (which takes 8 months). They only need more funds and machinery to upscale the process.

1 Yayasan is Indonesian for NGO

Institutional & legislative aspects

BCC managed to start collaborating with the government, more specifically with the DKP. This shows the possibilities of a public-private partnerships; how social enterprises can make government systems more effective and innovative, but also how government support can foster the development of a social enterprise.

> *"Our involvement with the government tells me that they understand it's a huge problem, they are doing a lot of research, they don't seem to have readily available funding or people are holding it back because they are gun shy. They caught a lot of criticism for not doing enough, but they are trying."*

According to the account of BCC it seems that the DKP is trying to improve the waste management system, but does not have the organizational capacity or funds to do that and therefore the system is still malfunctioning. The fact that the DKP gave BCC a site next to the dump does show that they are open for collaboration and willing to receive external support. In the two years that the BCC has their site at the Suwung, the DKP has not shown the involvement and interest in BCC that was hoped for. *BCC experienced the DKP as open-minded, but also very 'gun-shy' to work with external companies because of past failures (NOEI and the GALFAD plant).*
The institutional framework made it more difficult for BCC to register themselves as an NGO. They explain that setting up an NGO in Indonesia a time consuming and complicated endeavour.

Financial aspects

The project was started by initial investments of the 2 founders which allowed them to buy the needed machinery and equipment. Without them putting in their savings the initiative would not have come off the ground. BCC mainly gets their income from selling the compost, but at the moment is just self-sustaining,

> *"If I go away or my business partner goes away, this thing is gone. This tiny little thing that we have created, this seed of an idea it goes away. I have brought all my savings into it, my business partner has brought the majority of his savings into it and like I said before it is just sustainable. Every week to week, month to month, quarter to quarter, we just have enough money to put petrol in the machine and to pay our guys"*

The goal of BCC is not so much profit making, but more doing a good thing, scaling the model and setting a replicable example. The money they make is just enough to keep the social enterprise going, but there is no room for further investments. Currently, Bali Compost Crafters is thus severely limited by its lacking resources and therefore outside funding is needed. If they would have more funds they could buy more machinery, process more waste and produce more compost. By upscaling the initiative in this manner, more revenue can then also be gained from the sale of compost. Consequently, BCC is currently exploring the possibilities to get funding from whoever is passionate for the cause, ranging from major international donors to small tourism businesses in Bali.
Additionally, there seem to be many possibilities to sell more compost in the future. At the moment, they sell all the compost that they make and there seems to be more demand as they have only touched the market. BCC gained their customers through word to mouth promotion, and they have not advertised anywhere. They only have a simple website and a basic Facebook page. It thus seems that there are possibilities to market their product further, but first they need to be able to produce more compost that they can sell.

Technical aspects

BCC uses relatively simple technology to deal with the green waste. The wood chipper is easy to operate and can be used by local untrained employees after some instructions. For the composting process, they use aerators which they fabricated with locally available materials but for the rest the composting process is low-tech and

consist of making piles of mixed green and brown waste. The feedback BCC got on the quality of their compost has been very positive.
Yet, the wood chipper of BCC had to be imported from the US. As Oliver explains:

> *"we couldn't find any decent second-hand equipment in Asia that would do the job. So we ended up finding a small wood chipper, like a mulcher, the sort of machine that you would see with landscaping companies, dragging around these behind their trucks in the west and chopping trees to feed to the machine, where after woodchips come out. And we found one of those in California, we also found them in Australia, but they were cheaper in California. We bought a tractor, started fabricating other pieces of machinery, like a mulcher and an aerator, and crates and things like that. But the guts of our machinery took almost a year to import in through Surabaya".*

This quote shows that BCC had to import their most important piece of machinery. It took a long time to import this wood chipper, and if it breaks down it will probably take a long time to import spare parts or a new machine and its questionable if there will be local knowledge available to repair the machine. Since they only have one wood chipper at the moment, this one piece of machinery is crucial for the processing of green waste. BCC is in the process of getting another wood chipper donated from a machinery company from the US with a base in Jakarta, but until then the process is fragile due to the dependence on one machine that is not readily available in Bali. Furthermore, BCC does not have the funds to acquire a new wood chipper.

Social Aspects

BCC is owned by two foreigners and their two employees are from Java. Furthermore, BCC can possibly endanger the livelihoods of local woman that are hand trimming the leaves and small branches from the green waste. At the moment, most of the customers of BCC are still westerners. The plan is to change this in the future by cooperating with the UCDP and start supplying local farmers with their compost, preferably by donating it.
It should be noted that BCC is accepted by the local authorities.

Environmental aspects

BCC prevents 20 to 25 tonnes of green ways per week from going into the landfill and thereby reduces the emission of landfill gasses. In the composting process, they use natural products. If BCC starts providing farmer collectives with an organic alternative for chemical fertilizers, they can further enhance their environmental impact.

Conclusion

BCC started as a small company making and selling compost, but through their perseverance they managed to accomplish a lot in the 4 years they have been operating. The strong leadership of BCC, as well as their partnerships with the DKP and the Udayana University can be seen as essential for its success. BCC is a good example of a public private partnership and of how a social enterprise can innovate a governments waste management system. It can be said that the main limitation of BCC is the funding. If BCC wants to keep growing, they need to collect funds or generate more income, so they can upscale their operations at the Suwung and expand their involvement with the university and UCDP. An important risk factor is that BCC only has one wood chipper and if this breaks down, it might take time to repair and consequently the processing of waste stops. It can be concluded that Bali Compost Crafters is already preventing significant amounts of green waste from growing and it has great potential to further evolve as a social enterprise.

Merah Putih Hijau

Bali's governmental structure

In 2008, Indonesia implemented Waste Management Law No. 18/2008, which gave the local governments more responsibility and authority to determine their own waste management policies.
Bali's organizational structure can be divided into

- Kabupaten(regency)
- Kecamatan (municipalities)
- Kelurahan/ Desa (village)

The Desa thus is the lowest administrative structure in Bali. The Desa is traditionally controlled by the Banjar, a town council where the male heads of the families that live in the area come together to discuss town matters. The Banjar meets around twice a month and foreigners or non-Balinese are exempt from participating in these meetings. For the Balinese, membership of the Banjar is obligatory The Banjar is an important building block of Balinese society and is the link between the government and the Balinese people. The Banjar has a strong degree of autonomy and can decide about things like the implementation of laws, the sale of lands and the allocation of funds. As such, the Banjar is also responsible for arranging and implementing a waste management system on the local level.

Community Participation

In 2016, Merah Putih Hijau (MPH, literally translated means red white green) was founded by a group of (western) volunteers to try an alternative approach to waste management and actually implement a waste management system at a local level by working together with the Banjar. One of the founders and the creative brain behind MPH, is Nino. Nino grew up in Bali, but when he was 16 moved back to Germany to study. In 2009, Nino did his first work in waste management after he got a scholarship from the German development association and returned to Bali to intern at Temesi (described by Zurbrugg, 2013). He helped Temesi develop a strategy to increase their sales of compost and this is when he first realized the value of compost. Since then he has been interested in waste management. After Nino did his master in Sustainability Economics and wrote his thesis about material flow analysis, he decided to move back to Bali. He did some work in the international field and started his own sustainability consultancy company (Eco Mantra). In the 6 years that Nino was working with waste management, he learned that the top down approach does not work. As Nino explains:

> *"It doesn't work on the top level. It is to complex, it is to corrupt. People are way too caught up in their own politics. No-one wants to get their hands dirty. No-one wants to go to the field and implement and work where it actually counts.*

According to Nino, they just give recommendations on the top level, but they have no good system that can be implemented on the ground. With this idea in mind, Nino founded MPH to show how to implement a waste management system at a village level, so that this working model can then be replicated in other villages around Bali. The core principle of MPH is that the people own it. Giving people ownership of the project and having them manage and maintain it, reduces the dependency on guidelines and overarching government structures.

To give the local people ownership, a kelompok swadaya masyarakat (KSM) is registered at the Banjar. A KSM is a community working group, that becomes legal body by registering itself at the Banjar. The KSM can ask for

meetings, for changes in the village and can apply for funds from the government. MPH then cooperates with the KSM by helping the KSM building a recycling and collection facility. The KSM owns the facility and thus has the extended ownership of the project.

If MPH would have approached the Banjar and told them that they had to pay for everything, they would not have adopted it. Therefore, the idea of MPH is to fund the operations of the facility in the first year to prove the value of the system to the villagers and because it takes time to become part of the village. After the first year, the villagers have to run the system themselves and it should become self-sustaining through the value of the materials that are collected. All proceeds are meant to keep the facility running, but if there are any profits leftover, these will be distributed amongst the people in the form of a village fund that can be invested into a purpose of the villagers choosing. Additionally, the idea is that the leadership of the village project changes every 4 to 6 years. The idea behind this is that with every new leader, there will be new roadmaps and new ideas, so that the project will keep reinventing itself. On their website, MPH describes the solutions they propose as follows:

1. Low cost, low tech, low risk local community owned waste management
2. A household separation strategy and local collection system
3. Sale of recyclables for the benefit of the village community
4. Village scale composting to produce great compost for the rice fields
5. Education and community groups to maintain momentum

The Pilot village of MPH

To prove the effectiveness of their model, MPH chose the Desa Pererenan (Badung regency) as their pilot village. Pererenan is a typical Balinese village that consist of around 1000 households. MPH managed to convince some key people within the Banjar of their model and is now actively cooperating with them. The Banjar has donated 4 are of land and a building to MPH which they can use to build the facility (*Figure 28)* and donated a pick-up vehicle which can be used for the collection service. Additionally, to make compost a shredder was donated to MPH by the Role foundation, an NGO that is also actively trying to solve Bali's waste problem. The project officially started in October 2016, which means they have until October 2017 to sort everything out, before completely handing it over the project to the village. When visiting, the MPH project in Pererenan had been running for half a year, wherein MPH already achieved a lot. They got bins placed throughout the village and their collection service picks up the waste there on a daily basis. By now a bit more than 200 households are served by their collection service.

Figure 28: Aerial view of MPH facility.

MPH tries to reduce the waste that is going into landfills and therefore they are trying to recycle as much waste as possible. The non-organics are sold to recyclers to generate profit that can be reinvested in the organization. From the organic waste, MPH already makes compost at their facility with the use of the shredder. MPH uses a simple method to make compost. They make piles of organic waste and manually turn these. The idea is that this compost can then be sold to farmers that can use it to fertilize the rice fields.

To be able to recycle the waste, it obviously has to be separated. This is done at the facility, but more importantly MPH is promoting source separation. In *Figure 29* we can see the colour coded separation strategy that MPH tries to implement. This separation strategy helps making the local people understand why they have to separate their waste and how they have to do this. If the people understand and will actively start source separating, it will be easier for MPH to sell the recyclables and make compost out of the organic material. The idea is that people separate the non-organics waste (merah & putih) from the organic waste (hijau). The waste will only be collected if its separated correctly.

Figure 29: Color coded waste separation strategy developed by MPH

Besides their collection and recycling activities, MPH is also doing a program at the Perenan elementary school to educate the children about the importance of responsible waste management. MPH made booklets that are handed out to the kids and teacher and volunteers of MPH will give classes at the school. The program explains the waste problem of Bali and how waste is currently managed. The model of MPH is presented as a possible solution and therefore MPH trains the children in how to separate their waste. The children actively have to start separating waste at school and the idea is that this will prompt them to also do this at home. During the 6-month program, children visit the facility of MPH to see how it works, they visit a turtle conservancy to create a sense of caring for other living beings and they do a beach clean-up where they can practice waste separation. Volunteers

of MPH that are executing the school program will document the process and activities, to create a credible education model that can be replicated elsewhere.

MPH has received widespread attention in government and media circles in and around Bali. People are recognizing the potential of the system that MPH proposes and view it as a good alternative for the current waste management practices. They have managed to set up a PPP with the Banjar and are actively involving the local community in the waste management system, which are two things that are often recommended as a solution by waste management experts. MPH is currently still developing the project, optimizing the concept and researching its functioning. If the project in Pererenan proves to be successful, MPH collected all the needed data to replicate their model elsewhere. By actually implementing an alternative waste management system and proving its effectiveness, MPH really has the potential to become a sustainable solution for SWM in developing countries

Organizational aspects

MPH is still in the process of becoming a legal entity. They are currently exploring the possibilities of becoming an NGO or a company. As Nino explains:

> *"We can either do an NGO that helps the KSMs. Or we can do a social enterprise. But we have to weigh the benefits of both".*

Currently MPH is cooperating with an NGO (GUS), MPH shares a bank account with them and if a legal issue comes up, MPH can refer to them. Yet, this is not an ideal situation and therefore MPH hopes to soon become a legal entity. Whether this is going to be a company or an NGO has not been decided yet.

MPH currently has 4 employees. While these employees first had fixed salaries, this was soon changed into an incentive based income. The more the employees collect, the more they earn. This was changed because the employees were not picking up enough waste and were being lazy.
Besides the employees, MPH is supported by a large team of mainly western volunteers. As explained, the strong leadership and extensive knowledge of Nino have been crucial for MPH. The idea of MPH came from the experience he gained in the years he has been working on waste management. Nino is the link between the Banjar and the group of volunteers. The rest of the volunteers come from different backgrounds and not all of them have affiliation with waste management, yet often have other valuable skills. In the first half year, the volunteers have been meeting about twice a month to discuss the progress of the project and make future plans.
Through the volunteers, MPH has a huge network that they can use to arrange things. Nino is a well-known presence in the waste management sector of Bali, and this network can be used to MPH advantage. MPH is currently cooperating with the NGO GUS and with the NGO PPLH. Additionally, they are supported by Oliver, the founder of Bali recycling (described by MacRae & Rodic, 2015)

The model of MPH is very scalable and replicable. In their first pilot project, MPH tries do the research and collect data about how to run the model. This way, they are learning a lot about what works and what not. After MPH handed over the project in Pererenan over to the Banjar, they hope to replicate the system in another Desa. It is questionable if MPH will again manage to collect sufficient funds to sustain another project for a year, but at least the knowledge is there and the concept is proven.

Institutional & legislative aspects

MPH is actively working together with the Banjar, the lowest government structure in Bali. They managed to convince the local Banjar of Pererenan to give their model a chance and as such managed to set up a successful PPP. Through this PPP, MPH helps the Banjar of Pererenan innovating their waste management system and making it more effective. The Banjar provided MPH with a piece of land and a pick-up truck to support the initial phase of the project. In the meetings of the Banjar the project is discussed amongst the villagers and everyone can give their input. On the other hand, MPH brings in the need knowledge to implement the system and the needed

funds to sustain the system in the first year. If everything goes according to the plan, after 1 year MPH will retreat itself and it will be the Banjar that will run the waste management system.

Financial aspects

To run the facility costs MPH around €1500. Most of this money goes to paying the employees (±€1000), while the rest is used to maintain and improve the facility and the equipment. At the moment, the facility is still operating at a loss and the project is sustained through external funding that was raised by MPH. In the future though, the facility should be able to become self-sustaining. They have not reached their optimum yet, but within 1 year this should be accomplished. The material value of the waste can then sustain the operation, as the recyclables and compost can both be sold. It is expected that some profits will eventually be made, that then can be reinvested into the village fund

Figure: 30: The organic-waste shredder

To raise the needed funds to sustain their operations in Pererenan in the first year, MPH has relied on different methods of fund-raising. Firstly, they raised more than €4000 through a crowdfunding website. Secondly, MPH organized a large fundraiser event, where MPH auctioned all sort of coupons and products that were donated to the organization (Hotel nights, theme park tickets, surfboards etc). In total, they managed to raise more than €11.000 through this event. These funds are enough to keep the MPH project running in the first year, but it is questionable if they will manage to raise such a large amount of funds a second time through the used fundraising methods. On the other hand, if they have proven the concept of MPH, it is more likely that people will donate funds to MPH, because people know it is a successful system.

Technical aspects

MPH developed an easy colour coded separation strategy so that the villagers can understand how to separate their waste. At their facility, MPH makes compost by creating piles of organic waste and manually turning these (*Figure 31)*. This method could be easily understood by the local employees of MPH, that are now making the compost. There is one shredder used in the compost making process (*Figure 30*). Although it is easy to use, it might be more difficult to repair this shredder. If the shredder completely breaks down, it will not be easy to find a new shredder in Bali and this will be a costly endeavour.

Figure: 31: Composting piles

MPH is also experimenting with more complicated machinery. Nino is trying to make a pyrolysis machine for a €1000 with scrap parts in a local chop shop. With this machine, you are basically reversing the process of making plastic. You heat up the plastic in an oxygen free environment and turn it into a gas. Then you cool the gas down and it turns into an oil. Making the oil is relatively easy, but the difficulty is to make it usable for engines. Currently, they are still trying to find out how to make a usable product from this oil. Pyrolisis machines are available in China or Japan for €10.000 to €15.000, but this is way too expensive for MPH and cannot be earned back. Therefore, MPH is doing it with local materials in a local shop, so that it afterwards can be replicated with relatively low costs. Besides the pyrolysis machine, Nino is also looking into the possibilities to install

a machine that shreds plastics and a machine that makes cement bricks out of shredded plastics.
Until now, MPH has used appropriate technology that can be easily used by the local population. MPH is experimenting with more advanced treatment technologies, but is trying to produce these machines locally for a relatively low price.

Social aspects

The core principle of MPH is that the people own it, manage it and maintain it. By making the villagers participate, MPH tries to empower them and reduce their dependency on overarching structures. Although, there is a large team of western volunteers behind MPH, this is unimportant because they are on the background and the people who own the project are the villagers. The villagers can give recommendations or comments about the project in the community meetings of the Banjar and this way the whole village can participate in the decision-making. MPH serves poorer parts of the population with their waste management system, as opposed to private or government-led waste management services that request a fee for their waste collection.

When the facility starts operating at its optimum it should start making profit, which will be reinvested in the community through a village fund. This way, the villagers will feel that the separating waste can actually benefit the community and automatically they will support it. MPH is already supporting the villagers by providing in income for the 4 local employees and through their educational program at schools. As Nino explains:

> *"The facility is actively investing in the people and the families. So, you see the extension of the facility and meaningfulness of it. Is already attached to benefits. Through the people that are earning their salaries, the locals in the village. They are already happy about that. And their families are happy about it. And they talk about that when they hang around together. And saying ooh look we are part of that process. And then the process continues to grow. And expand right. So it has to become one with all the people. So there is this long socialization strategy"*

MPH is very well embedded in the local context and has the support of the local community, because they are the ones that benefit from the project.

Environmental aspects

MPH aims to reduce the waste that is going to landfills. By actively promoting source segregation, MPH makes it possible to recycle a higher percentage of the non-organics and increase the amount of organic waste that is being composted. It can be said that the project of MPH acts in an environmentally friendly way. If they manage to replicate their model in other villages, they can significantly reduce the amount of waste going into landfills.

Conclusion

MPH is an extremely promising alternative for the existing ineffective waste management practices. By giving ownership to the people the waste management project embeds itself in the local community and consequently gets their support. MPH fits perfectly into the decentralization strategies that the government of Indonesia proposes, since they try to make the lowest government structure start improving their waste management system by showing the benefits it can bring. Such a PPP is exceptional in the developing world.
MPH tries to use low cost, simple technology to make it appropriate for the local context. The institutional & legal aspects, the technical aspects and the social aspect are the main strengths of MPH
The organizational structure of MPH is there main weakness. They are not yet a legal entity and are largely depended on volunteers, that can fall away at any time. The leadership and expertise of Nino has been crucial and makes MPH somewhat depended on him. Another possible weakness of MPH is the financial structure. Although they are convinced that the material value can sustain the operations, this first has to be proven. Until now, the project in Pererenan has depended on outside funding and would not have sustained itself without it. Additionally, if another project is started, this outside funding would be needed again.
It can be concluded that the concept of MPH still has to be proven, but already has shown the possibilities of a different approach. MPH has been innovative and tries to tackle every aspect (education, collection, treatment) that is currently causing Bali's waste problem

Peduli Alam

East-Bali

One of the more recently developed tourism areas in Bali is Amed. Amed refers to a long stretch of coast of around 14 km along the east coast of Bali that includes 7 villages (amongst which the village Amed) (*Figure 15*). Despite the fact that Amed is somewhat remote and more difficult to reach due to the surrounding mountains, in the last decade tourism activity developed rapidly in this area. By now Amed is well-known for its diving opportunities and loved by tourists who want to get away from Bali's main tourism area and stay in a quieter place. This increase in tourism activity obviously was accompanied by an increased production of waste.

Just like many other places outside the cities and main tourism areas of Bali, Amed did not have a proper waste collection service. Also, the informal waste sector is not very active in this part of Bali. The government truck picked up the waste from the businesses who paid a fee, while households unable to pay mostly dumped and burned their rubbish. In response, the NGO Peduli Alam was founded in 2008 by Charlotte and Laetita, two French women living in Amed that were disgusted by the amount of rubbish around her. In Indonesian Peduli Alam means "protect nature" and the objective of the organisation was to create awareness amongst the local population about the waste problem and provide them with accessible simple solutions to tackle the waste problem.

Collection service

In 2009, PeduliAlam completed the first stage of the project by establishing a waste collection service. 50bins (30 cement, 20 metal) were placed next to the roadside on central places in the village. People could dispose of their non-organics in these bins and then Peduli Alam would pick it up for free. They bring the waste to a landfill that is located 35 km from Amed, where informal waste pickers take out the recyclables. Peduli Alam only picks up the non-organics, because the idea is that the local population can get rid of their organics themselves. Amed is still a rural area so most people have space to do home-composting or they can feed their food scraps to the pigs that can be found in the area. The separation of the waste was purposely kept simple so people only had to separate into organics and non-organics.

Figure 32: Waste shovelled on a tarpauling out of a cement bin.

For more than 8 years Peduli Alam managed to sustain its collection service and pick up waste in different parts of the Amed area. The truck nowadays collects the waste around 20 times a month. The idea is that there are 5 areas that each fit into one truckload, which means the truck picks-up waste 5 times a week in different parts of the Amed area. In March 2017 Peduli Alam managed to buy a new, bigger truck through some major donations, which makes it possible to pick up more rubbish at a time. Peduli Alam now has dispersed over 200 bins throughout Amed region and provides a collection service to a large part of Amed area. About half of these are stationary metal and cement bins,

while the other half are moveable bamboo bins - made by a local guy - that can be used by households or small shops. Throughout the years, the bins have not always been used correctly i.e. people throwing in organics or burning the waste in there. Therefore, Peduli Alam does regular surveys to check if the bins are used properly. If they find that this is not the case, Peduli Alam tries to solve this by finding out who did it and explaining them this is not the purpose of the bins. If people keep throwing in organics or burning stuff after they explained it again and again, Peduli Alam takes away the bins and stops collecting from these places.

Awareness Creation & Upcycling

In their early-phase, Peduli Alam also started doing awareness and prevention campaigns in the local area. This basically means giving presentations at local schools wherein the basic information about waste and recycling is explained (e.g. burning is bad, difference between organic and non-organic). Peduli Alam hands out educational material and shows them how waste should be separated. Additionally, Peduli Alam does upcycling workshop with the kids to make it more fun and make them see the value of waste. These educational initiatives have been going for more than 8 years now and Peduli Alam still visits schools on a monthly basis. This way, Peduli Alam has managed to reach many kids in the area and significantly increased the awareness off the need for proper waste disposal.

Figure 33: Woman sowing waste

Although the two main activities have been the collection service and educational programs, over the years Peduli Alam kept being inventive and diversified its activities. In 2012, Peduli Alam started cooperating with 4 local women to make bags out of plastic sachets by using a fold and weave or sowing technique (*Figure 33)* These plastics sachets are non-valuable waste, as they cannot be recycled because of the aluminium layer they have on the inside. Peduli Alam collects the sachets from local "warungs" (shops) who separate them in return for 20.000 per kilo. Peduli Alam washes the sachets, then sorts them by colour, and then brings them that upcycle them into all sorts of products. In the last 5 years this initiative has further developed and nowadays 14 women are making all sorts of products out of the sachets that are collected in more than 25 warungs. Through this initiative, Peduli Alam shows local people the value of waste and gives them an incentive to change their mind-set. At the same time, they prevent the non-recyclable sachets from being disposed. The women are united in an independent cooperative, through which they sell their plastic products. Peduli Alam pays the women for every bag or item that they make and sells them with profit, that can then be reinvested in the NGO.

Figure 34: Peduli Alam shop

In 2016, Peduli Alam opened a shop along one of the main roads in Amed. Whereas before Peduli Alam only had a facility in the outskirts of Amed, their shop made them more visible and accessible for tourists and this significantly increased their product sales. In the Peduli Alam shop one can find all sorts of upcycled products, such as ashtrays, bracelets, bins and all sorts of bags (*Figure 34*). They also started selling locally produced bamboo straws recently reduce the use of plastic straws. Peduli Alam keeps looking for new ways to upcycle waste. For example, they covered the steps to their shop with bottle caps that they picked up from the beach.

Another example is their use of 'ecobricks', where plastic bottles are packed solid with non-biodegrable waste to make reusable building blocks. Peduli Alam makes ecobricks in their workshops with kids and uses them to make small stools. Additionally, in front of their shop they made a huge bottle shaped statue out of "ecobricks" (*Figure 35*). Another future plan is to start making laptop sleeves out of old wet-suits.

Figure 35: Bottle made out of ecobricks.

Over the years, Peduli Alam has seen the results of their efforts in the local area. Where burning and illegal dumping was omnipresent before Peduli Alam started, nowadays people are increasingly using the Peduli Alam bins and are more aware that they have to keep the area clean to keep the tourists coming. One of the main future plans of Peduli Alam is to install a material recovery facility somewhere in the Amed area. For this they approached the local government, but they have not been very cooperative yet.

Organizational aspects

Peduli Alam is officially registered as an NGO. In its initial phase, Peduli Alam was driven by the strong leadership of Charlotte (Laetita soon stepped back), without whom the whole organization would have never came into being. She managed to raise the needed funds and get the right contacts to set up the organization. Since 2015 a German woman named Heike is the coordinator of Peduli Alam. When Charlotte went back to France, Heike filled up the gap. In the last two years, Heike has been volunteering, kept Peduli Alam running and is of crucial importance to the organization. The leadership of Charlotte and Heike have driven the success of Peduli Alam. Additionally, Peduli Alam still largely depends on the input of volunteers and without them it would be difficult to keep the project running (when visiting there were two French volunteers). This dependency on volunteers and strong leadership are weaknesses as they can easily fall away. This makes the organizational structure somewhat fragile

Figure 36: Plastic sachets sorted by colour.

Peduli Alam has 5 Balinese employees. There is one truck driver and 3 guys working behind the truck. They used to have monthly wages, but this has been changed into a pay per pick up to get the employees more motivated. One Balinese employee helps Peduli Alam with their educational presentations at schools.

The warungs that collect the plastics sachets get paid rp 20.000(€1,50) per kilo of sachets (*Figure 36)* which is extremely high if you compare it to the prices of other plastics (typically 1000- 2000 rp (€0,05-0,10). The woman that make the upcycled bags get paid per bag, of which the price can differ (€3-10)

Because Peduli Alam is located in a remote region, it is more difficult to set up partnerships with other social enterprises. In 2015, Trash Hero Amed was founded, an NGO that does weekly beach clean ups. Peduli Alam has been strongly involved in the initial start-up of Trash Hero Amed, but this intensive cooperation did not last. Both NGOs are now more doing their own thing. Another initiative that has recently started and is

supported by Peduli Alam, is trash to treasure, where local people can bring their waste to the treasure shop in return for a token, with which they can buy products.
For the rest, there are no active organizations in the Amed area that focus on environmental protection or waste management and therefore there are no options for cooperation. If there is a festival or event in Bali that is focussed on waste, Peduli Alam is usually present (e.g. Bali's biggest beach clean-up, sustainable solution festival, sustainable design festival).

For now, Peduli Alam reached its limit of growth. It does not have the capacity to grow any further due to their lack of manpower and resources. Yet, throughout the years Peduli Alam has shown some resilience and managed to reinvent themselves in one way or another. Peduli Alam already serves quiet a big chunk of Bali's east coast with their collection service that is run by a small team. Interestingly, the model of Peduli Alam has been replicated in another area of Bali, where it is also functioning now. This show how replicable the model is.

Institutional & legislative aspects

On their website, Peduli Alam states that they are coordinating with authorities and the department of the environment of Karangesem region. Yet this information seems to be outdated, as Heike explains that at the moment PeduliAlam does not really cooperate with the government. The government accepts the presence of PeduliAlam and is happy to receive any support, but Peduli Alam is not getting anything in return for their help. To build a material recovery facility, Peduli Alam needs a lot of funds. As it will also be beneficial for the government, they hope to set up a PPP or get some financial support, but such an endeavour has not come to fruition yet. There is a smaller dump site in Chulik, which is only 10 km away from Amed. Peduli Alam went there to ask if they could bring their waste to save costs and time, but found that the site was a complete mess. As the people are unwilling to pay for the waste collection, the government does not have enough funds to pay employees to deal with the waste. As a result, the waste is piling up there and they started burning it again. Peduli Alam offered to help manage and run the dumpsite, but the government did not want that. As such, Peduli Alam is trying to cooperate with the government, but has not managed to set up anything meaningful yet. Peduli Alam will keep trying to cooperate with the government, as they expect that it takes patience to accomplish such thing. The government is slowly improving their waste management practices in the area by making their waste pick-up more regularly and placing signs to create awareness.

Financial aspects

Peduli Alam financially sustains itself through donations and the sale of upcycled bags. The donations mainly come from western companies, especially from France. Some bigger companies donate large amounts of money from time to time and this kept Peduli Alam going until now. To get an additional source of income, Peduli Alam started selling their upcycled bags made from sachets (*Figure 33*). With their shop that opened in 2016, they are more visible and easier for tourists to find, resulting in increased sales of products. Through this additional source of income, Peduli Alam can cover more expenses and decreases their dependency on outside funding. PeduliAlam does not get any income from collection service fees or the sale of recyclables. According to Heike, they are not doing this because in their try-outs possible income from this proved to be very little. Despite the income generating activities of Peduli Alam, the NGO is still largely dependent on external funding. Without these grants, it would be hard for Peduli Alam to sustain itself.

Technical aspects

PeduliAlam aims to provide simple, accessible solutions for ineffective waste management practices. Their employees that do the collection shovel the waste onto a tarpaulin and then lift it up in the truck (*Figure 32*). Their separation system is kept simple so that it was easy to use for the local population. The local woman make the upcycled bags with a simple fold and weave technique or basic sowing machines, that they can learn to operate relatively easy. The technology and techniques that Peduli Alam uses are thus appropriate for the local context.

Social aspects

Although Peduli Alam was founded and is largely run by foreigners, Peduli Alam is supported by the local community. Amed is a small locality, so after Peduli Alam was founded their presence soon became well known in the village. PeduliAlam employs 5 local Balinese people themselves, there is a team of 14 Balinese woman making the upcycled bags, there is one Balinese making the bamboo baskets that can be used as bins and 25 warungs collect the plastic sachets. As such, Peduli Alam has been providing sustainable livelihood opportunities for the local population for over 8 years now. Additionally, they educate the local children at the schools in the area. People know that Peduli Alam does a good thing and therefore they accept its presence

Environmental aspects:

Amed is a remote area and therefore there are not a lot of options to dispose of your waste. Due to this lack of alternatives people were dumping and burning their waste. By providing waste bins and a collection service for the poorer parts of the population, Peduli Alam prevented widespread burning and dumping and brings this waste to the landfill. On the landfill in Amlapura, the informal waste pickers pick out some of the recyclables and there is a rudimentary composting facility. Although Peduli Alam tries to upcycle waste in various ways, most of the collected waste ends up in the landfill. Therefore, there certainly are possibilities to enhance the disposal of their waste. If Peduli Alam would have their own MRF, they can improve the separation process and get more of the collected waste recycled. Also, it would save them driving 35 km up and down to the landfill on a daily basis. Although, Peduli Alam reduced the environmental impact of the waste that is being produced, there are possibilities to decrease the amount of waste going into the landfill and further enhance the separation and recycling process.

Conclusion:

Peduli Alam has managed to keep their operations running for over 8 years and has become a widely known presence in Amed Area. It has an almost daily collection service that picks up waste from households and small shops that were previously not served. This way, it prevents a serious amount of waste from being dumped and improperly disposed. Additionally, Peduli Alam has created awareness amongst the local population through their educational programs. While they have tried to cooperate with the government, such a partnership has not come to fruition yet.

Peduli Alam is a good example of an NGO that started selling products to get an additional source of income. So far, they have not been enough to sustain the organization and therefore they are still largely dependent on outside funding. Similarly, the functioning of the organization depends on the input of volunteers.

Nonetheless, Peduli Alam already achieved a lot through this organizational structure in the last 8 years and they keep reinventing themselves. By looking for opportunities and being creative they manage to find accessible solutions for the waste problem. There are still possibilities for Peduli Alam to further expand their operations (MRF) and the model of Peduli Alam is easily replicable, if one can collect the funds to do so.

Saraswati Papers

Paper waste

While plastics are the most visible and worrisome waste flow around the world, paper pollution should not be overlooked. Paper production is still a major cause of worldwide deforestation and its production process can contribute to air and water pollution, through contaminants in waste water and the emission of toxic air pollutants. Furthermore, most of the produced paper still ends up in landfills, while the recycling of paper can be relatively easy. Every ton of paper that gets recycled saves roughly 17 mature trees (The Paper Project, 2017). Indonesia produced more than 10 million tonnes of paper in 2014, while they consumed almost 7 million tonnes in the same year, which amounts to every person in Indonesia consuming 23 kilos per year (FAO, 2014). These numbers suggest that there are opportunities and good reasons to improve paper recycling in Indonesia, especially in Bali where the per capita paper consumption is supposedly higher.

22 years of paper making

In Bali, the opportunity to start a paper recycling company was recognized by Kali, an Australian woman who wanted to do something about Bali's increasing waste problem. Kali moved to Bali in 1994, and after some experimenting in her kitchen and doing a paper making course, she founded Saraswati Paper in 1995 with the support of the Wisnu foundation (an NGO specialized in community resource management).
Kali employed a team of Balinese women and taught them how to make paper by using "an ancient and traditional process of blending, dipping and pressing sheet of paper by hand and hanging it out to dry). While it all started small in Kali's backyard (*Figure 37*), Saraswati Papers has since then evolved into a medium-sized social enterprise.

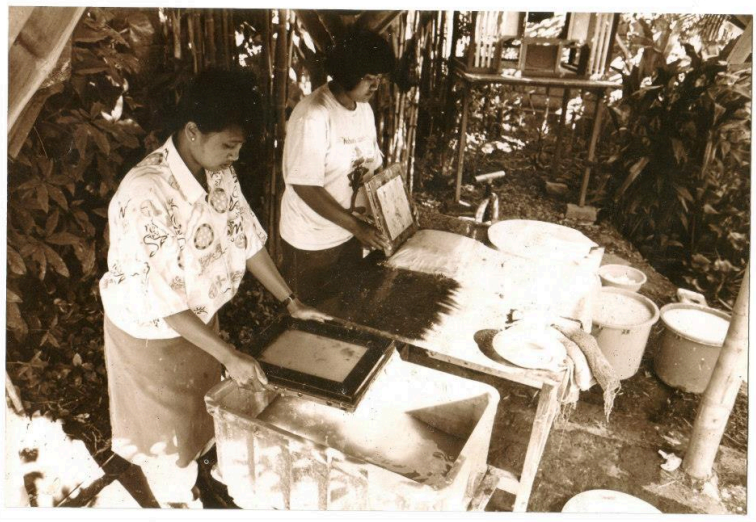

Figure 37: Indonesian woman making paper in 1995

Today, 22 years, later Saraswati Papers still produces handcrafted, 100% recycled paper. Where Saraswati Papers in the beginning only produced basic blank paper, through innovation they have kept evolving their designs and products, to where they now produce a wide variety of paper products. Saraswati Papers can choose the thickness and the structure of the paper, and of course they can also dye it in different colours. But not only that, by using natural materials such as shredded bamboo or flower petals they can make their paper even more unique. They can also fabricate various types of paper or cardboard product packaging, which they can design to a business's specific needs and are sold wholesale. Not only did Saraswati Papers acquire their own paper making factory, they now have two shops in Bali, one in Ubud and one in Kerobokan. In these shops, one can find all sorts of refined cards, boxes, booklets, photo albums and other stationery that are all handmade a. The products are decorated with lush materials such as leather, silk and gold-leaf. Such

delicacies and the fact that its high quality handcrafted recycled paper makes it possible to sell these products, for relatively high prices to niche markets that want chic, environmentally friendly products.

Figure 38: Storage of Saraswati Paper

Saraswati Papers processes around 4 tonnes of paper waste per year, which is very little if you compare it to the amount of waste other social enterprises process. The waste paper that Saraswati Paper processes, comes from various offices, hotels and advertising companies around Bali. Preferably they collect printing paper or paper with little ink, which makes the criteria for the waste wherein the paper has to fit tight. Saraswati Papers does not collect on a monthly or weekly basis, but has runner that arranges pick up when needed or companies can bring their paper waste to Saraswati Paper themselves. They only have a small storage where they have to put all the paper, and they just make sure there is always paper in there (*Figure 38)*

Business strategies

There are various examples of how Saraswati Papers has used innovative products, business strategies and partnerships. For example, they have a partnership with 'Bali Safari & Marine Park" for whom Saraswati makes paper out of elephant poo (which is high in fiber, and perfect for papermaking). Another example is their collaboration with 'Alila hotel group'. Part of Alila's 'zero-waste' program was to deliver their paper waste to SaraswatiPapers to get it recycled into business cards, folders etc. to close the loop. In 2009, Saraswati collaborated with Mars INC. in a sustainability project called MyCocoaPaper where the bark of cocoa trees grown in Sulawesi was turned into paper. Not only does Saraswati Paper thus collaborate with local businesses, they also produce packaging and other paper products for big international companies with CSR programs (when visiting they were making packaging for a lipstick company from the US (*Figure 39.)*. They get orders from the US, Europe, Australia and Asia and more than 80% of what Saraswati Papers nowadays produces is for export. Saraswati paper even produced a commemorative photo book for Obama of his visit to Indonesia, which again shows the variety of activities and projects that Saraswati Paper is engaging in.

Figure 39: Woman making lipstick boxes

Education

Saraswati Paper also tries to include an educational element. The idea is that the women take Saraswati's message of recycling home and spread this message in their communities. About once a month Saraswati Papers gives workshops to local schoolkids. The children learn about the importance of recycling, assist the staff in the paper making process and afterwards take home some of their self-made paper. Saraswati Papers is also mentioned in the Lonely Planet and interested people can do papermaking workshops at the Saraswati factory, where you learnhow to make their own paper or packaging. The workshops are mainly done by tourists and cost 100.000-rupiah pp (±6 euros, discount for groups possible).

Saraswati Paper aims to show people that their waste can become something beautiful and also something viable, and hopefully encourage other businesses to do the same thing. While they also aim to solve Bali's waste problem, the amount of waste they process is very little. Yet, Saraswati Paper does add to solving Bali's waste problem through educational initiatives and showing people the possibilities of recycling. Finally, they sure are an inspirational social enterprise, that uses interesting business models, that has managed to sustain itself and has been promoting recycling for over 2 decades.

Organizational aspects

Saraswati papers is officially registered as a company and employs 20 local, low-educated, Balinese woman. These women work 6 days a week for 8 hours a day, and get the minimum wage and medical insurance. They can get bonuses when have to work overtime or when there are big orders. The company was founded by an Australian woman, whose dedication and enthusiasm has been the driving force behind Saraswati Paper. Nowadays, there are two Balinese assistant managers who are in charge of the day-to-day activities and keep the company running, while Kali is managing more on the background.

Saraswati Papers has few significant collaborations with other social enterprises in Bali's SWM. There network lies more in the business and tourism sector of Bali. In fact, they get orders from companies around the world that want to utilize Saraswati's paper for CSR programs. Through this network, Saraswati Papers has managed to keep growing, their model is very scalable and it seems that the company has not reached its growth limits.

Institutional & legislative aspects

Saraswati Paper has all the needed paperwork to function as a legal company. Saraswati Paper does not work together with the government. According to the Balinese assistant manager the local government of Badung is not really concerned about recycling. The government of Denpasar more so. Saraswati Paper could function without government support and as there was no initiative from the government, a public private partnership never happened.

Financial aspects

Through the years, Saraswati Papers has found inventive strategies to sustain themselves. To begin with, Saraswati Papers has 2 shops in Bali where they sell their recycled paper product. Saraswati Papers generates part of their income by giving workshops to tourists and through partnerships with local business. The most important form of revenue though seems to be orders from international companies. Through these market strategies Saraswati Papers has managed to sustain itself for more than 2 decades without relying on outside funding.

Technical aspects

Saraswati paper uses simple technology to produce their paper products. First, they manually sort the paper based the amount of ink that is on it, so they can choose the darkness of the new paper. They shred the waste paper into pieces, boil it and the they soak it overnight to clean the paper and create pulp. Whereas before they then kneaded this pulp by hand or used a kitchen blender. Nowadays the pulp is thrown in a big blender, to produce a sort of dough of which they can make new paper.
They add starch to determine the thickness and then this dough is hand-pressed on silk screens and put on the front porch to dry in the sun. The recycled paper can then be turned into various paper products and packaging that are also fabricated by hand. The blender is the only electric piece of machinery they use in the production process (the red

Figure 40: Paper making process

machine you see on the left of *Figure 40*) This big blender is produced locally and can easily be replaced or repaired if needed. Saraswati Paper uses low-tech, low-cost technology for the papermaking process, that is suitable for the local context. Most of the other materials for the papermaking process are also locally available, and only some materials are imported from other parts of Indonesia.

Social aspects

Despite the founder being Australian, Saraswati Paper is strongly embedded in the local community. The 20 women that work there are all from the areas around the factory (e.g. Canggu, Mengwi). Saraswati empowers low-educated, local woman by giving them an opportunity to earn an income and learn a craft. At the same time, Saraswati Paper promotes gender equality. Some of the woman that worked for Saraswati Papers have gone on and managed to become school teachers or start up their own small companies.

Environmental aspects

The products of Saraswati Paper are made from 100% recycled paper and they only use organic materials. For the colouring, they use natural dyes and some of the paper is textured by using natural plant fibres, such as bamboo. The ink on waste paper is removed by boiling it overnight, so that they do not have to use any bleaches or chemicals for cleaning the paper. The water that Saraswati uses in their paper making process is carefully saved to be reused again. All this shows that Saraswati Paper tries to make their production process acts environmentally responsible and produces eco-friendly paper. The amount of paper that Saraswati papers prevents from going into the landfill is small as is their influence on effective waste management.

Conclusion:

The amount of waste that Saraswati paper processes can be seen as negligible if you consider the amount of waste that is produced in Bali every day. Nevertheless, Saraswati Papers takes care of the livelihoods of 20 local Balinese woman, they have an environmentally responsible production process and the company promotes recycling in Bali's society. Through the sale of their paper products and partnerships with the business sector, Saraswati Paper has managed to sustain itself over a longer period. As such, Saraswati Papers is a good example of how a social enterprise can survive and grow by using innovative business strategies. The viable business model, strong leadership and social embeddedness can be seen as the factors that made Saraswati Papers a success story.

Niskala

Tri Hita Karana

Bali, known as the island of gods, is famous for its strong cultural and religious traditions. With 83,5% of Bali's population being Hindu (BPS, 2017), one will be amazed by the amount of puras (Balinese Hindu temples) on the island. Interestingly, Bali managed to use tourisms to strengthen and preserve its cultural and religious traditions (Williams, 1998). Many of the Balinese believe in the traditional Tri Hita Karana philosophy that emphasizes balance and harmony. Literally translated, Tri Hita Karana means 'three causes of happiness'. The three elements that create this sense of happiness, safety or well-being are:

- Harmony amongst people
- Harmony with god (or supernatural beings)
- Harmony with nature or the environment

People should have harmonious relationships with other people, with God and with the environment for their own and the general well-being (Peters &Wardana, 2013). The philosophy of Tri Hita Karana can be seen in daily Balinese life. The Balinese are generally regarded as very friendly and helpful people and they seem to live in harmony with each other. Every day, millions of Balinese thank the gods through the Canang Sari, small offerings that can be found in temples and small shrines, but also laying on the ground and in homes around Bali. The Balinese have some major public ceremonies to honour the Gods (e.g Galungan, Kulungan), but also numerous private ceremonies (e.g. during pregnancy, after birth, after a baby is 3 months, weddings, funerals). Although these ceremonies uphold the harmonious relationships amongst humans and between humans and god, at the same time they disrupt the harmonious relationships with the environment because of all the waste that is produced in the ceremonies, but not properly disposed of. This was recognized by two Indonesian guys, Amid and Wisaka, and prompted them to come up with Niskala, a waste management service for ceremonies.

Figure 41: Amid & Wisaka at the UN

The UN

Amid and Wisaka met in February 2017, after they started working together at 'Kembali', the recycling centre of the famous 'Green school' in Bali. They soon realized the opportunity to incorporate the Tri Hita Karana in a waste management service. Through Kembali, Amid and Wisaka already had connections with other social enterprises in Bali and they decided to give it a go. Niskala was founded in March 2017, after Amid and Wisaka pitched their idea and won the 'UN Global Hackaton' in Bali. After defeating the teams that won the Hackatons in Geneva and New York City, they got the chance to present Niskala to the general assembly of the UN as part of UN Sustainable Development Goals Agenda 2030 Goal #12: Responsible for Consumption & Production Patterns (*Figure 41*).

Zero waste ceremonies

Niskala means unseen or abstract in Sanskrit and this is used as a metaphor for the waste problem in Bali. Out of sight, is out of mind and by pretending not to see the problem, there is no problem with the Tri Hita Karana. The idea of Niskala is that people can improve their Tri Hita Karana through zero-waste ceremonies. Through a survey that asked what people do with their ceremonial waste, they found that most of the waste from ceremonies goes to the landfill, while some of it is even being dumped in the river or burned. Niskala did a trial at a wedding, where they provided separation bins so that the waste could be sorted and recycled afterwards. The organic waste will be processed by Bali Compost Crafter, while the recyclables are going to Eco-Bali. Avani Will provide them with Bags to collect the waste in. In its initial stage, Niskala will focus on weddings in Denpasar, the capital city of Bali. Denpasar is chosen because people are usually more aware there and only in Denpasar there are more than 3000 wedding ceremonies each year. Providing a service for such a tangible private ceremony is something Niskala can already organize and through their survey they found that people are interested in paying for such a service. When it concerns a public ceremony, the situation is more complicated. The waste comes from the community and it is thus not always clear who should be charged for the service and the amount of waste is usually a lot bigger. Nonetheless, Niskala hopes to expand its activities to public ceremonies in the future and will try to use their income from private ceremonies to fund a service for public ceremonies.

Figure 42: Canang sari

Niskala is still very much experimenting and searching for the most effective way to deliver their service. In the trial wedding, they found that the people need a supervisor to assist them in the separation process, because people sometimes got confused about the categories. Additionally, in the future Niskala will add an education element to their service by providing infographics and information about waste separation and why this is important in the light of Tri Hita Karana. They will also try to find a solution for the "Canang sari", a daily offering that is made by the Balinese Hindus that nowadays has plastic in it and causes litter on the island (*Figure 42*) Eventually, Niskala also hopes to install separation bins at the temples and involve the high priests, so that they use their influence to promote the importance of waste separation and reduction.

Organizational aspects

Niskala was founded by 2 young Indonesian guys. After Amid and Wisaka first presented their idea in Bali, they soon teamed up with three volunteers that helped them develop their project. Amid and Wisaka already had a network and extensive knowledge about Bali's SWM system thanks to their work for the Green School. As such it was easier for them to set up collaboration. They are already cooperating with EcoBali, Bali Compost Crafters and Avani. Niskala is very open for collaboration:

> *"I think the most important is collaboration with other initiatives. You can just learn a lot from each other and help, so that is why we are also open for that"*

The enthusiasm and network of the founders have been crucial in the initial success of Niskala. At the moment, Niskala is still a social initiative, but they are in the process of becoming a company. At first, the focus will be on Denpasar, but the model is very scalable and if it is a success, they will try to expand their service to the whole of Bali.

Institutional & legislative aspects

Niskala is not cooperating with the government yet. They indicate that it is complicated to work with the government because there are so many layers. Niskala is still al small-scale initiative and the goal was to start it up fast, which is more difficult when cooperating with the government. In 1 year, they might start trying to work with the government, but for now they want to keep it their own small project.
Niskala won a competition which gave them a chance to present their initiative to the general assembly United nations as part of the UN Sustainable Development Goals Agenda 2030. Niskala received very positive feedback at this event, though it is not sure if this support of the UN will give them any benefits in the long run.

Financial aspects

Niskala was started with some initial funding, but eventually the waste management service for ceremonies has to become self-sustaining by charging a fee of 30 to 60 euros for a private ceremony, depending on the amount of waste. Niskala did a survey in which they asked if people are willing to pay for a ceremonial waste service. They found that 90% of the respondents is willing to pay. The amount they wanted to pay was between 300.000 and 1 million rupiah (25 to 80 euro). It thus seems that there is a market for a ceremonial waste service in Bali. Their focus is on middle and high-class Balinese that are environmentally aware.

Technical aspects

Niskala will only focus on the collection and separation of the waste, the treatment of the waste will be outsourced. The Balinese population at weddings and public ceremonies have to separate their waste themselves. Niskala did one trial at a wedding where the waste was divided into paper, plastic materials, plastic cups (240 ml aqua cups), organics and residue. At the Green School, Amid and Wisaka work with 21 different categories, so compared to this the 5 categories at weddings are not so much. Yet, it was already found that these categories were confusing and that somebody from Niskala should assist the wedding guests in the separation process. It has to be seen how many categories will be there in the future. They might reduce the amount of waste categories eventually to make it easier for people to separate.

Social aspects

The two founders are both Indonesian, one is born in Sulawesi, while the other one is Balinese.
Niskala is strongly embedded in and specifically designed for the local context. It uses Bali's strong cultural and religious tradition to create awareness about the waste problem and promote source separation. Religion might be a vehicle to mobilize the local population and create the needed awareness to get the communities to start changing their waste disposal habits. Since the message of Niskala is difficult to refute by the Balinese because it is part of their tradition, it can be said that Niskala is supported by the local community and local context. The social aspect is a main success factor of Niskala.

Environmental

The aim of Niskala is to prevent as much ceremonial waste as possible from going into the landfill, by transferring the ceremonial waste to recycling companies. They try to separate the waste in 5 different categories to optimize the recycling process. If Niskala manages to upscale their operations they can prevent a significant flow of waste from going into the landfill.

Conclusion

According to Tri Hita Karana, a good relationship between humans and the environment should be upheld for everyone's well-being. This message is huge by Niskala to prevent the Balinese from destroying the environment by littering, illegally dumping and burning their waste. Niskala thus builds on a strong religious tradition, which gives the organization the potential to have a large impact on the waste disposal habits of the Balinese. The main success factors of Niskala is this social embeddedness of its core principles. Additionally, the strong leadership, expertise and networking abilities of Niskala's two founders have fostered the initial success of Niskala. Since Niskala only started a couple of months ago, it is not possible to do any definite statements about its effectiveness.

11. Conclusion

In this chapter, the key findings of this research will be described. First, the results of the analysis will be summarized and to conclude the main research question will be answered.

The characteristics of the social enterprises
Most of the social enterprises included in this research were founded in the last 5 years. This suggest that social entrepreneurship has been booming in recent years and that there has been more attention for Bali's waste problem. Most of the social enterprises are officially registered as companies. A company can be regarded as the most effective legal structure to address collection and waste treatment issues, as the NGO included in this research had significant weaknesses. The social enterprises were mostly micro- and small-sized enterprises. Micro-and small-scale enterprises are appropriate for Bali's context because they require little initial investment, manpower and planning. The three medium-sized enterprises have shown that it is possible to upscale the operations of a social enterprise through a viable business model and effective organizational structure. The social enterprises in Bali's SWM system have very saleable and replicable models. The scalability of the project is very important for the effectiveness of a social enterprise, because this makes it possible to increase its impact. If a social enterprise cannot grow or is not replicable, it does not provide a real solution for ineffective SWM systems in developing countries. The main limitations that prevented the social enterprises from upscaling were the lack of funds and the lack of manpower. The spatial focus of most of the social enterprises was on a village or regional level of Bali, while the medium-sized enterprises expanded their focus to the international market. The goal of all social enterprises in this study is to find solutions for Bali's waste problem. For most of the social enterprises this social goal was prominent, while profit making was subordinate or non-existent. Yet, there were some social enterprises that tried to make profits, but this was difficult in the context of Bali.

The activities and income sources of the social enterprises
The activities and solutions that the social enterprises propose for ineffective waste management practices are various. To begin with, social enterprises can play a role in educating local communities about the importance of responsible waste management. Social enterprises have been giving educational programs and presentations at local schools to educate the next generation about waste management. Also, social enterprises have been educating local communities about the need for source separation. Local communities in Bali nowadays rarely separate their waste, due to a lack of awareness and lack of infrastructure to do so. Source separation is extremely important for the further functioning of SWM systems and that is recognized by the social enterprises in Bali. Most of the social enterprises try to implement easy understandable separation strategies whereby the organics have to be separated from the non-organics. The promotion of source separation makes it possible for the social enterprises to collect the waste separated. While the government collection services usually only collect from the main roads and from paying customers, the social enterprises try to serve poorer parts of the population and areas that else would not have any collection service available

By introducing separation strategies and collecting waste separated, the social enterprises can more easily recycle the non-organic waste and make compost out of the organic waste. The waste flow in Bali still consists largely of organic materials and this is clogging up the landfills.

The possibilities to increase composting practices in developing countries have been recognized by the social enterprises in Bali's SWM system. The social enterprises make compost through the use of simple machinery, which makes it possible to process larger amounts of organic waste than the rudimentary composting facilities of the local governments. Also, the social enterprises are finding new purposes for the compost by providing it to local farmers to use as a fertilizer.

The social enterprises are utilizing and experimenting with innovative treatment methods to reuse, recycle or recover waste. The social enterprises take the waste hierarchy into account and realize that landfilling is the least preferred waste disposal method. Therefore, they try to focus on the reducing, reusing, recycling and recovery to reduce the amount of waste going into landfills. The failure of the WtE plant that was build next to Bali's biggest landfill suggest that expensive, high-tech equipment is not suitable for Bali. Since most of the social enterprises are relatively small and do not have a large budget, they are using inexpensive, low-tech small-scale technologies that are more appropriate for Bali. There are some social enterprises that are experimenting with more-sophisticated technology to treat waste, but because of their small-scale these technologies are still deemed appropriate. These more-sophisticated technologies can possibly provide a solution for the treatment of non-valuable waste. The upcycling of waste by social enterprises can provide livelihood opportunities for the local population and can create awareness about the value of waste. The treatment methods of the social enterprises show their resourcefulness and these solutions can help with innovating the SWM system of Bali.

The social enterprises use different income models to sustain themselves. All the social enterprises try to sell products or services to generate a reliable source of income, yet often these activities are not enough to sustain their operations. Therefore, most social enterprises use hybrid income models and still rely on outside funding. This makes their business model vulnerable. Many of the social enterprises experienced difficulties in sustaining their operations and therefore tried all sorts of ways to generate income. Despite such inventive endeavors, lack of funds was still a main limitation for the social enterprises.

The collaborations of the social enterprises

There is widespread cooperation between social enterprises and NGOs involved in Bali's SWM system. Such collaborations can improve the functioning and effectiveness of the social enterprises. By sharing resources and knowledge the social enterprises can increase their impact. While most of the social enterprises have partnerships with other social enterprises and NGOs, this study clarified that there are certainly possibilities to further enhance the collaboration between the social enterprises. It was found that many of the social enterprises do not even know of each other's existence despite them having complimentary activities. The collaboration between the social enterprises was hindered by distance, different approaches, available time and funds, ego and, most importantly, the lack of communication and coordination. A network that promotes and facilitates cross-sector collaborations has huge potential to improve coordination, communication and cooperation between the social enterprises.

Although three social enterprises managed to set up a PPP, this seems to be more of an exception since the other social enterprises found it difficult to set up a PPP. In general, there was little willingness from the governments side to set up active partnerships with the social enterprises and they were lacking the funds and skills to do so. Additionally, there is not always an incentive for social enterprises to set up a partnership with the government and therefore this was not always pursued. At the same time, it was found that PPP can foster innovation and

can improve the effectiveness of a government-led waste management system. PPP surely has the potential to benefit both the social enterprise and government and there are good reasons to try to enhance this in the future.

Besides collaboration with the social enterprises and governments, the social enterprises also have inventive collaborations with the business sector. This can be tourism related businesses in Bali, but also international companies that want to improve their CSR. Also, the social enterprises are cooperating with educational institutions. There are social enterprises that cooperate primary schools, with high schools and with a university. While most social enterprises recognize the huge importance of the informal sector waste pickers, there is little cooperation between the social enterprises and the informal sector. Only one social enterprise was trying to organize the informal sector and therefore there surely are possibilities to enhance the collaboration between the social enterprises and the informal sector. In general, it can be concluded that the collaboration within Bali's SWM system is not optimal yet. Enhancing the collaboration can significantly improve the effectiveness of Bali's SWM system.

The performance and functioning of the social enterprises

The case studies have shown that effective leadership is extremely important for the functioning of the social enterprises. This dependency on the strong leadership makes the social enterprises vulnerable, because if the leader falls away the whole social enterprise might collapse. The strong leadership of the social enterprises is an important success factor, yet at the same time it is a weakness. To create an effective social enterprise, it is important to have partnerships. This can be with businesses, governments, educational institutions or other waste management companies. It can be concluded that it is very important for a social enterprise to have a well-functioning organizational structure. A strong foundation is needed to be able to effectively address the social goal and if this is missing the social enterprise is vulnerable. Most of the social enterprises do not get any support from the government. Since the social enterprises can function without the support of the government, this is not deemed necessary for a successful social enterprise. On the other hand, the 3 PPP's that were established have proven to be beneficial for both the government and the social enterprise. Having the support of the government can be seen as a success factor, while not having the support is not directly a weakness for a social enterprise.

Throughout this study it became clear that the lack of funds is a limitation that is preventing the social enterprises from further expanding and increasing their impact. The reliance of most social enterprises on outside funding makes their business model vulnerable. If a social enterprise manages to sustain itself completely through the sale of products or services, this improves its functioning and effectiveness. It can be concluded that having a viable business model and being able to generate sufficient income is another important success factor for the social enterprises.

The majority of the social enterprises favored low-tech, low cost technology that could easily be used by local employees. Such technologies have proven to be more effective in Bali than imported, expensive, large-scale technologies. It can be concluded that the appropriate technology was a success factor of the social enterprises. The social enterprises are usually well-embedded in the local communities. The social enterprises provide employment for the local population and this obviously gives them the support of the local communities. Community ownership and religion are other vehicles that can be used to get the support of a local community. The support of the local community is an important aspect that can foster the success of a social enterprise. Similarly, community participation helps increasing the

effectiveness of the social enterprise. The social enterprises take their environmental impact sufficiently into account. The social enterprises try to avoid waste from going into landfills, while they promote recycling and composting. While their environmental performance is usually good, this does not directly determine the success of a social enterprise. Here, it only determined its effectiveness in solving Bali's waste problem.

Final verdict

In conclusion, the research question of this study will be answered:

> *How can social entrepreneurship add to effective solid waste management and how do the characteristics and enabling aspects influence the functioning of the social enterprises involved in Bali's SWM system?*

As the analysis has shown, the social enterprises add to effective solid waste management in Bali by providing solutions for various waste issues. The social enterprises in Bali fill service delivery gaps left by the government and bring innovation and expertise into the SWM system. They provide inexpensive small-scale solutions that are adapted to the local context and are more effective than current waste management practices. This way, Bali truly has become a laboratory that showcases possible solutions for waste management problems. Yet, at the moment the social enterprises are still working in the margin. In this respect, a quote of one of the interviewees says everything:

> "Here in Bali, I am always amazed at how much is being done. At the same time, I am also amazed that you cannot really see the effects."

While the social enterprises already provide solutions, they have to upscale their operations to really start making a difference. The lack of funds and manpower is preventing the social enterprises from upscaling their operations. If the social enterprises would receive more funds and support from governments and businesses, they can expand their operations and increase their impact. This way social entrepreneurship could reach its full potential and seriously increase the effectiveness of SWM systems.

The main success factors of the social enterprises are the financial and organizational aspects. If a social enterprise has the ability to generate enough income, it can grow and tackle the waste problems more effectively. Similarly, an effective organizational structure is needed to make the social enterprise function productively and decrease its vulnerability for setbacks. The other enabling aspects can foster the functioning of a social enterprise, but do not seem to be necessary conditions for establishing a successful social enterprise. Although government support, community support and appropriate technology can improve the functioning and effectiveness of a social enterprise, this is not impermeable. The social enterprises in Bali's waste management system have shown innovativeness and creativity to provide alternatives for the business as usual that has caused Bali's waste problem. While it is impossible to provide a blueprint for an effective SWM system, it is possible to learn from effectively functioning social enterprises. By showing the huge potential of social entrepreneurship for SWM systems, this study provides solutions for ineffective waste management practices in developing countries and helps tackling one of the most pressing issues of today's world.

12. Discussion

Like most areas in developing countries, the government-led waste management system of Bali is ineffective. The waste law that was implemented in 2008 by the national government of Indonesia to decentralize waste management has not been working effectively. The local governments lack the financial means and organizational capacity to deliver proper waste management services. The government prioritizes other issues and corruption amongst government agencies is widespread. As a result, large amounts of waste remain uncollected, are illegally dumped or randomly burned. The local Balinese population is often unaware of the negative impacts of their disposal habits, there is little source separation and the poorer parts of the population are unwilling to pay collection fees. The waste that is picked up by the government is disposed of in landfills, that are unsanitary and are reaching their maximum capacity. The government of Bali has cooperated with a private company to enhance the situation at Bali's biggest landfill and recover waste from the energy, yet this endeavor has been a complete disaster due to inappropriate technology that costed the government huge amounts of money. As such, Bali's waste problem is still increasing and there is a rapid need for appropriate solutions to keep the tourism industry alive and reduce the negative environmental and health impacts. This study on SWM in Bali confirms the findings of Meidiana & Gamse (2010) that the implementation of Waste Management Law No. 18/2008 by local governments has not been successful due to financial shortages and weak enforcement.

Because of the lacking government-led waste management system, all sorts of social enterprises are nowadays involved in every aspect of Bali's SWM system. Yet, little is known about how these social enterprises function and how they add to effective SWM management. Therefore, the aim of this study was:

> *To clarify the characteristics and activities of the social enterprises involved in Bali's SWM system and to analyze how different institutional, organizational, financial, technical, social and environmental aspects influence the functioning of these social enterprises.*

This study on social entrepreneurship in Bali's SWM system added to the literature in two ways. Firstly, it added to the literature on social entrepreneurship. Social entrepreneurship is still a relatively new concept and there are few studies that have researched social entrepreneurship empirically. This study has shown what role social entrepreneurship can play within a specific sector (waste management). It increased our understanding of the functioning of social enterprises and showed how resourceful these social enterprises are in pursuing their social goal and generating income. Additionally, it has shown how social enterprises are innovative and try to change the business as usual of governments and business. This study has also shown the wide variety of organizations that can be typified as social enterprises and that these organizations can have widely differing characteristics. A social enterprise does not necessarily have to be a company, it can also be an NGO or CBO. The only requirement is that they meet the 3 characteristics that typify social entrepreneurship (social goal, innovativeness & market orientation). There has been a lot of theoretical debate about the definition of social entrepreneurship and this will probably go on because it is such a complex phenomenon that is difficult to capture in a single definition. This study has shown that the definition chosen ("market oriented initiatives pursuing social aims in an innovative way") is useful because it includes a wide variety of organizations, yet at the same time excludes a lot, mainly because of the market orientation. Yet, there is a thin line between what is a social enterprise and what not, and therefore we should use the concept with considerate flexibility.

Secondly, this study added to the literature on waste management. It has been argued that more case studies are needed to further our understanding of the complex SWM systems in developing countries. More specifically, the role of the private sector in SWM systems in developing countries needed to be further clarified. Therefore, this research clarified the role that social enterprises play in Bali's SWM system. It has confirmed the idea that private sector involvement and PPP can improve SWM systems in developing countries. Yet, it also confirmed the idea of Ahmed & Ali (2006) that governments are usually not receptive for cooperation with the private sector because they have little incentive to change the business as usual and do not have the funds and skills to implement innovative approaches. More generally, this study confirmed that collaboration between all stakeholders can improve SWM systems, but that this collaboration and coordination is usually lacking in developing countries

This study has also shown that social enterprises can play a valuable role in every facet of SWM and can fill important service delivery gaps that are left by the government. Although waste collection has traditionally been the responsibility of the public authorities, this study has shown that social enterprises can fulfill an important role in this respect. This confirms the idea of Sharholy et al., (2008) that involving micro enterprises and NGOs can improve the efficiency of collection services. Additionally, the idea of Wilson et al., (2013) that polluter pays principles are inappropriate for developing countries is confirmed, as is his argument that poorer parts of the population and more remote areas are often unserved by waste collection services. The local communities in Bali rarely separate their waste due to a lack of awareness, which is in line with other studies. Sharholy et al., (2008) already found that there is little source separation in developing countries, while Guerero et al., (2013) argued that there is little source separation due to a lack of awareness and knowledge. Most of the social enterprises in Bali try to implement easy understandable separation strategies whereby the organics have to be separated from the non-organics. This is the most common separation strategy in developing countries (Hoornweg & Bhada-Tata, 2012). In general, community participation helped increasing the effectiveness and functioning of Bali's SWM system and this is in line with the literature that regards community participation as a possible solution for ineffective waste management (Bolaane, 2006; Henry et al., 2006)

This study confirmed the idea that governments play a relatively small role in recycling, while the informal- and private sector play a large role. Additionally, this research has shown that there are relatively simple alternatives for the traditional way that SWM systems are functioning. While MacRae (2012) argued that the most successful models are intermediate in scale, these are not easy to set up and it might be more feasible to gradually work from a microenterprise towards a medium-sized enterprise. Micro-and small-scale social enterprises might be more appropriate for developing countries because they require little initial investment, manpower and planning. The social enterprises in this research provided small-scale, low-cost solutions that are appropriate for developing countries and can help the waste management sector with innovating and becoming more effective. The waste flow in Bali still consists largely of organic materials and this is clogging up the landfills, just like in many other developing countries (Hoornweg & Bhada-Tata, 2012). As noted by Troschinetz & Mihelic (2009), there are huge possibilities to increase composting practices in developing countries and this was done by the social enterprises in Bali's SWM system. While Hoornweg & Bhada-Tata (2012) questioned how widespread the usage of innovative treatment methods is, this study has shown that social enterprises try to introduce small-scale recycling, reusing and recovery practices. The failure of the WtE plant that was build next to Bali's biggest landfill confirms the argument of Wilson et al., (2013) that sophisticated high-cost equipment is not suitable for developing countries where funds and expertise are usually absent.

Finally, this research has confirmed that the assessment tool of Zurbrugg (2013) is suitable for a rapid assessment of waste management projects. The set of tools he developed forms a good basis for an analysis and can be adapted to one's own needs. The examples of the social enterprises involved in Bali's SWM system that are described here can provide valuable lessons about their functioning and can be compared with social enterprises in a different local context. Additionally, they can provide inspiration for people who want to do something about the ever-increasing waste problem.

Further research

As explained, this research has shown that social entrepreneurship can be a solution for ineffective SWM practices. More research is needed in different local contexts to confirm this idea. Bali is an island with a high degree of tourism and this makes its situation very peculiar. This research should be seen as an exploratory research that examines the wide variety of social enterprises that can be involved in SWM systems in developing countries. As explained, for this research 35 social enterprises were interviewed and it is difficult to acquire detailed information about such a large amount of social enterprises. Further research can focus on more detailed descriptions of social enterprises. Such a study can verify the results that are found in this study. Additionally, this study did not include the view of the government on the social enterprises in Bali's SWM system. Future studies can try to talk to the government to get their view on social enterprises. Another interesting topic for further research can be the effect of government policies on waste management. Multiple social enterprises stated that the SWM system of Bali's capital city Denpasar was more effective than the SWM system of other regencies because the government of Denpasar actively tried to improve the system. A comparison between government policies in different regencies might give interesting results.

Recommendations

Based on this study, it can be argued that the local governments of Bali should try to further encourage social enterprises to enter the SWM systems by giving them incentives. Nowadays, the laws and policies of the government do not improve the functioning of the social enterprises. Furthermore, there should be more monitoring of the performance of local SWM system. While decentralization can be an effective policy measure, there is monitoring needed to check how this is working in practice. At the moment, there is no overarching structure that can guide local governments in their waste management strategies. Hopefully the new waste management policy that is currently being drafted by the Indonesian government will provide more specific guidelines on how to implement these strategies and on how local SWM systems can be strategically improved.

To conclude, some final recommendation for social enterprises in SWM systems of developing countries will be given. Social enterprises should always keep their social goal in mind and pursue this with everything they have. This way, it is possible to achieve a lot with little money and manpower. While governments might be reluctant to cooperate at first, through perseverance the government might become convinced. Always keep an eye out for possible collaborations since this can significantly improve the functioning of the social enterprises and the SWM system. Furthermore, it is important for social enterprises to have a viable business model and this should be calculated upfront. Depending on outside funding is not recommended, as the availability of such funds is decreasing. Social enterprises should try to get the support of the local communities by providing them with employment or other benefits. Furthermore, try to keep the technology simple and affordable, because this is deemed most appropriate for the context of developing countries. Finally, social enterprises have to keep being innovative and creative, because this is what they do best. We need a lot of good ideas to be able to save this world from drowning in waste.

13. References

Abu-Saifan, S. (2012). Social entrepreneurship: definition and boundaries. *Technology Innovation Management Review*, *2*(2).

Ahmed, S. A., & Ali, M. (2004). Partnerships for solid waste management in developing countries: linking theories to realities. *Habitat international*, *28*(3), 467-479.

Ahmed, S. A., & Ali, S. M. (2006). People as partners: Facilitating people's participation in public–private partnerships for solid waste management.*Habitat International*, *30*(4), 781-796.

Arif, S. A. (2016) Landfill (or dumpsite?) Suwung for regional Sarbagita, Bali. Retrieved from: http://www.balifokus.asia/single-post/2016/04/27/LANDFILL-or-DUMPSITE-Suwung-for-Regional-Sarbagita-Bali

Asase, M., Yanful, E. K., Mensah, M., Stanford, J., &Amponsah, S. (2009). Comparison of municipal solid waste management systems in Canada and Ghana: A case study of the cities of London, Ontario, and Kumasi, Ghana.*Waste Management*, *29*(10), 2779-2786.

Austin, J., Stevenson, H., & Wei-Skillern, J. (2006). Social and commercial entrepreneurship: same, different, or both?. *Entrepreneurship theory and practice*, *30*(1), 1-22.

Belanger, J. (2013) The plastic to oil machine. *Alternatives journal.* Retrieved from: http://www.alternativesjournal.ca/science-and-solutions/plastic-oil

Bhattacharya, S. C., & Salam, P. A. (2002). Low greenhouse gas biomass options for cooking in the developing countries. *Biomass and Bioenergy*, *22*(4), 305-317.

Bolaane, B. (2006). Constraints to promoting people centred approaches in recycling. *Habitat International*, *30*(4), 731-740.

Bornstein, D., & Davis, S. (2010). *Social Entrepreneurship: What Everyone Needs to Know?*. Oxford University Press.

BPS (2017) BadanPusatStatistikProvinsi Bali. Retreived from: https://bali.bps.go.id

Brønn, P. S., &Vrioni, A. B. (2001). Corporate social responsibility and cause-related marketing: an overview. *International journal of Advertising*, *20*(2), 207-222.

Bruce, A., &Storey, D. (2010). Networks of waste: Informal economic systems and sustainability in Bali, Indonesia. *Local Economy*, *25*(3), 176-189.

Clean Development Mechanism Project Design Document (CDM-PDD) (2007). PT Navigat Organic Energy Indonesia Integrated Solid Waste Management (GALFAD) Project in Bali, Indonesia

Chakrabarti, S., Majumder, A., & Chakrabarti, S. (2009). Public-community participation in household waste management in India: An operational approach. *Habitat International*, *33*(1), 125-130.

Dacin, P. A., Dacin, M. T., &Matear, M. (2010). Social entrepreneurship: Why we don't need a new theory and how we move forward from here. *The academy of management perspectives*, *24*(3), 37-57.

Dees, J. G. (1998). The meaning of social entrepreneurship.

Diaz, L. F., Savage, G. M., & Golueke, C. G. (1996). Sustainable community systems: the role of integrated solid waste management. In: International Madison Waste Conference Municipal and Industrial waste (pp. 280-291). Department of engineering professional development.

Eden, R. (2007) Integrated solid waste management project in Bali, Indonesia - unfccccdm project 0938

Food and Agriculture organization of the United nations (2014). Forest Products, 2010-2014, 144-223)

Gaia, (2010). Dodgy deals: CDM incinerator case Galfad, Bali, Indonesia, 1-3.

Gerdes, D. (2005) Case Studies in Community-Based Solid Waste Management Bali, Indonesia.

Guerrero, L. A., Maas, G., & Hogland, W. (2013). Solid waste management challenges for cities in developing countries. *Waste management*, *33*(1), 220-232.

Halla, F., & Majani, B. (1999). Innovative ways for solid waste management in Dar-Es-Salaam: toward stakeholder partnerships. *Habitat International*, *23*(3), 351-361.

Henry, R. K., Yongsheng, Z., & Jun, D. (2006). Municipal solid waste management challenges in developing countries–Kenyan case study. *Waste management*, *26*(1), 92-100.

Herder, K. & Larsson, K. (2012) The growing piles of waste on Bali; A problem or an opportunity to make money. University of Gothernburg.

Hoornweg, D. & Bhada-Tata, P. (2012), 'What a Waste: A Global Review of Solid Waste Management', *Urban Development Series - Knowledge Papers,* No. 2.

Hopewell, J., Dvorak, R., & Kosior, E. (2009). Plastics recycling: challenges and opportunities. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, *364*(1526), 2115-2126.

Huber, E., &Solt, F. (2004). Successes and failures of neoliberalism. *Latin American Research Review*, *39*(3), 150-164.

Hultman, J., & Corvellec, H. (2012). The European Waste Hierarchy: from the sociomateriality of waste to a politics of consumption. *Environment and Planning A*, *44*(10), 2413-2427.

Huybrechts, B., & Nicholls, A. (2012). Social entrepreneurship: definitions, drivers and challenges. *Social entrepreneurship and social business*, 31-48.

IWP (2017). Indonesian Waste Platform, About us. Retrieved fromhttp://www.indonesianwaste.org/en/home/.

Joseph, K. (2006). Stakeholder participation for sustainable waste management. *Habitat International*, *30*(4), 863-871.

Johnson, S. (2000). Literature review on social entrepreneurship. Canadian Centre for Social Entrepreneurship, 1-16.

Kaddafi, M. (2012) Sampah di Bali: SetiapTahun, Rp4.015.000.000.000,-TerbuangPercuma. Retrieved from: http://jejakmantra.blogspot.nl/2012/07/sampah-di-bali-setiap-tahun.html

Kristianto, F. (2016). Dalam 1,5 Tahun, Jumlah Sampah Plastik di Bali Hanya Berkurang 0,1%. Retrieved from: http://kabar24.bisnis.com/read/20161009/78/590804/dalam-15-tahun-jumlah-sampah-plastik-di-bali-hanya-berkurang-01

Kushnir, K., Mirmulstein, M. L., & Ramalho, R. (2010) How Do Economies Define Micro, Small and Medium Enterprises (MSMEs)? Companion note for the MSME country indicators. World Bank/IFC.

Lazarevic, D., Aoustin, E., Buclet, N., & Brandt, N. (2010). Plastic waste management in the context of a European recycling society: comparing results and uncertainties in a life cycle perspective. *Resources, Conservation and Recycling*, *55*(2), 246-259.

MacRae, G. (2012). Solid waste management in tropical Asia: what can we learn from Bali?. *Waste Management & Research*, *30*(1), 72-79.

MacRae, G., & Rodic, L. (2015). The weak link in waste management in tropical Asia? Solid waste collection in Bali. *Habitat International*, *50*, 310-316.

Marshall, R. E., & Farahbakhsh, K. (2013). Systems approaches to integrated solid waste management in developing countries. *Waste Management*, *33*(4), 988-1003.

Martin, R. L., & Osberg, S. (2007). *Social entrepreneurship: The case for definition* (Vol. 5, No. 2, pp. 28-39). Stanford: Stanford social innovation review.

Meidiana, C., & Gamse, T. (2010). Development of waste management practices in Indonesia. *European Journal of Scientific Research*, *40*(2), 199-210.

Meidiana, C., & Gamse, T. (2011). The new Waste Law: Challenging opportunity for future landfill operation in Indonesia. *Waste Management & Research*, *29*(1), 20-29.

Merrild, H., Larsen, A. W., & Christensen, T. H. (2012). Assessing recycling versus incineration of key materials in municipal waste: the importance of efficient energy recovery and transport distances. *Waste management*, *32*(5), 1009-1018.

Morrissey, A. J., & Browne, J. (2004). Waste management models and their application to sustainable waste management. *Waste management*, *24*(3), 297-308.

Ngoc, U. N., & Schnitzer, H. (2009). Sustainable solutions for solid waste management in Southeast Asian countries. *Waste management*, *29*(6), 1982-1995.

Ocean Conservancy (2017). The Next Wave: investment strategies for plastic free seas.

Ocean Conservancy (2015). Stemming the Tide: Land-based strategies for a plastic-free ocean

Papargyropoulou, E., Lozano, R., Steinberger, J. K., Wright, N., & bin Ujang, Z. (2014). The food waste hierarchy as a framework for the management of food surplus and food waste. *Journal of Cleaner Production*, *76*, 106-115.

The Paper Project (2017) Paper facts & Trivia. Retrieved from: http://paperproject.org/paperfacts.html

Pariatamby, A., & Tanaka, M. (2014). Municipal solid waste management in Asia and the Pacific Islands. *Environmental Science, Springer, Singapore*.

Pitana, I. (2010). Tri Hita Karana–the local wisdom of the balinese in managing development. *Trends and Issues in Global Tourism 2010*, 139-150.

Peredo, A. M., & McLean, M. (2006). Social entrepreneurship: A critical review of the concept. *Journal of world business*, *41*(1), 56-65.

Peters, J. H., & Wardana, W. (2013). *Tri hitakarana: The spirit of Bali*. KepustakaanPopulerGramedia (KPG).

Rathi, S. (2006). Alternative approaches for better municipal solid waste management in Mumbai, India. *Waste Management*, *26*(10), 1192-1200.

Rothbauer, P. (2008). Triangulation. 893-894

Rouse, C. J. (2008). Planning for sustainable municipal solid waste management. *Appropriate Technology*, *35*(3), 65.

Sharholy, M., Ahmad, K., Mahmood, G., & Trivedi, R. C. (2008). Municipal solid waste management in Indian cities–A review. *Waste management*, *28*(2), 459-467.

Shekdar, A. V. (2009). Sustainable solid waste management: an integrated approach for Asian countries. *Waste management*, *29*(4), 1438-1448.

Song, J. H., Murphy, R. J., Narayan, R., & Davies, G. B. H. (2009). Biodegradable and compostable alternatives to conventional plastics. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, *364*(1526), 2127-2139.

Tang, J. (2004). A case study of a hotel solid waste management program in Bali, Indonesia.

Temesi Recycling. (2017). Waste banks. Retrieved from: http://temesirecycling.com/waste-banks/

The Conversation (2017a).Indonesia vows to tackle marine pollution. Retrieved from: https://theconversation.com/indonesia-vows-to-tackle-marine-pollution-74038

The Conversation (2017b) How can Indonesia win against plastic pollution? Retrieved from: https://theconversation.com/how-can-indonesia-win-against-plastic-pollution-80966

The Guardian (2017) Indonesia pledges $1bn a year to curb ocean waste. Retrieved from: https://www.theguardian.com/environment/the-coral-triangle/2017/mar/02/indonesia-pledges-us1-billion-a-year-to-curb-ocean-waste

Troschinetz, A. M., &Mihelcic, J. R. (2009). Sustainable recycling of municipal solid waste in developing countries. *Waste management*, *29*(2), 915-923.

Van Ewijk, S., & Stegemann, J. A. (2016). Limitations of the waste hierarchy for achieving absolute reductions in material throughput. *Journal of Cleaner Production*, *132*, 122-128.

Van de Klundert, A., &Anschütz, J. (2001). Integrated sustainable waste management–the concept. *WASTE, Gouda, The Netherlands*.

Volkmann, C., Tokarski, K., & Ernst, K. (2012). Social entrepreneurship and social business. *An Introduction and Discussion with Case Studies. Gabler. Wiesbaden*.

WASTE (2017). *Our approach. Integrated Sustainable Waste management.* Retrieved from: www.waste.nl/en/our-approach.

Willmott, L., &Graci, R. S. (2012). Solid waste management in small island destinations: a case study of GiliTrawangan, Indonesia. *Téoros. Revue de rechercheentourisme*, *31*(31, 3 (HS)).

Wilson, D. C., Velis, C., & Cheeseman, C. (2006). Role of informal sector recycling in waste management in developing countries. *Habitat international*,*30*(4), 797-808.

Wilson, D. C., Velis, C.A., &Rodic, L., (2013). Integrated sustainable waste management in developing countries. *Proceedings of the Institution of Civil Engineers*, *166*(2), 52.
World Factbook (2017). Indonesia. Retrieved from: https://www.cia.gov/library/publications/the-world-factbook/geos/id.html

Zahra, S. A., Rawhouser, H. N., Bhawe, N., Neubaum, D. O., & Hayton, J. C. (2008). Globalization of social entrepreneurship opportunities. *Strategic entrepreneurship journal*, *2*(2), 117-131.

Zahra, S. A., Gedajlovic, E., Neubaum, D. O., & Shulman, J. M. (2009). A typology of social entrepreneurs: Motives, search processes and ethical challenges. *Journal of business venturing*, *24*(5), 519-532.

Zurbrügg, C., Drescher, S., Patel, A., &Sharatchandra, H. C. (2004). Decentralised composting of urban waste–an overview of community and private initiatives in Indian cities. *Waste management*, *24*(7), 655-662.

Zurbrügg, C., Gfrerer, M., Ashadi, H., Brenner, W., &Küper, D. (2012). Determinants of sustainability in solid waste management–The Gianyar Waste Recovery Project in Indonesia. *Waste management*, *32*(11), 2126-2133.

Zurbrügg, C. (2013): Assessment methods for waste management decision-support in developing countries. Ph.D. Thesis - UniversitàdegliStudi di Brescia, Facoltà di Ingegneria, Dipartimento di IngegneriaCivile, Architettura, Territorio, Ambiente e Matematica.

Annex I

In this overview the date of the meeting, person and stakeholder who is met, type of meeting and location are depicted. An extended overview of these meetings including findings is available at request.

Date	Actor(s)	Type of meeting	Location
17-2-17	Roger Spranz[2]	Informal, observational notes	Canggu
19-2-17	One Island, One Voice	Bali's Biggest Beach Cleanup (BBBC). (participated at Batu Balong beach), observational notes	Canggu
20-2-17	ecoBali (Roger and Dwi)	Formal, observational notes, video interview BTOWU[3]	Canggu
20-2-17	Research and Production Center (RAPC) (Lucas D'Hulst)	Informal, randomly encountered on the way to ecoBali	Canggu
21-2-17	BioRock (Komang Astika)	Video interview BTOWU, observational notes	Pemuteran
21-2-17	Reefseen (Chris Brown)	Video interview with BTOWU, observational notes	Pemuteran
22-2-17	ROLE Zero Waste to the Ocean conference	Conference, networking, observational notes, recording talks	Nusa Dua
23-2-17	ecoBali	Volunteer in separation process, observational notes	Canggu
25-2-17	Muriel Ydo	Informal meeting	Seseh
25-2-17	-	Arranged Beach Clean Up in collaboration with BTOWU, ecoBali and Canggu Beach Hostel.	Pererenan
27-2-17	Merah Putih Hijau (MPH)	Board meeting of MPH. Notes of meeting.	Canggu
1-3-17	MPH	Visit facility in pilot-village	Pererenan
1-3-17 & 2-3-17	ecoBali (Paola Cannuciari)	Interview, observational notes	Canggu
4-3-17	RAPC (Lucas D'Hulst)	Interview	Canggu
5-3-17	Muriel Ydo (aka Misses Nokia, aka Polisi Sampah)	Interview and informal meeting, notes	Seseh
6-3-17	Keep Bali Clean (David Eagle)	Interview	Kerobokan
6-3-17	Bye Bye Plastic Bags (Elvira and Isabel Wijsen, other youngster who are part of BBPB)	BBPB's monthly meeting, observational notes	Canggu (BaliOn residence, also BBPB office)

[2] Individual, PhD-candidate, founder Making Oceans Plastic Free, part-time employed by ecoBali.
[3] By the Ocean We Unite.

7-3-17	Rumah Kompos (Supardi Asmorobangun)	Interview, visit facility	Ubud
7-3-17	Greenschool and Kembali (Pauline O'Brien, Wisakananda Pradipta, Abid Kamalsyan)	Interview, visit school/Kembali project	Abiansemal
11-3-17	BBPB	Pilot village, observational notes	Pererenan
13-3-17	MPH	Board meeting	Canggu
14-3-17	BaliFokus (Anita)	Interview, visit office	Denpasar
14-3-17	Indosole (Chris Pappas)	Interview, visit office	Canggu
16-3-17	ROLE Foundation (Mike O'Leary)	Interview, visit office, visit facility in construction right now	Nusa Dua
27-3-17	ecoBali (Paola)	Bram meeting Paola, visit facility, plan volunteering day, observational notes	
31-3-17	Bali Recycling Company/Gringgo (Olivier)	Interview	Sanur
31-3-17	Coral Triangle Center (Rili)	Interview Rili Djohani (executive director CTC)	Sanur
2-4-17	Muriel Ydo	Informal visit, gather information, planning visits in which Muriel can helps us with access issues	Seseh
3-4-17	MPH	Board meeting	Canggu
7-4-17	Bali Compost Crafters (Oliver Mauger)	Interview	Kerobokan/ Sunset Road
9-4-17	Keep Bali Clean	Event attendance	Berawa Beach
10-4-17	MPH	Meeting for Fundraiser event	(Deus) Canggu
13-4-17	Bye Bye Plastic Bags	Interview with Melati Wijsen (co-founder of BBPB)	Canggu (office BBPB)
17-4-17	Merah Putih Hijau	Fundraiser event, networking	Deus (Canggu)
18-4-17	Making Oceans Plastic Free	Interview with Roger	Canggu
21-4-17	Sustainable Solutions Festival (at Green School)	Networking, observation	Abiansemal
23-4-17	Merah Putih Hijau	Interview with Nino	Canggu
24-4-17	Bottle for Botol	Interview with Alice Sainsbury (chief of operations)	Sanur
24-4-17	Merah Putih Hijau	Board meeting	Canggu
26-4-17	Green-books	Interview with Petr Hindrich (founder of organization)	
27-4-17	Sampah Jujur	Interview with Baxter Smith	Ubud
28-4-17	Merah Putih Hijau	Facility working day	Pererenan
28-4-17	TPA Suwung (Bandung), Bali Compost Crafter	Visit to Government landfill, TPA Suwung. Also BCC facility. Also Navigat Organic	Sanur
29-4-17	Sustainable Design Festival	Attend different keynote speakers and network afterwards	

1-5-17	Temesi Recycling	Visit the facility	Gianyar
1-5-17	Peduli Alam	Visit their new shop and help in plastic sorting	Amed
2-5-17	Peduli Alam	Interview Heike (current person in charge in Bali)	Amed
2-5-17	Trash Hero Amed	Interview with Valerie (person in charge in Amed)	Amed
4-5-17	Bottle for Botol	Visit to office and interview with Herni (current employee of BfB, former employee of PPLH) and interview with Dode (employee BfB)	Sanur
4-5-17	DEPO	Visit to facility	Sanur
4-5-17	Dion	Meeting	Canggu
5-5-17	IDEP Foundation	Participate in gardening day and interview with Doni Marmer (Communications and resource manager at IDEP)	Gianyar
5-5-17	Avani Eco	Interview with Daniel at Avani office in Denpasar.	Denpasar
6-7-17	Bali Sustainability Hub	Meeting with Matt Ellsky and Mike O'Leary about establishing BSH and the ecovillage project	Bondalem
8-5-17	Nazava	Interview with Jeroen from Social Impakt and Nazava	Sanur
8-8-17	Bookgreener, Precious Plastic, Refill Bali, Think outside the trash	Interview with Alex Tsuk, founder of Bookgreener.	Ubud
9-5-17	Sampah Jujur	Trash walk participation	Ubud
9-5-17	Rumah Kompos	Visit facility, good bye to Supardi	Ubud
11-5-17	Indonesian Waste Platform	Interview with Nina, founder of IWP	Seminyak
11-5-17	Waste river machine visit		Sunset Road
12-5-17	ecoBali	Volunteer in waste separation process. Meet with Ketut, Nina and Muriel.	Canggu
16-5-17	Project Clean Uluwatu	Town hall meeting	Uluwatu
17-5-17	PlasticPollution solution	Interview Julie	Seminyak
18-5-17	Pit's Solutions	Interview Peter Joseph	Ubud
22-5-17	Ecobricks	Interview Russel and Ani	Gianyar
22-5-17	Malu Dong	Interview BMO	Denpasar
23-5-17	Saraswati Paper	Interview Dwi and facility tour	Kerobokan
24-5-17	Posititve Impact forever	Interview Piet van Zyl	Ubud
24-5-17	Niskala	Interview Abid	Ubud
25-5-17	Malu Dong	Interview BMO	Denpasar
26-5-17	Canggu Beach clean-up	Participating in beach clean-up	Canggu
27-5-17	Malu Dong/ I am not plastic	Meeting between Malu dong and Avano	Denpasar

Annex II

During the first interviews questions were also asked to learn more about the characteristics of Bali's waste problem. As these questions were consistently answered the same, after a while this was left out of the topic list of the interviews. In some interviews, still attention was given to the characteristics, but then it happened in a natural manner. Before starting each interview, the respondent was informed about the purpose of the interview and research it was part of, the respondent was told that it could be anonymized after his or her preference, and permission was asked to record the interview.

Questions focused on characteristics of Bali's waste problem:

Can you tell us a bit more about the historical context of the waste problem in Bali?

- *Follow-up: and waste management system in Bali?*

Who are according to you the main producers of waste in Bali?

- *Can you also tell us more about main types of waste?*
  - *Most in quantity*
  - *Most problematic*

Can you tell us more about the stakeholders that are involved in waste management in Bali?

- *Who are the stakeholders?*

Can you tell us more about policies and regulations on waste management are actively enforced in Bali/Indonesia?

Topic list semi-structured interview:

Introductory questions

Who are you?

What do you do?

What does … … (stakeholder) exactly do?

What is your position within … … (stakeholder)?

Why and when was … … (stakeholder) founded?

What is the legal form of … … (stakeholder)?

Focus on content research: focus structure stakeholder

What are the main activities of … … (stakeholder)?
- *Follow-up: How are these activities carried out?*

On what aspect of the waste problem / waste management process does … … (stakeholder) focus?
- *Follow-up: prevention, treatment, more holistic?*

How does … … (stakeholder) generate income and funding to maintain their existence?

Does … … (stakeholder) collaborate with other actors in Bali's waste management system?
- *If so, with whom?*
    - *Government, stakeholders focused on the same aspect (prevention, treatment), other businesses, international organizations?*
- *If not, why not?*

Do you see any barriers in Bali's waste management system?
- *Barriers in general?*
- *Possibilities to overcome these barriers?*

Closing questions

Is there anything that we did not focus during the interview that you would like to address?

Tell them about IWP, ask if they are registered, if not, ask them if they want to.

Words of thanks

Annex III

Survey collaboration within Bali's waste management sector

- 1) E-mail message send to all stakeholders
- 2) Actual survey

1) E-mail to all stakeholders:

Dear all,

In the last few months we have been driving all around Bali to meet as many actors as possible involved in Bali's waste management system. Thanks to all of you we already collected a tremendous amount of data and greatly increased our understanding of Bali's waste problem and the impressive efforts that are made to tackle this problem. To finish our work off, we would like to ask for 5 more minutes of your time. We created a short survey to get a precise idea of who is collaborating with whom and based on this survey we want to make an infographic that shows the linkages between the organizations involved in Bali's waste management system. We hope this information might give inspiration for future collaborations.

Thanks in advance.

Kind regards,

Bram and Erwin

---

2) Actual survey:

Collaboration in Bali's waste management system

Q1: *Your name:*

……

Q2: *Which organization do you represent?*

……

Q3: *Which of the following organizations do you know?*

- **Bye Bye Plastic Bags**
- **ecoBali**
- **Bali Recycling Company**
- **Gringgo**
- **Merah Putih Hijau**
- **Keep Bali Clean**
- **Re>Pal**
- **Avani**
- **IDEP Foundation**
- **Sampah Jujur**

- **Peduli Alam**
- **Trash Hero**
- **Bali Compost Crafters**
- **Fasilitas Temesi**
- **ADUPI**
- **Kembali/NISKALA**
- **Indosole**
- **Bottle for Botol**
- **Coral Triangle Center**
- **ROLE Foundation**
- **Pusat pendidikan Lingkungan Hidup (PPLH)**
- **BaliFokus**
- **GUS Bali**
- **Making Oceans Plastic Free**
- **Rumah Kompos**
- **Project Clean Uluwatu**
- **Bookgreener**
- **Precious Plastic**
- **Refill Bali**
- **Nazava/Social ImpaKt**
- **Green-books**
- **Malu Dong**
- **Saraswati Papers**
- **Ecobricks**
- **Pit's Solution**
- **Bottles for Earth**
- **Five Pillar Foundation**
- **Bali Plasticpollutionsolution**
- **Dinas Kebersihan dan Pertamanan (DKP)**
- **Indonesian Waste Platform**

Q4: *Are there organizations that are involved in Bali's waste management system, which are not included in the list above?*

……

Q5: *With whom of these stakeholders do you collaborate?*

- **Bye Bye Plastic Bags**
- **ecoBali**
- **Bali Recycling Company**
- **Gringgo**
- **Merah Putih Hijau**
- **Keep Bali Clean**
- **Re>Pal**
- **Avani**
- **IDEP Foundation**
- **Sampah Jujur**
- **Peduli Alam**
- **Trash Hero**
- **Bali Compost Crafters**
- **Fasilitas Temesi**

- **ADUPI**
- **Kembali/NISKALA**
- **Indosole**
- **Bottle for Botol**
- **Coral Triangle Center**
- **ROLE Foundation**
- **Pusat pendidikan Lingkungan Hidup (PPLH)**
- **BaliFokus**
- **GUS Bali**
- **Making Oceans Plastic Free**
- **Rumah Kompos**
- **Project Clean Uluwatu**
- **Bookgreener**
- **Precious Plastic**
- **Refill Bali**
- **Nazava/Social ImpaKt**
- **Green-books**
- **Malu Dong**
- **Saraswati Papers**
- **Ecobricks**
- **Pit's Solution**
- **Bottles for Earth**
- **Five Pillar Foundation**
- **Bali Plasticpollutionsolution**
- **Dinas Kebersihan dan Pertamanan (DKP)**
- **Indonesian Waste Platform**

Q6: *With which two organizations do you mainly collaborate?*

……

Q7: *With which of these organizations would you like to collaborate in the future? (maximum 3)*

……

Q8: *What hinders the cooperation between the different organizations?*
……

Q9: *Do you think a network that promotes and facilitates cross-sector collaborations can help improve Bali's waste management system?*
- Yes
- No