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Circular Economy: principles, legal framework and applications in China

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引言

七十年代以来全球的人们都意识到了地球的资源有限，所以科学家开始研究可持续性议题的解决办法。现在资源保护是一个很重要的问题，这是因为一方面资源枯竭影响环境，一方面资源枯竭影响经济。进行可持续发展的方法不同，其中有循环经济。循环经济的目标是一边进行经济发展，一边保护资源和环境。这篇论文不仅会介绍循环经济的发展和内容（如循环经济的学派、原则等），而且会介绍在中国循环经济实施的情况。中国是世界三大经济体之一，中国虽然是世界最大的温室气体排放国，但是中国提出了不少循环经济倡议。中国成为世界循环经济推广和实施的领先者。从循环经济实施角度来看，我们可以申明循环经济的背景是环境保护。这篇论文研究在中国用的循环经济实施方法，尤其自上而下的做法以及循环经济有关的法律和五年计划的措施。这篇论文分析循环经济相关的法律柜架并介绍五篇法律文件：《中华人民共和国清洁生产促进法》，《中华人民共和国循环经济促进法》，《中华人民共和国国民经济和社会发展第十一个五年规划》，《中华人民共和国国民经济和社会发展第十二个五年规划》和《中华人民共和国国民经济和社会发展第十三个五年规划》。最后，这篇论文集中于微观层面的循环经济实施的情况，就是说在中国公司层面的循环经济实施的情况。中国广东省为这篇论文第三章的案例研究，此外为了更好明白这件问题，会提供论文作者参加的一项研究项目的结果。

第一章介绍循环经济， 它的发展的原因和循环经济的不同学派。这些不同学派有助于循环经济实际应用。循环经济实际应用会遵守不同原则，这些原则帮助公共组织和私人组织进行循环经济有关的措施。宏观层面，中观层面和微观层面，这三个层面是循环经济措施的三个执行层面。

第二章论述在中国在宏观层面的循环经济实施，内容包括上述的法律和五年计划。关于五年计划我们可以说第十一个五年规划的重点是资源养护的措施，而第十二个五年规划和第十三个五年规划的重点是再利用、资源化和再制造的措施。清洁生产促进法和循环经济促进法有关系。清洁生产促进法包括跟循环经济有关系的措施：节能、保

护资源、再利用废物、处置废物、控制污染、减少污染、进行合适产品设计。循环经济促进法也包括这些措施，而这条法律尤其注重 3R 原则：减量化、再利用、资源化。此外，这一条法律针对中国经济的所有行业和公司。

因为循环经济为中国国家发展战略，所以是中国中央政府决定循环经济有关的措施的，就是说中央政府用自上而下的做法， 而委托地方政府负责循环经济措施的实施。第三章论述这个过程：在进行循环经济措施实施过程中机构的内在、外在因素有什么作用？外在因素就是商业和政府的关系，而内在因素就是公司管理者循环经济的知识和公司管理者进行循环经济措施的愿意。在执行环境保护的措施时政府的角色很重要，这些措施也包括循环经济的措施。研究显示政府可以影响公司的税款。在中国有国有企业和私人公司，其中国有企业更多地受到政府的影响。国有企业也是政府的工具以便实现他的目标。这篇论文第三章的案例研究是关于广东省的，我们研究在广东省机构的内在、外在因素起的作用，尤其在环境保护和循环经济措施实施的方面。关于外在的因素，就是说政府的因素，我们指出政府在广东省也会影响公司的业绩。从机构内在因素来看，我们分析论文作者参加的研究项，有助于研究广东省公司循环经济实施的情况。基于此，我们可以明白公司管理者关于循环经济的思想内核，也能了解管理者关于循环经济的思想和知识是否会影响循环经济的实施。我们发现公司管理者了解循环经济的原则并开始进行循环经济有关的措施。循环经济措施实施的结果非常驳杂，此外管理者对于循环经济措施的积极思想与循环经济活动的实际应用无关，事实上在一些情况下，虽然积极因素支持循环经济措施的实施，但是措施还没被执行了。这些结果表明除了管理者对于循环经济措施的思想以外有其他因素影响循环经济措施的实施。从公司内部角度来看，这个情况的原因可能是决策过程包括不同的经理，此外环境经理的促進者角色经常被忽视。从公司外部角度上看来，我们已经解释过政府对公司的环境保护和循环经济措施实施的影响力。这个情况让公司一边优先进行对政府来说最主要的措施，一边却忽视其他的措施。

总而言之，这篇论文指出重点以便了解当前在中国循环经济发展的情况。第一为中国政府对循环经济措施的实施的承诺：对中国政府来说循环经济一边是中国国家发展战略，一边是一个国际责任。第二为自上而下做法和地方政府在进行循环经济措施实施

过程中起的作用。第三为机构内在、外在因素在进行环境保护和循环经济措施实施过程中对环境绩效的影响力。为了调查这项议题，广东省以及这篇论文作者参加的一项研究项目的结果为第三章的案例研究。这三个重点以及对循环经济有关的法律和五年计划的分析为这篇论文的核心。这篇论文的语言为英文，这样国际读者更方便会了解论文内的信息以及在中国解循环经济实施的情况。这篇论文的作者查阅不同的资料（书、研究文件、法律文件、网站等），这些资料的语言是英文、中文和意大利文（中文和意大利文的资料是由这篇文章的作者翻译的）。

Introduction

Nowadays the international community is redirecting its efforts towards environmental concerns and sustainability. The Earth resources have been dissipated on an ongoing escalating rate and the ecological footprint[1] of countries is more and more burdensome. If everyone on the planet consumed resources at the same rate as the average European citizen we would need 2.8 Earths (Word Wide Fund For Nature (WWF), 2019). On a global scale from the beginning of the 1970s the rate of consumption began to surpass the biocapacity of the planet, meaning that for fifty years we have lived exploiting and consuming more resources than the Earth's rate of renewal, currently hitting an alarming data: 1.7 planets would be needed to cover the global rate of resources consumption (Word Wide Fund For Nature (WWF), 2019). China's Ecological Footprint is the highest in the world but considering the pro-capita data the United States of America and European Union outclass China (Word Wide Fund For Nature (WWF), 2019). One of the goals set by the 2015 Paris Agreement was to maintain the temperature increase well below 2°C, but even though the parties who ratified the Agreement are implementing national measures in order to control their emissions, the Planet Earth is still moving towards a 3.2°C warming by the end of the century (United Nations Environment Programme (UNEP), 2019). Every year at a global level 2.01 billion tonnes of municipal solid waste (MSW)[2] are generated, environmentally safe procedures are not always followed when handling MSW, in fact at least 1/3 of the total amount of MSW is not managed in a safe manner (Kaza, Yao, Bhada-Tata, & Van Woerden, 2018). By 2050 global waste is expected to register an increase to 3.4 billion tonnes, with a more than three times increase in low-income countries, where open-dumping is still the main procedure followed for waste disposal (Kaza et al., 2018). 5% of global emissions of CO2[3] in 2016 (1.6 billion tonnes) came from solid waste treatment and disposal, mainly generated by open dumping and landfills lacking of a system able to capture the gas originated from the disposal processes; in 2050 the data is expected to reach 2.6 billion tonnes per-year if the situation of the waste management sector remains the same (Kaza et al., 2018). Resource consumption is escalating, global waste is increasing, and at the same

[1] The Ecological Footprint measures the amount of biologically productive land and sea area required to produce all the resources a population consumes and to absorb its waste, taking yearly technological advances into account (Word Wide Fund For Nature (WWF), 2019).
[2] Municipal Solid Waste (MSW) comprises residential, commercial and institutional waste (Kaza et al., 2018).
[3] Greenhouse gases (GHG) are considered by scientists the leading cause of climate change (Intergovermental Panel on Climate Change (IPCC), 2014), of which CO2 is responsible for 64% of man-made global warming (European Commission, n.d.-a).

time products' lifespan is decreasing. A study conducted from 2004 to 2012 and commissioned by the German Federal Environment Agency[4], in fact, found evidence concerning the shortening of the electrical and electronic products' lifespan, as well as the increasing percentage of appliances in the white goods sector replaced within just five years due to technical flaws (Weihe, 2016). This suggests that the current tendency is no more directed towards the repairing and refurbishing of goods; goods, instead, are disposed as waste and replaced with new products.

This evidence needs rapid action, a response able to slow down the rate of both resources dissipation and CO2 emissions, in order to move towards a more sustainable future, constituted by reasonable patterns of production and consumption and more in line with the natural cycle. Diverse scholars, in fact, from the observation of the natural world were able to elaborate new business models, which combine strategies to face and mitigate the serious environmental problems that have been wounding the Planet since the First Industrial Revolution and that are now dominating the list of the Top 10 long-term risk drawn up by the World Economic Forum, both in terms of likelihood and impact (World Economic Forum, 2019). A new economic rationale should be taken in consideration, moving away from the traditional linear model of "take-make-dispose" and head towards a more cyclical way of intending the economic system: circular economy (CE). Many efforts have been already made in this direction, China and the European Union in particular, have been taking a leading position in the promotion and implementation of CE policies and strategies. This thesis is focused on the implementation of CE actions in the first global greenhouse gases (GHG) emitter on absolute basis (United Nations Environment Programme (UNEP), 2019), the People's Republic of China.

The structure of thesis will be articulated as follows: in Chapter 1 the CE concept will be considered, taking in account different level of analysis. The second Chapter will focus on the implementation of CE in China, particularly examining the legal framework and the governmental initiatives adopted. Chapter 3 will focus on a case study regarding the implementation of CE at the level of single organizations, to which the author of this thesis has taken part. In conclusion considerations and results will be summed up.

[4] The study, covering the period 2004-2012, was commission by the he German Federal Environment Agency (UBA) and conducted by the Öko-Institut (https://www.oeko.de).

Chapter 1 Circular economy: a vast concept

1.1 Circular economy definition

The term circular economy (CE) should be firstly seen as being part of the broader milieu of economy. On the basis of a first level of analysis the term CE can be defined as the antonym of linear economy. Starting from the term "linear economy", we will now proceed to identify the meaning of CE.

A linear economy is an economic system that follows the "take-make-dispose" paradigm. In a simplistic way the process can be described as follows: take raw materials, make the product and dispose the product as waste once reached its end-of-life. CE, on the contrary, focuses on closed-loops systems, in which waste does not exist, and inputs and outputs from various sources are connected with each other, the use of renewable resources is encouraged, and the provision of services is preferred over the provision of goods. The linear economy paradigm is the prevalent economic paradigm followed by the global economy (Sariatli, 2017). The pursuit of the linear economy model on the one hand has brought enormous wealth to the industrial countries during the last century, on the other hand it has triggered an ongoing escalation of costs and losses as stressed by the 2020 Circularity Gap Report, which points out that globally the amount of resources entering the economy in 2017 reached 100.6 billion tonnes, of which 92 billion tonnes were extracted resources, and only 8.65 billion tonnes cycled resources; at the end-of-life stage only 31 billion tonnes of materials were put in the long-term-stock, while a total amount of 32.6 billion tonnes was wasted, precisely 23.9 billion tonnes of resources were not recycled or recovered in any way, meaning that nowadays only 8.6% of the total resources which enter into the economy is cycled. At the end-of-use phase, the remaining part of materials that originally entered the economy is either composed by emitted resources (14.6 billion tonnes) or dispersed resources (22.4 billion tonnes). These data highlight a negative trend in the circularity of the global economy: the rate reached 9.1% in the findings of the 2018 Circularity Gap Report (de Wit;, Hoogzaad;, Ramkumar;, Friedl;, & Douma, 2018), while currently, the rate has dropped to 8.6% (de Wit;, Hoogzaad;, & von Daniels, 2020). The document explains that the trend is in line with the ongoing use of the linear economy model, and in particular is related to high rates of resources extraction, continuous stock growth and still low levels of end-of-life processing and cycling (de Wit; et al., 2020). More and more researchers point out

the fact that the linear model should be abandoned, in order to make way for the adoption of the circular model, whose core concepts can be summarised in the 3Rs: reduce-reuse-recycle (which present some variations, as we would analyse later in details).

The origin of the concept of CE is still debatable, despite this, there is evidence that dates back its first formulation in 1848, when the first President of the Royal Society of Chemistry A.W. Hofmann suggested that in the ideal chemical factory there should be no waste, but only products, adding that the more efficient the use of the waste, the more the profit that the company can earn (Murray, Skene, & Haynes, 2017). Starting from the 1970s the concept of CE began to be precisely defined and elaborated (Geissdoerfer, Savaget, Bocken, & Hultink, 2017); the contribution made by Boulding in the debate over CE provides an early formulation of the importance of adopting this new economic paradigm (Suttie et al., 2017). Boulding describes the difference between open and closed economic systems, referring to the former as the "cowboy - economy" and to the latter as the "spaceman - economy" (Boulding, 1966). In the "spaceman - economy" production and consumption do not occupy the main concerns, and resources are seen as limited, in fact, focus is placed on the relation between the multiple outputs of the different parts of the system, which are connected to the inputs of other parts of the same system (Boulding, 1966). Diverse scholars identify Pearce and Turner as the founders of CE concept (Geissdoerfer et al., 2017); in their 1989 work the relationship between waste and economic activity is highlighted (Pearce & Turner, 1989) and a circular economy model is provided by the two scholars (Wautelet, 2018).

Although many studies have been pursued, and a new wave of interest in the subject has gained momentum in the last decade (Geissdoerfer et al., 2017), a univocal definition of CE has not been formulated yet. As for now, as many as 114 different definitions have been collected by Kirchherr et al. (Kirchherr, Reike, & Hekkert, 2017), highlighting the fact that the studies on the subject are still ongoing and that one single and universal definition has not been identified yet. According to Kirchherr et al.'s research the 3R framework, namely "reduce-reuse-recycle" is the most common way of describing the concept of CE implementation (Kirchherr et al., 2017). The research further points out that the most used definition is the one provided by the Ellen MacArthur Foundation[5], in which CE is described as "*an industrial*

[5] The Ellen MacArthur Foundation was established in 2010 by Ellen MacArthur, former English sailor, with the purpose of promoting circular economy and help the transition towards it. The foundation works both with businesses and institutions, such as government and cities; furthermore, it also collaborates with academia and

system that is restorative or regenerative by intention and design […] replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models." (Ellen MacArthur Foundation, 2013b)

1.2 Circular Economy Application: Different Schools of Thought

Although a single and universal definition of CE has not been developed yet, interest towards its practical utilization has begun to rise since the late 1970s; this concern highlighted the possibility to apply CE to the actual economic system and processes of industrial production (Ellen MacArthur Foundation, 2017b). When analysing and suggesting ways of applying CE to the existing economic situation scholars have introduced different schools of thought, namely: regenerative design, biomimicry, natural capitalism, cradle to cradle, performance economy, blue economy, industrial ecology and industrial symbiosis.

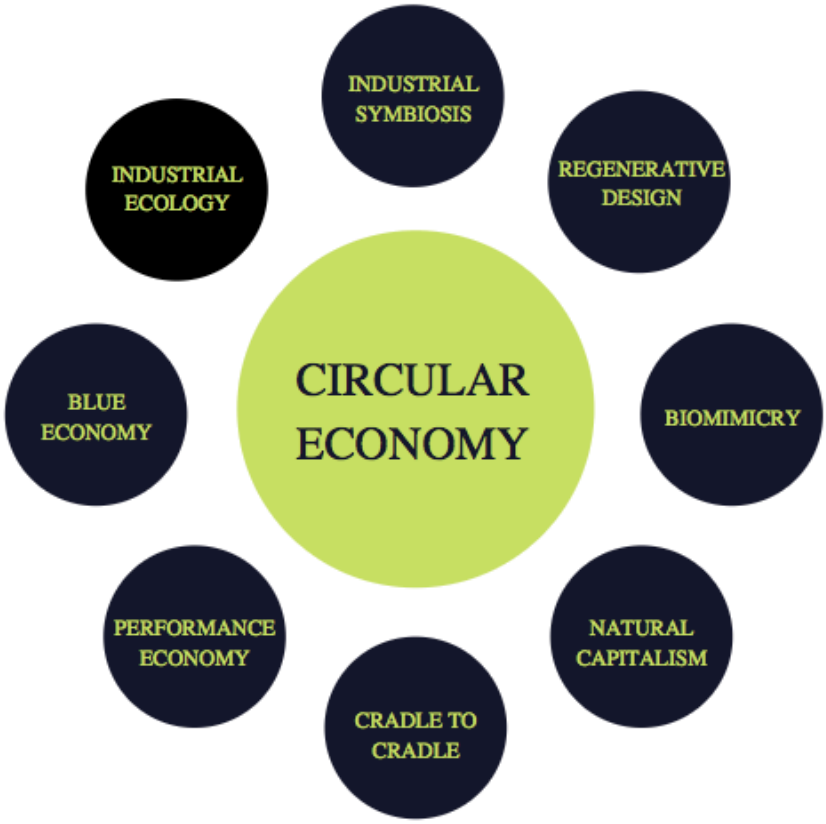

Figure 1 *CE schools of thought.*

scholars. The Ellen MacArthur Foundation carries out analysis activities and also promotes different worldwide initiatives. The official website is https://www.ellenmacarthurfoundation.org.

1.2.1 Regenerative design

The American professor of landscape architecture John T. Lyle launched the idea of regenerative design, which was exposed in a comprehensive way in the 1996 volume "Regenerative Design for Sustainable Development" (Tillman Lyle, 1996). The author emphasized the need for following nature patterns of design and for abandoning the linear system flow in favour of a more cyclical flow, i.e. regenerative design (Mang & Reed, 2012), which is conceived as being applicable to all systems (Ellen MacArthur Foundation, 2017b).

1.2.2 Biomimicry

The founder of biomimicry school of thought is the biologist and author Janine M. Benyus. The term biomimicry or biomimetics is derived from the combination of two Greek words: *bios*, life and *mimesis*, imitation; it was not invented by Benyus, but by Otto H. Shimitt, an American biomedical engineer and biophysicist who in 1957 coined the term "biomimetics" (Bhushan, 2009). Benyus spread the concept and popularized it through her 1997 book "Biomimicry: Innovation Inspired by Nature" (Biomimicry Institute, 2020) in which she highlights the three principles of biomimicry: nature as model, nature as measure and nature as mentor (Benyus, 2002). These three principles convey a clear idea of the purpose of biomimicry: a sustainable world already exists (Ellen MacArthur Foundation, 2013a) and humans have to learn, get inspired and judge their creations in respect of nature.

1.2.3 Natural capitalism

Natural capitalism is a business model proposed by Paul Hawken, Amory Lovins and Hunter Lovins in the 1999 book "Natural Capitalism: Creating the Next Industrial Revolution". Natural capitalism combines business and environmental interests and fosters four key principles:

1. Increasing resource productivity;
2. Redesigning industry on biological models with closed loops and zero waste;
3. Shifting from the sale of goods to the provision of services;
4. Reinvesting in the natural capital. ("Natural Capitalism- Creating the Next Industrial Revolution," 2020)

1.2.4 Cradle to Cradle

Cradle to Cradle is a design framework developed by the American architect William McDonough and the German chemist Michael Braungart presented in the book "Cradle to

Cradle: Remaking the Way We Make Things" (Braungart & McDonough, 2002). Their cooperation was sealed in 1995 with the foundation of MBDC[6], which in 2005 launched the Cradle to Cradle Certified Products Program (now licensed to the Cradle to Cradle Products Innovation Institute), in order to certify the clients who reached a certain level of sustainability in their products (William McDonough, 2020). The Cradle to Cradle three main principles are:

1. Everything is a resource for something else: waste does not exist, according to the nutrient metabolisms concept materials can either be designed to return safely to the earth as biological nutrients or re-used as technical nutrients for new products. The first cluster, biological nutrients, is composed by consumption products, which are those products that are consumed in the process of fulfilling their purpose, while the second one, technical nutrients, comprises service products, which are products that are used or borrowed in order to provide a service but whose materials are not consumed up;
2. Use clean and renewable energy;
3. Celebrate diversity: adapt to local challenges and opportunities. (Ellen MacArthur Foundation, 2012; William McDonough, 2020)

1.2.5 Performance economy

The father of performance economy is the Swiss architect and industrial analyst Walter R. Stahel, who as early as 1976 viewed the potential of CE (Ellen MacArthur Foundation, 2017b); the core idea behind the performance economy business model is to sell services rather than products, which has to be combined with sustainable taxation and CE (Ellen Macarthur Foundation, 2012); this concept was firstly outlined in the 2006 book "The Performance Economy" by Stahel, and further expanded in the 2010 edition of the book (Stahel, 2010).

1.2.6 Blue economy

The blue economy is the actualization of the philosophy that resides under the "ZERI[7] in Action" network, founded in 2004 by the Belgian economist and entrepreneur Gunter Pauli. Pauli presented his idea in the book "The Blue Economy: 10 years, 100 Innovations. 100 Million Jobs" (Pauli, 2010), which was conceived as a report to the Club of Rome[8]. The blue economy's core idea is that current industrial processes can be modified in order to address the

[6] McDonough Braungart Design Chemistry, https://mbdc.com/about-mbdc/.
[7] Zero Emissions Research and Initiatives (http://www.zeri.org/ZERI/About_ZERI.html).
[8] The Club of Rome, as defined in its website (https://www.clubofrome.org/about-us/) "*is an organization of individuals who share a common concern for the future of humanity and strive to make a difference"* founded in 1968. The main founders were the Italian industrialist Aurelio Peccei and the Scottish scientist Alexander King.

environmental problems related to our current economic system, focusing on the generation of value through the adoption of more basic and cleaner technologies (The Blue Economy, 2016a). It is necessary to find solutions within what is already available and innovate following natural examples, in order to provide basic needs in a sustainable way (The Blue Economy, 2016b). Twenty-one principles constitute the blue economy, among which it is important to mention the attention given to the non-existence of linear natural systems and of waste (The Blue Economy, 2016b).

1.2.7 Industrial ecology

Industrial ecology (IE) using a systemic thinking conceives industry as part of the natural systems that surround it (Chertow, 2008). IE focuses on the phases of production processes, which learning from nature, should adopt a cycling approach, striving to conserve and reuse resources both in production and consumption stages (Chertow, 2008). Given the systemic approach used in IE, attention is particularly paid on the global impact that the production processes have from the beginning to end (Ellen MacArthur Foundation, 2017b).

1.2.8 Industrial symbiosis

Industrial symbiosis (IS) is "*the process by which wastes or by-products of an industry or industrial process become the raw materials for another*" (European Commission, 2018). A more in-depth definition given by Lombardi and Laybourn includes the fact that the network established between different organizations under IS is devoted both to develop eco-innovation and abiding cultural change (Lombardi & Laybourn, 2012), resulting in overall developed and improved businesses and processes.

1.3 Different levels of CE adoption

CE practices can be implemented at different levels: macro-, meso- and micro-level. Macro-level of implementation means to use CE practices at the global, country, society, region, province and city level (Merli, Preziosi, & Acampora, 2018; Pesce et al., 2020). Meso-level implementation comprises the use of circular practices at the level of eco-industrial parks and supply-chains, while micro-level implementation means to implement CE practices at the corporate level, that is at the level of companies (Pesce et al., 2020).

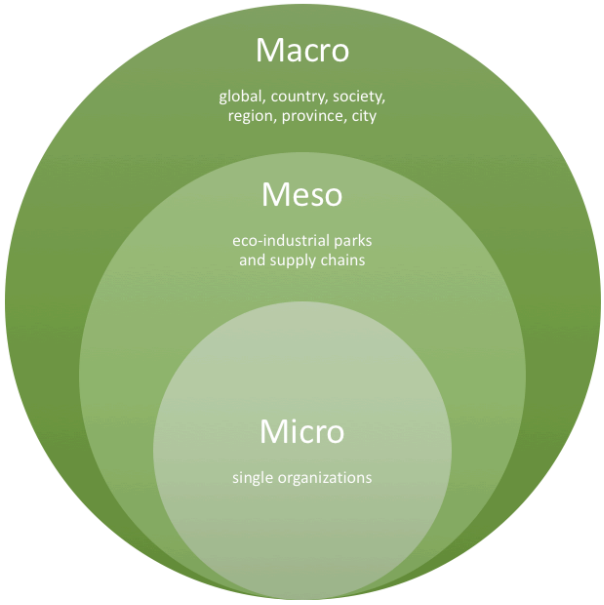

Figure 2 *CE adoption levels.*

The macro-level dimension is the most widely studied: over a half of the available scientific articles concentrate on macro analysis of CE implementation (Merli et al., 2018) while researches concerning meso- and micro- level are still less diffused. Meso-level analysis of CE implementation, in particular, makes up for only the 14.69% of the current literature, of which only 3.54% of publications refer to supply chains (Merli et al., 2018). Implementation of CE at macro-level concerns multiple systems: industrial, infrastructural, cultural and societal systems are all subjected to an integration and redesign process (Ghisellini, Cialani, & Ulgiati, 2016). The establishment of eco-industrial parks initiatives is the most prominent implementation plan for CE at meso-level; this practice is widely used in China, where between 2001 and 2014 26 national eco-industrial parks have been constructed, more precisely since 2012 eco-industrial parks have begun to be transformed into CE-based industrial parks (Mathews, Tan, & Hu, 2018), highlighting the link existing between industrial parks and CE implementation. Cleaner-production policies and eco-design strategies are instead used in order to implement CE at the micro-level of companies (Ghisellini et al., 2016), as it is noticeable in China with the "Cleaner Production Promotion Law" which entered into force in 2003 (Standing Committee of the National People's Congress, 2002).

1.4 CE principles

The existence of different schools of thought determines the fact that there is not a single set of principles that underlies CE application, furthermore the evidence that different levels of CE adoption exist, brings us to the conclusion that the principles could either specifically address the micro-level of companies or adopt a more general view. Pesce et al. (Pesce et al., 2020) identified six sets of CE principles.

The first set of principles proposed is the one provided by the Ellen MacArthur Foundation. The choice to include this set of principles stems from the fact that the Ellen MacArthur Foundation, although being neither an official organization nor a standard board, is considered as the world leader organization in promoting CE adoption at the company, national and academic level, it has in fact funded the Circular Economy 100 (CE100) network, in which all types of organizations, from businesses, to governments and universities, share and learn how to implement CE (Ellen MacArthur Foundation, 2017a). The CE guiding principles proposed by the Ellen MacArthur Foundation are exhibited in **Table 1** here below.

Table 1 *Ellen MacArthur Foundation CE principles.*

Design out waste and pollution	The aim is to produce no waste and no pollution, comprising GHG emissions, hazardous waste and air, land and water pollution.
Keep products and materials in use	Maintain the highest value of products and materials. Products and materials are designed to keep circulating in the economy (durability, reuse, remanufacturing, recycling strategies are pursued).
Regenerate natural systems	The aim is not only to protect the environment choosing to use renewable resources, but also to improve the environment returning biological nutrients to the soil.

The first official standardised framework concerning CE principles is the BS 8001:2017 Framework for implementing the principles of the circular economy in organizations by The British Standards Institution (The British Standards Institution, 2017) (hereinafter referred to as BS 8001:2017), which helps companies to develop and implement CE actions inside the organization, guiding the management towards the adoption of CE by providing a set of six principles underling CE actions. The principles supported by the BS 8001:2017 are summed up in **Table 2** here below.

Table 2 *BS 8001:2017 CE principles.*

Systems thinking	Organizations undertake a holistic approach in order to understand the complexity of the system they operate in, which is composed of relationships, activities and decisions, which can affect value creation.
Innovation	Organizations focus on continuous innovation to facilitate the transition towards CE, for example acting on the design of new products, the redesign of old ones and of the processes.
Stewardship	Organizations view themselves as accountable for their direct and indirect impacts in the wider system they are part of, meaning that the organizations take responsibility for everything that occurs from upstream to downstream, meaning they focus also on the supply chain- level and consumer- level.
Collaboration	Organizations collaborate both inside and outside, formally and informally, in order to create value. Collaboration is a key step in the path towards sustainability and CE.
Value optimization	Organizations keep all products, components and materials at their highest value and utility at all times. Reconsidering what is waste is essential to effectively implement value optimization.
Transparency	Organizations do not hesitate to disclose information and data which are relevant to their CE implementation. They communicate the information in a clear, accurate, timely, honest and complete manner.

The third set of principles, which is formulated by the non-for-profit organization Circle Economy, has been selected because of the commitment of the organization in helping businesses and governments in the process of CE adoption through valuable solutions. Circle Economy launched in 2018 the Circularity Gap Report initiative, in which the global economy is analysed and the importance of CE as the path to be followed by the global economic system is stressed. The principles are presented in **Table 3** here below.

Table 3 *Circle Economy CE principles.*

Design for the future	The systems thinking approach is used in the design process, to ensure the right materials are used and that extended future use is possible.
Incorporate digital technology	Digital technology should be used as an efficient tool to provide information on the usage of resources and the supply chain.
Preserve and extend what is already made	Maximise the value and lifetime of resources by repairing, maintaining and upgrading them while in use.
Prioritise regenerative resources	Materials and energy should be constituted by renewable, reusable and non-toxic resources.

Use waste as a resource	Waste can be reused and recycled therefore becoming a source of secondary resources.
Rethink the business model	The business model needs to be reconsidered taking in consideration new ways for creating value and focusing on strengthening the connection between products and services.
Collaborate to create joint value	Transparent collaboration has to be pursued both inside and outside the organization to create joint value.

In addition to the organizations' efforts towards the identification of CE principles, the recent scientific literature comprises also CE principles elaborated by single scholars.

The first of these set of principles is the one provided by Weetman in the book "A circular economy handbook for business and supply chains : repair, remake, redesign, rethink" (Weetman, 2016). She identifies four core principles underlying CE, which are presented in **Table 4** here below.

Table 4 *Weetman CE principles*

Waste = food	Waste does not exist. Products have to be designed to maintain their highest value at all times, and to be disassembled or reused at end-of-life (EoL).
Build resilience through diversity	Taking nature as a model, organizations at all levels should stress diversity to build resilience and resources.
Use renewable energy	Renewable energy should be used to sustain the activities of the organizations.
Think in systems	Use an holistic approach to understand relationships, activities and decisions that constitute the system in which organizations operate, in order to create value.

Suárez-Eiroa et al. (Suárez-Eiroa, Fernández, Méndez-Martínez, & Soto-Oñate, 2019) proposed a classification of CE operational principles, i.e. how CE works; in this sense Suárez-Eiroa et al. view CE principles as technical strategies that define how CE systems operate. **Table 5** shows the above-mentioned operational principles.

Table 5 *Suárez-Eiroa et al. CE principles.*

Target operational principles	**Adjusting inputs to the system to regeneration rates**	Minimize and attempt to eliminate the inputs of non-renewable resources and prefer the use of renewable resources in line with Earth's boundaries.

	Adjusting outputs from the system to absorption rates	Minimize and attempt to eliminate the outputs of technological waste and adjust the emission rate of biological waste in line with Earth's boundaries.
Core operational principles	**Closing the system**	Connect the waste stage to the resource acquisition stage.
	Maintaining resource value within the system	Improve durability and interconnect different stages of the product life cycle, through reuse, repair, refurbish, remanufacture, recondition and repurpose.
	Reducing the system's size	Reduce the total amount of resources circulating in the system.
Transversal operational principles	**Designing for CE**	Design within the CE framework: the product has to be easily repaired, recycled and recovered. Modular design and eco-design are important concept within this principle.
	Educating for CE	Education of people is essential for correct and successful CE implementation.

Finally, Tonelli and Cristoni in "Strategic Management and the Circular Economy" (Tonelli & Cristoni, 2019) identified four guiding principles of CE. The principles are showed in **Table 6** here below.

Table 6 *Tonelli and Cristoni CE principles.*

Green technologies and responsible use of natural resources	Focusing on inputs, the companies have to prefer renewable energy usage and minimize the use of virgin materials.
Maximize the utilization rate of assets	Fully exploit assets maximizing their utilization rates. Sharing and the provision of services over selling of goods are innovative ways to do so.
Maintain highest value	Maintain highest value of materials and products through reuse, repair, remanufacture and refurbish.
Minimize negative externalities	Applying the first three principles in order to gradually achieve zero negative externalities, such as pollution.

Circle Economy and Suárez-Eiroa et al. both identify seven principles; six principles are described by BS 8001:2017 standard; Weetman and Tonelli and Cristoni both classify four CE principles, while the Ellen MacArthur Foundation's CE principles are in number of three. CE

principles are defined in different ways by different authors, but we can find similarities among them. All sets of principles comprise considerations on appropriate circular design and highest value maintenance, five out of six sets comprise considerations on resources and four out of six pay attention to waste, in conclusion two out of six reflect on the need of thinking in systems, other two out of six sets focus on collaboration and two other sets consider the matter of pollution.

1.5 CE implementation tools

According to the Cambridge Dictionary[9] a tool is "*something that helps you to do a particular activity*"; in order to implement CE measures at all levels, there is the need of using tools and instruments to guide, measure and facilitate the adoption of CE.

The tools available comprehend a vast range of options: guidelines (Ellen MacArthur Foundation, 2017c), strategies (Kalmykova, Sadagopan, & Rosado, 2018), case studies (Kalmykova et al., 2018), frameworks (The British Standards Institution, 2017), certifications (such as Cradle to Cradle (William McDonough, 2020)), labels (such as EU Ecolabel (European Parliament & Council of the European Union, 2009)), indicators (Saidani, Yannou, Leroy, & Cluzel, 2018), standards (The British Standards Institution, 2017), business model canvas (Ellen MacArthur Foundation, 2016) and software (GaBi, n.d.). These tools are applied and used during diverse phases of CE adoption and implementation, given the fact that they provide different contents and hence play distinct roles in any entity's transition towards CE. In order to understand why these tools are applied in different situations we should start by analysing the meaning of these tools and subsequently consider their scope of application in the different phases that an entity should go through when transitioning towards a circular mode of operation. The entity approaches the topic through an initial phase (the entity analyses its own situation, generates awareness among its stakeholders, analyses the opportunities brought by the adoption of CE), which is followed by a phase in which ideas and strategies aimed at CE implementation are developed, their feasibility assessed, and prototypes are studied; the third phase consists in the actual implementation of the entity's plan; at the end the monitoring and reviewing phase closes the process, coupled with reporting actions[10].

[9] The Cambridge Dictionary has been used to provide all the definitions enlisted in section 1.5, therefore when a diverse source is not reported the definition is the one provided by the Cambridge Dictionary.
[10] This phases summarize the eight steps for CE implementation proposed by the BS 8001:2017 Framework for implementing the principles of the circular economy in organizations (The British Standards Institution, 2017).

Starting from the first tool hereabove listed, a guideline is a piece of "*information intended to advise people on how something should be done or what something should be*". It is therefore clear that the role of a guideline is informative and should be taken in consideration both before and during the entity's transition towards CE. A helpful tool in the embryonic phase of the entity's adoption of CE is the framework. A framework is defined as "*a system of rules, ideas, or beliefs that is used to plan or decide something*"; this definition suggests the fact that the framework provides the general rules, ideas and beliefs that the entity considers as the basis for the planning phase for the transition towards the CE, an example of a framework that focus on CE implementation in the organizations is the already mentioned BS 8001:2017 (The British Standards Institution, 2017).

A strategy can be defined as "*a detailed plan for achieving success in situations such as war, politics, business, industry, or sport, or the skill of planning for such situations*". On the basis of this definition a strategy is a tool used after an analysis of one's assets and objectives has been done, and it provides the entity a path to follow for the correct implementation of CE on the basis of its own considerations. A case study is "*a detailed account giving information about the development of a person, group, or thing, especially in order to show general principles*", given this definition we can spot the role of the case studies in the implementation of CE, they help the entity that is approaching CE, with examples that imply that a set of principles shall be followed. Therefore, this tool can be used by the entity when communicating to its own members the willingness of a transition towards CE, presenting successful stories of CE implementation through case studies and therefore developing awareness and enthusiasm (initial phase). Furthermore, case studies can also help the entity to search for its own path for CE implementation, by presenting diverse situations in which the transition towards CE took place (second phase). The second phase of CE implementation could call for the use of business model canvas, which are described by Osterwalder and Pigneur as "*a shared language for describing, visualizing, assessing, and changing business models*" in their book "Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers" (Osterwalder & Pigneur, 2010). Indeed, in the transition towards the CE discourse, this tool is used in order to develop the entity's idea of CE implementation; a business model in fact "*describes the rationale of how an organization creates, delivers, and captures value*" (Osterwalder & Pigneur, 2010), therefore it can be defined as the reasoning that underlies the implementation plan of the initiatives that the company undertakes. In order to organize the

ideas and strategies software ("*programs that you use to make a computer do different things*") that can help the entity in the CE adoption process have been developed, rendering it a useful tool to resort to.

In order to assess and measure whether an entity is following correctly the CE measures that it has designed, and to do the same analysis also on the basis of national and international dispositions on the topic, indicators and standards are used. An indicator is generally defined as "*a pointer, sign, instrument etc which indicates something or gives information about something*", in this context the following definition better explicates the connotation of an indicator: "[…] *are signals. They are tools to simplify, measure and communicate success*" (European Parliament, 1998). A standard is "*a basis for judging quality, or a level of excellence aimed at, required or achieved*". We can therefore identify indicators as a tool for the measurement of a certain performance, while a standard as a specific point that the measurement has to reach or maintain. Thus, indicators and standards are tools that can be applied both during the implementation phase and the monitoring and reporting one.

Finally, it is useful to introduce the role of two other tools, namely certifications and labels, which are not used in the actual CE implementation phases but are either beneficial for the entity or, in some cases, are required in order to comply with national and international dispositions. A certification is "*the process of earning an official document, or the act of providing an official document, as proof that something has happened or been done*", a certification therefore can help the entity prove that its processes, products or services are in line with CE propositions. For this reason, this tool can be used when the entity has already started its transition towards CE and is able to apply for certifications that assess the circularity, or other CE-related features that pertain to its processes, products or services. A certification can be useful for the customers and the general public to identify the efforts made by the entity towards CE. A similar role is played by the labels. A label generally refers to "*a piece of paper or material that is attached to something and gives you information about it*", an effective labelling system can be useful in order to identify goods that fall in the categories of products that follow CE principles. For example, as we will see in the next Chapter, a labelling system for remanufactured products and energy- and water- saving products is mentioned in the CE-related chapters contained in the Chinese Five-Year Plans that this thesis has taken into analysis.

1.6 CE in the international context

International organizations such as United Nations (UN) are pushing forward the need for CE implementation on a large scale. In 2015, in fact, UN has launched the 2030 Agenda for Sustainable Development, proposing the Sustainable Development Goals (SDGs) as at its core provisions. Among the twelve targets, SDG 12 Sustainable Consumption and Production is the one that is best suited for the usage of CE practices in order to achieve its fulfilment. The goal, in fact, focuses on the adoption of various CE-related behaviours such as the efficient use of natural resources, the reduction of waste and pollution, as well as green procurement and the promotion of a lifestyle in line with nature. CE could contribute to the attainment of numerous other goals, for example number 7 on affordable and clean energy, 8 on decent work and economic growth, 11 on sustainable cities and communities, 13 on resolutions on climate change, 14 on seas, oceans and marine resources protection, and 15 on terrestrial ecosystems protection (United Nations General Assembly; ECOSOC Joint Meeting, 2018).

The 2020 Circularity Gap Report provides a description of how countries are working in order to reach *"an ecologically safe and socially just operating space for humanity"*, by observing both the social performance on the basis of the United Nations Human Development Index (HDI), and the ecological performance based on the measurement of the demand of global biological resources per person. Three types of country-clusters have been identified: build, growth and shift countries. Concerning the process of getting circular, Build-countries are in a favourable position, circular strategies can be easily adopted in building infrastructures, which are still not developed. Growth-countries, such as China, are fast-growing, therefore their consumption of materials is high; in order to become circular they should pay attention on a more efficient use of natural resources and development of human capital through education, furthermore they should rethink the business model to increase the durability of the products, build stock for the future, introduce regulatory measures on waste reduction and finally decarbonise the economy through the use of regenerative resources in power generation. Shared innovation should play a key role in the transition, and this can be seen in Chinese growing eco-industrial parks. In shift-countries, such as European countries and the United States of America, incentives towards dematerialization of consumption and relative tax measures should be used in order to achieve their sustainable goals; furthermore these countries should take control of their impacts and move towards a sharing business model (de Wit; et al., 2020).

Given the momentum gained by CE in recent years (Geissdoerfer et al., 2017) and international organizations and bodies calling for its implementation, it is useful to analyse how the concept of CE is perceived in different realities such as the European Union (EU), China and the United States of America (USA), which have been chosen as the subject of analysis due to the fact that they represent the three largest economies of the world, as well as the world's top 3 GHG emitters on an absolute basis (United Nations Environment Programme (UNEP), 2019). In accordance with the structure of this thesis the Chinese situation will be analysed more in depth in Chapter 2.

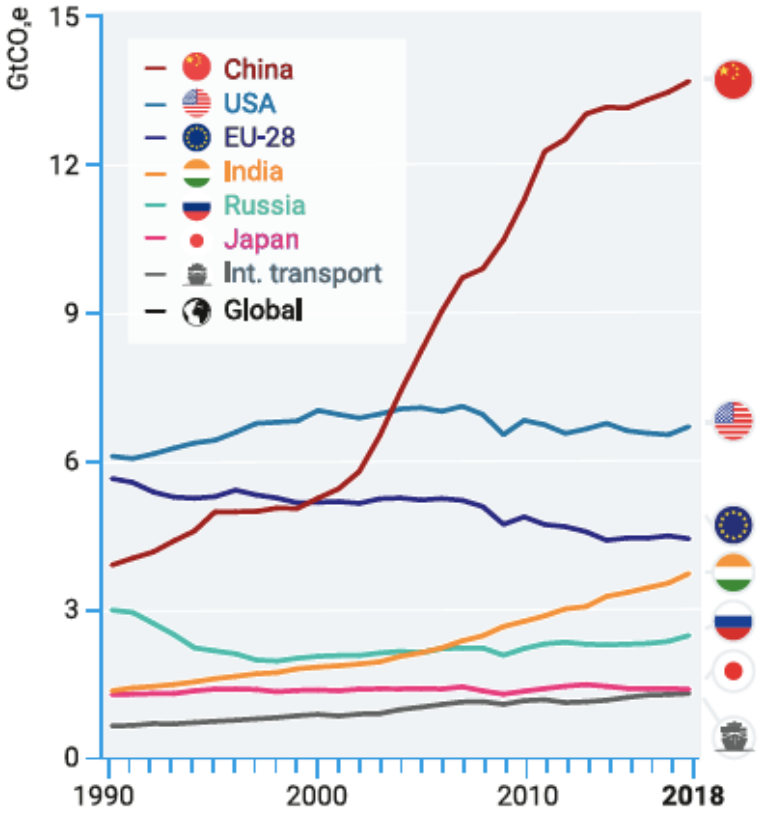

Figure 3 *Top GHG emitters on an absolute basis, Emissions Gap Report 2019.*

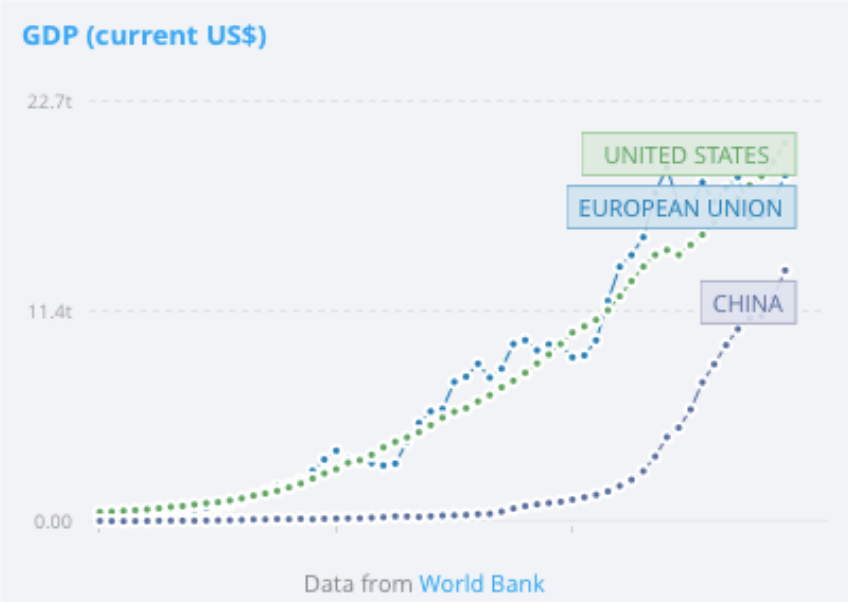

Figure 4 *Top GDP countries, World Bank data 2018. Available at: https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2018&locations=EU-US-CN&start=1960&type=points&view=chart.*

When analysing how the concept of CE is conceived in EU we refer to the institutional definition given by the European Commission (EC). The EC, in fact, is the executive arm of the EU, in this sense the definition proposed by the EC has to be considered as the official definition used in EU:

"In a circular economy, the value of products and materials is maintained for as long as possible. Waste and resource use are minimised, and when a product reaches the end of its life, it is used again to create further value. This can bring major economic benefits, contributing to innovation, growth and job creation." (European Commission, n.d.-b)

The above-mentioned definition stresses the concept of reduce-reuse-recycle-recover (4Rs), which adds a 4th "R" to the 3Rs concept of reduce-reuse-recycle. Moreover, the definition points out the importance of adopting CE in the long run, highlighting the side benefits brought by its implementation, namely innovation, growth and job creation. These positive opportunities are remarked also by the United Nations Economic Commission for Europe (UNECE), which identifies CE as a qualitative growth, comprising the blossoming of new jobs and economic sectors, which leads to a need for experimentation, referring not only to a technological change, but also to an experimentation with policies, governance and business ideas (United Nations Economic Commission for Europe (UNECE), 2019). In order to move towards CE practices in 2015 the EU launched "Closing the loop - An EU action plan for the Circular Economy". This

initiative comprises production, consumption, waste management and different priorities areas such as plastic, food waste and raw materials. (European Commission, 2015) 54 different actions have been developed and carried out before 2019 (European Commission, 2020).

Having outlined CE conception and implementation stage in EU, we will know present CE in China. CE concept was introduced in China in 1998, even if the term and some pertaining practices were already in use (J. Qi et al., 2016). Ten years later, in 2008, the Chinese government issued the "Circular Economy Promotion Law" (later amended in 2018) in which CE is defined as "the broader term that indicates the implementation of reduction, reuse and recycle actions in the production, circulation and consumption processes" ("本法所称循环经济，是指在生产、流通和消费等过程中进行的减量化、再利用、资源化活动的总称"，*běn fǎ suǒ chēng xúnhuán jīngjì, shì zhǐ zài shēngchǎn, liútōng hé xiāofèi děng guòchéng zhōng jìnxíng de jiǎn liàng huà, zài lìyòng, zīyuán huà huódòng de zǒngchēng*) (Standing Committee of the National People's Congress, 2018), following therefore the 3R (reduce-reuse-recycle) concept. It is important to highlight the fact that CE was also included in the 11th, 12th and 13th Five-Year Plan for National Economic and Social Development. The 11th Five-Year Plan for National Economic and Social Development (2006-2010) is the first document in which CE is presented as a part of the national development objectives. The 12th Five-Year Plan for National Economic and Social Development (2011-2015) was launched by Hu Jintao presidency and cites CE in Chapter 23, where it is highlighted the importance of developing CE in four different areas: implement a circular production method (推行循环型生产方式, *tuīxíng xúnhuán xíng shēngchǎn fāngshì*), improve circular usage of the resources and recycle system (健全资源循环利用回收体系, *jiànquán zīyuán xúnhuán lìyòng huíshōu tǐxì*), spread the green consumption model (推广绿色消费模式, *tuīguǎng lǜsè xiāofèi móshì*) and strengthen the policies and technological support (强化政策和技术支撑, *qiánghuà zhèngcè hé jìshù zhīchēng*) (National Development and Reform Commission (NDRC) of the People's Republic of China, 2011). The 13th Five-Year Plan for National Economic and Social Development was issued during Xi Jinping presidency and covers the 2016-2020 years. The Plan's Section 5 comprises the theme of CE, stressing in particular the importance of eco-industrial parks (National Development and Reform Commission (NDRC) of the People's Republic of China, 2016). It is worth to note that CE in China is pursued through a top-down strategy, meaning that the implementation is pursued through a "command and control" mechanism that stems from the national

governmental policies (Ghisellini et al., 2016). We will further analyse the aspects concerning CE presence in the Chinese legal framework in Chapter 2.

The US government has not provided a definition of CE yet, there are not governmental laws or initiatives directed towards the implementation of CE at the current moment. Being the US Chamber of Commerce the largest business corporation in the world, it was chosen therefore to cite the definition of CE given by one of its affiliate programs, the U.S. Chamber of Commerce Foundation Corporate Citizenship Center's Environment Program, in order to represent the American way to approach the CE topic. According to the above-mentioned institution, CE is described as *"an industrial model that is restorative or regenerative by design and intent: products, components, and materials are kept at their highest value at all times. It is a system geared toward designing out waste; it looks at all options across the entire chain in order to use as few resources as possible in the first place, keep those resources in circulation for as long as possible, extract as much value from those resources, and then recover and regenerate those materials and products at the end of that particular useful life*." (United States Chamber of Commerce Foundation, 2015) This definition focuses on the three principles provided by the Ellen MacArthur Foundation: design out waste and pollution, keep products and materials in use and regenerate natural systems (Ellen Macarthur Foundation, 2017). A 2018 research by the Dutch global financial institution ING points out that even though only 16% of US companies has already begun to use CE principles when carrying out their activities, an additional 62% of companies has the willingness to move towards a more circular business strategy (ING, 2018). It appears therefore that, even though national programs on CE implementation have not been issued, the single entities are internally motivated to move towards the adoption of CE practices.

The decision of the US President Donald Trump to withdraw from the Paris Agreement[11] in 2017 affected the image of USA in the sustainability arena. According to scholars, one of the consequences the withdrawal could bring to life is the reduction of possibilities for the world to act in order to mitigate climate change (H.-B. Zhang, Dai, Lai, & Wang, 2017). This situation,

[11] The Paris Agreement is a universal agreement ratified by 187 members of the United Nations Framework Convention on Climate Change (UNFCCC), comprising both developed and developing countries, which entered into force on 4th November 2016. The most prominent goals of the Agreement are: 1) to carry on the fight against climate change by limiting the rise of global average temperature below 2°C above pre-industrial levels and striving to limit the temperature increase to 1.5°C above pre-industrial levels and 2) increase the ability to implement climate change adaptation. Further information can be found at: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.

on the one hand it could favour China, offering the opportunity to the People's Republic of China to achieve a front row position in the global governance environment, on the other hand it could place burdensome expectations on China, which should take action in order to form effective international collaboration (H.-B. Zhang et al., 2017), as for example the 2018 Memorandum of Understanding (MoU) between China and European Union which confirms the willingness of both parties to collaborate in the CE field in order to exchange best practices, policies, strategies and investments (European Commission & National Development and Reform Commission of the People's Republic of China, 2018), delineating these two international powers as world leaders in the implementation of CE policies.

Chapter 2 Circular economy in China: background, implementation tools and initiatives

Since Deng Xiaoping's opening up policies launched in 1978 Chinese economy grew with an average annual growth rate of 10% (J. Qi et al., 2016) becoming the world largest economy on a purchase parity power basis (Morrison, 2019). Rapid industrialization caused severe environmental pollution, the Chinese government decided to take action and find a solution that allowed China to maintain an high-speed growth (necessary to reach a per-capita income similar to the world average one) while protecting and improving the environment (J. Qi et al., 2016): CE was chosen as the way to answer to these two requirements. The country is required to maintain a 6% economic growth until 2030, while reducing energy consumption, pollution emissions and waste discharge (J. Qi et al., 2016).

The purpose of this chapter is to present and analyse Chinese laws, plans and policies that are referred to CE application and support, bearing in mind the pivotal role played by the Chinese government in the formulation and implementation of all these legislative tools. In order to proceed in this direction, it is essential to understand CE (and its related legal framework) as part of the broader context of environmental protection and sustainability (and their related legal frameworks). The first part of this chapter will therefore provide important information on how the environmental issue is faced, and how the pertaining discourse is articulated in China.

2.1 The environmental issue: a "war against nature" or a "war against pollution"?

In 2014 President Xi Jinping declared a "war against pollution", the previous year, in fact, the new administration had to face serious pollution problems, in particular Beijing highly hazardous haze pollution, in which the concentration of PM 2.5 exceeded ten times the NAAQS[12] levels, and provoked national and international media turmoil (Grumbine & Xu, 2013; Y. Sun et al., 2014). The current situation is therefore characterized by the Chinese government commitment to the environmental issue, but has the Chinese government always been committed to this cause?

[12] NAAQS stands for China National Ambient Air Quality Standard.

Chinese leadership attitude towards the environmental issue has been diverse throughout the PRC history. Starting from the Maoist era, we can affirm that the Maoist view of nature was utilitarian. We can identify Maoist idea of human-nature relationship in the *chengyu*[13] "removing mountains and draining seas" (移山倒海，*yí shān dǎo hǎi*), which conveys the idea of the supremacy of the humankind over nature: humans are able to dominate nature, with their willingness they are able to alter it, in order to pursue their goals (Lora-Wainwright, 2019). Mao Zedong, in fact, openly set a "war against nature", whose objective was economic development. Natural resources, in fact, started being drained in order to achieve the country's development in various economic activities. Even after Deng Xiaoping raise to power in 1978, and his launch of economic reforms and opening up policies, the utilitarian exploitation of natural resources for the sake of national development was not abandoned, until the introduction of the concept of "moderately prosperous society" (小康社会, *xiǎokāng shèhuì*) in 1992. With this term, in fact, Chinese leadership sought a new path of development, rebalancing economic growth in order to pay more attention on societal problems, among which the concern over the environmental issue. Jiang Zemin administration (1993-2003) saw an increasing commitment towards the environmental issue yet overshadowed by economic growth and industrial development. The turning point in the environmental discourse can be seen in the Hu-Wen administration (2003-2013) decision of pursuing a "scientific development" (科学发展, *kēxué fāzhǎn*), coupled with "ecological civilization" (生态文明, *shēngtài wénmíng*): a new balance between nature and growth was declared essential for the nation's development. It is from this policy renewal onwards, that the environmental issue gained prominent importance in the Chinese government agenda, allowing the concept of CE to gain momentum, not only inside the academia but also inside the legislative milieu.

2.2 A command and control approach to CE

The CE concept is related to both the environmental and the economic sphere; in China both of these issues are addressed using a top-down approach, meaning that the government uses command and control instruments when facing the organization and regulation of the multiple aspects pertaining these two issues. It is therefore essential to present the tools used by the Chinese administration in order to enact its strategy, firstly introducing how Chinese Law is

[13] A *chengyu* is a Chinese idiom, usually made of four characters.

conceived and which elements brought to the establishment of a strong central power enacting command and control measures.

Chinese Law has been subjected to many studies, first of all it is essential to highlight the fact that Confucianism and Legalism both contributed to the formation of Chinese political and legal institutions during the Imperial Era, in fact both the Confucian 礼 *lǐ*, rites and Legalist 法 *fǎ*, law, had a remarkable role in shaping Imperial institutions (Cavalieri, 2008). It was only after the foundation of the Republic of China in 1912 and Chiang Kai-shek takeover in 1927 that new legal institutions were founded based on the rule of law of the legal models existing in continental Europe (Cavalieri, 2008). With the advent of the Maoist Era (1949-1976) and the foundation of the People's Republic of China (1949-) new values contributed in shaping the Constitution and the Chinese legal apparatus: soviet values (Cavalieri, 2008). It is important to highlight the fact that since the first 1954 Constitution the concept of the separation of powers (legislature, executive, judiciary) has not been part of the Chinese institutional structure (Cavalieri, 2008): a strong, central power was instead enacted, with the Chinese Communist Party (CCP) and its leader as the main actor. Another soviet element that is still crucial in modern China is the concept of a planned economy and development, achieved through the formulation of the five-year plans. Five-year plans, in this sense, can be seen as another indicator for the degree of importance of the government in aspects not necessarily related with the political and legal sphere such as economy and finance (D. Chen, Li, & Xin, 2017). Having illustrated the strong role of central planning and control in the Chinese context, it is therefore clear that the Chinese tendency to implement actions related to economic and environmental issues using a top-down approach, is the result of a pre-determined condition concerning the political and legal apparatus of China, which are both subjected to the strong role of the CCP and the government agenda.

As we mentioned above, it is useful to firstly understand which implementation tools and top-down measures are used in the environmental field, in order to better understand how CE is implemented. CE implementation, in fact, follows the pattern prescribed for the more eradicated implementation of environmental protection measures. As we will better explain in the following sub-section, the pertaining measures are included in laws, policies, regulations and plans. China particularly relies on targets; the environmental target policy (ETP) launched in 1989, is the emblem of how the government was able to control and evaluate the

implementation of environmental measures, originally binding ETP to local governments, which had the possibility to adapt and fix the targets on the basis of the local situation, and later changing its strategy multiple times. As local institutions tended to set low targets, the central administration decided to alter its dispositions, binding the targets with the evaluation of local cadres and secondly with the local economic performance evaluation. After severe pollution persisted the targets were bound with fiscal transfer payments to virtuous areas. In 2016 Xi Jinping administration noticed that the local government misused the governmental investments and realized that direct governmental subsidies were not effective as a market-based approach and voluntary measures could be. The administration, therefore bound the targets to large industrial enterprises, shifting the environmental problem from the government control to enterprises own responsibility and willingness to follow the set targets, creating a new system based on market approach coupled with the institution of new green policies (Mu, 2018). From the analysis of ETP, being it one of the most used tools for the implementation of environmental policies, we can identify the fact that in the implementation of environmental policies (and therefore CE policies) there are two main variables: the central-local government relationship and the relationship between the authorities and the enterprises.

Referring to the first variable, local official evaluation has been bound for many years with their achievements, in which GDP performance had prominent importance, creating a mechanism by which local actors stressed economic development over the environmental protection issue (Y. Qi & Zhang, 2014). Additionally, the evaluation pertaining environmental protection was inadequate and inaccurate, and the reporting system misleading, given its bottom-up approach that give way to data manipulation (Y. Qi & Zhang, 2014). The key role played by local administration in the implementation of national measure, can be seen also when directly analysing the provisions contained in laws and plans: local administration is seen as the first level of policy implementation, and with regard of some issues it must also adapt the policy to the local situation. The “one size fits all” principle, in fact, has to be smoothed in order to balance the discrepancies that exist between Chinese regions and provinces (Jiang & Xu, 2020). The local situation and the geographical position affect also the kind of relationship that exists between the administration and the businesses. We will therefore move to the description of the second variable: the relationship between the authorities and the enterprises.

Four different relationship styles can be identified on the basis of the predominance of either the authoritative governance of economy at different governmental levels, or the market

coordination of businesses: interdependent style (government and businesses both play a strong role in the industrial development, possessing mutual relations), networked style (limited authoritative governance is coupled with a leading role undertook by businesses, which establish intra- and inter-sector alliances for industrial development), statist style (the government leads industrial development through a top-down approach by allocating resources and issuing market regulations, businesses are considered as the vehicle for the implementation of the governmental strategies) and atomistic style (neither governmental authority nor business networks play a strong role in the industrial development, the risk of collusion may occur) (X. Zhang & Zhu, 2018).

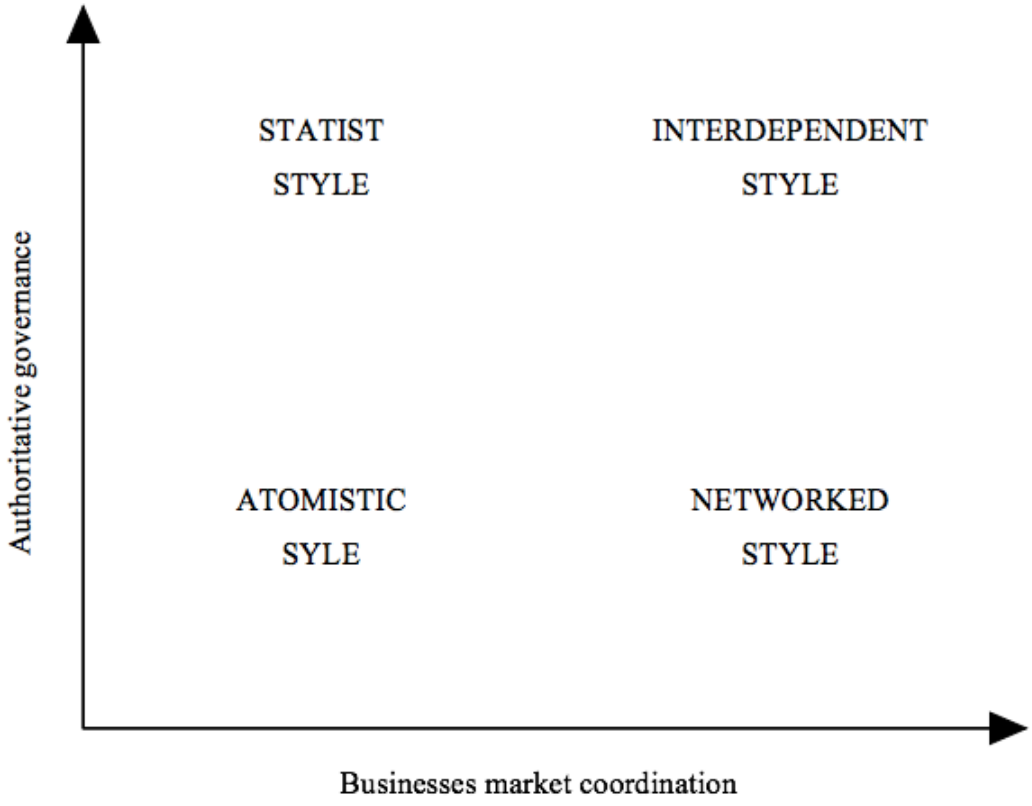

Figure 5 *Graphical representation of business-government relationship styles.*

Translating the discourse on the CE level, scholars such as Qi et al. (J. Qi et al., 2016) point out the fact that given the complexity of CE sphere of implementation, the individuals and enterprises alone are not capable of achieving the application and implementation of CE and its pertaining measures at all levels, therefore a regulative system is required, in order to establish the systems and actions necessary for the accomplishment of the above-mentioned goals,

underlying the need for a top-down, statist style relationship between the authorities and the business actors. Moreover, a great part of the CE measures is directed towards finance, energy, water and high resource-consumption sectors. Given their strategic importance, these sectors present a tight governmental control over their activities (X. Zhang & Zhu, 2018), as well as a concentration of government's investments (EUS ME Centre, 2013), meaning that the government-business relationship style is identifiable in the statist style. The statist style, as mentioned above, comprehends top-down control measures enacted by centralized regulatory and planning authorities, aimed at directing and pursuing industrial development. As we will further analyse in Chapter 3, in some regions the business actors are able to actively dialogue with the local governmental institutions, shifting the focus of CE promotion and implementation on the enterprises, which, given their power, shall proactively engage in CE implementation.

The top-down and command and control methods here above presented, nurture the rise of some consideration on the role -if any- that the general public participation and the non-governmental organizations (NGOs) play in the environmental discourse, and specifically in the CE promotion and implementation in China. First of all, we shall depict the situation of the general public and NGOs in the environmental field, and generally in the context of a low-carbon economy, further adding some considerations on these two variables' contribution to the CE discourse. The NGOs have been active in the environmental field since the first environmental NGO (ENGO) "Friends of Nature" (自然之友, *zìrán zhī yǒu*) was founded in 1994; in their early years ENGOs tried to raise awareness and educate the general public (Fu, 2016). What characterized ENGOs since their establishment, is their tendency not to adopt a confrontational behaviour towards the State, and not to organize large-scale social movements (Zhan & Tang, 2013). It was only in 2003 that the ENGOs started to lobby on environmental issues and mobilise the general public, a key event in this process was the campaign against the construction of the Nvjiang River dam (Fu, 2016). In China it is extremely difficult the pursuit of environmental advocacy, and ENGOs still try to establish a dialogue with the administration, rather than opposing it, in order to avoid the revocation of their non-profit status, and therefore having the duty to pay taxes (Shapiro, Brunner, & Li, 2018); depending on their political resources, in fact, NGOS are able to use formal or informal channels to interact with the State (D. Liu, 2019). What is characteristic of the Chinese reality is that many ENGOs are founded and managed by State agencies, and are known as GONGOs (N. Zhang & Skoric, 2019). There

have not been studies on the linkage between NGOs and CE yet, but being the change of behavioural and attitude paradigms at all levels of society one of the engine for a circular development, NGOs and particularly ENGOs could exploit their user base in order to promote the adoption of a circular lifestyle and educate the general public on the government's CE-based development (Su, Heshmati, Geng, & Yu, 2013). NGOs shall be the driving force behind public participation, but as we have previously depicted, Chinese reality is different from the Western conception of NGOs advocacy. The government issued many laws and regulation that target public participation in the construction of a low-carbon economy, but the actual participation resulted less than the government presumptions (W. Yang et al., 2019); scholars, in fact, suggest that public participation rights should be improved, and that the general public should be more actively engaged (G. Zhang, Deng, Mou, Zhang, & Chen, 2019), the lifestyle and consumption pattern of the public are in fact essential for the implementation of CE (Guo, Geng, Sterr, Zhu, & Liu, 2017). Raising awareness is therefore functional to the participation of the general public in the implementation of the central government guidelines and suggested behaviours targeting the pursuit of CE. The most widespread and used method that enables the population to take part to the environmental discourse is the complaining letter. Through this method, people can present environmental problems to the local environmental bureaus, which have the duty to respond (G. Zhang et al., 2019). In the end, both the general public and NGOs participation to the environmental issue, have suffered from an even stricter control in recent years (Kostka & Zhang, 2018).

2.3 Implementation tools, a general overview

The Chinese government embraced CE as a national development strategy with the wider objective of pursuing a sustainable development (Guo et al., 2017; Yuan, Bi, & Moriguichi, 2008). The all-around importance of CE can be seen by the fact that the main body responsible for CE promotion and regulation is the National Development and Reform Commission (NDRC). The NDRC is an agency under the State Council, the executive body of the National People's Congress. Among its multiple duties, the NDRC is responsible for the formulation of national strategies aimed at the economic and social development (such as the Five-Year Plans for National Economic and Social Development), it participates to the establishment of financial and fiscal policies, supervises import and export policies and promotes sustainable development practices. The range of action of the NDRC does not focus on a single topic, but it merges different issues together that are the symbol of the government agenda. In relation to CE, the duties undertook by the NDRC are to formulate CE regulations, appraisal criteria and

development plans. There are two additional agencies which have a major role in CE promotion, namely the Ministry of Industry and Information Technology (MIIT) and the Ministry of Ecology and Environment (MEE) (formerly SEPA); the former focuses on policies pertaining resources and producer responsibility, the latter is engaged in defining eco-industrial parks and cleaner production regulations (J. Zhu, Fan, Shi, & Shi, 2019). Besides these three main bodies, specific CE aspects are promoted and regulated by multiple agencies, such as the Ministry of Land and Resources, the Ministry of Science and Technology and the Ministry of Finance (J. Zhu et al., 2019).

As mentioned in section 1.6, the Chinese vision of CE focuses on the 3Rs concept: reduce, reuse and recycle; these three actions are applied on a three-level hierarchy, i.e. at micro, meso and macro level: within an enterprise, between different enterprises and diverse industries (as for the case of industrial parks), and at the city (or larger area) level (J. Qi et al., 2016). In order to address all the three levels, laws, regulations, plans and policies have been developed, both specifically for CE and for a more general focus on environment and sustainability. In fact, CE regulative framework can be depicted by taking in consideration the broader framework of laws concerning the environment and sustainability issues. In 1978 the Constitution of the People's Republic of China (hereinafter the Constitution) was amended and reference to the environment and natural resources protection, together with pollution reduction, was made (J. Qi et al., 2016). We can therefore identify in the Constitution the primary legislative basis for law making on environmental and sustainability issues (J. Qi et al., 2016). Before CE concept official introduction in 1998, a total of 28 laws, plans and regulations have been issued regarding the aforementioned issues[14]. The most relevant laws and regulation that are directly connected to the spectrum of CE (3Rs; waste and pollution minimisation; energy and resources consumption reduction; environmental protection and sustainable development) are summarized in **Table 7** here below.

Table 7 *Chinese legal and regulatory measures related to the spectrum of CE issued before CE concept was officially introduced in China.*

NAME	YEAR	TYPE
Environmental Protection Law of the People's Republic of China	1979 (amended in 1989 and 2014)	law

[14] This data is the result of a University group research project ("China's path towards environmental sustainability") coauthored by the author of this thesis together with Sofia Marcon, Licia Parodi and Gaia Spoggi.

Water Pollution Prevention and Control Law of the People's Republic of China	1984 (amended in 1996, 2008, 2018)	law
Interim Provisions on Several Issues Concerning the Comprehensive Utilization of Resources	1985	regulation
Law on Prevention and Control of Atmospheric Pollution of the People's Republic of China	1987 (amended in 1995 and 2018, revised in 2000 and 2015)	law
China's Agenda 21	1994	plan
Law of the People's Republic of China on the Prevention and Control of Solid Waste Pollution	1995 (revised in 2004, and later mended in 2013 and 2016)	law
Energy Conservation Law of the People's Republic of China	1997 (revised in 2007, and amended in 2016 and 2018)	law

Even if during the five-year period of the 10th Five-Year Plan the central government started paying attention to CE (Cui & Zhang, 2018), we can identify the 2002 Cleaner Production Promotion Law of the People's Republic of China as the most relevant step towards CE implementation. The relevance is given by the fact that, as we will analyse in sub-section 2.4.1, it comprises many concepts and actions directly related to CE. In addition to this legislation, before the promulgation of the Circular Economy Promotion Law of the People's Republic of China in 2008 the most relevant laws, plans and regulations concerning the broad topics covered by CE can be identified in **Table 8** here below.

Table 8 *Chinese legal and regulatory measures related to the spectrum of CE issued from 1998 to the establishment of the Circular Economy Promotion Law of the People's Republic of China.*

NAME	**YEAR**	**TYPE**
Cleaner Production Promotion Law of the People's Republic of China	2002 (amended in 2012)	law
Law of the People's Republic of China on Environmental Impact Assessment	2002 (amended in 2018)	law
Interim Provisions for National Eco-Industrial Parks Demonstration Application, Naming and Management	2003	regulation

Provisional Guideline for Planning National Eco-Industrial Parks Demonstrations	2003	regulation
Renewable Energy Law of the People's Republic of China	2005 (amended in 2009)	law
Opinions on Accelerating Circular Economy Development	2005	regulation
The 11th Five-Year Plan for Economic and Social Development of the People's Republic of China	2006	plan
Evaluation Index System for Circular Economy Development	2007 (amended in 2017)	index
Guideline for Circular Economy Development	2007	regulation
Evaluation Index System for Eco-Industrial Parks	2007	index
Guideline for the Construction Plans of Eco-Industrial Parks	2007	regulation

As it is clear from the data comprised in **Table 8**, the 2005 Opinions on accelerating circular economy development (hereinafter referred to as "the Opinions"), targeted specifically CE and constituted the guidelines for national CE implementation (J. Qi et al., 2016). From 2007 diverse guidelines were issued on CE and eco- industrial parks (J. Qi et al., 2016); as a matter of fact, the establishment of pilot eco-industrial parks and demonstration areas for CE dates back to 2003, together with the issue of regulations and guidelines related to the management and planning of these projects[15] (J. Qi et al., 2016; J. Zhu et al., 2019). 2004 marks the year of the first National Working Conference on CE, in which CE development administration was given to NDRC: considering that CE is an inclusive concept, in which both the environmental and economic regulative frameworks have to coexist, it was no longer possible to delegate CE development to the State Environmental Protection Administration (SEPA), as it was initially appointed (J. Qi et al., 2016). The 11th Five-Year Plan for National Economic and Social Development was the first plan to include the CE concept and to propose a definition for it, in

[15] The regulations and guidelines are namely: the "Regulations on Application for, Naming of and Management on State-Level Demonstration Eco-Industrial Parks (Trial)", the "Guideline for Planning of Demonstration Eco-Industrial Parks (Trial)", the "Regulations on Application for, Naming of and Management on State-Level Demonstration Areas for Circular Economy (Trial)" and the "Guideline for Planning of Demonstration Areas for Circular Economy (Trial)".

which development and conservation are encouraged in equal measure, prioritizing the latter; the 3R principle is also cited as being the basis for the building of a resource recycling system[16].

Regulations, policies and provisions continued being formulated and enacted, after the promulgation of the Circular Economy Promotion Law of the People's Republic of China in 2008 and its entry into force the following year. The documents target both general and specific CE issues: waste (for example agricultural and solid waste reutilization) and recycling, comprehensive utilization of resources, remanufacturing and pollution prevention and control are the main themes addressed. New concepts were introduced, such as city-mining and extended producer responsibility; furthermore, taxation related to the environment and the reutilization of resources was further elaborated. Finally, attention started to be given to climate change. In 2011 the 12th Five-Year Plan for Economic and Social Development of the People's Republic of China was issued, presenting key objectives relative do environmental, sustainable and circular matters, we will further analyse this document in sub-section 2.5.1. In 2016 both the Promotion Plan of Extended Producer Responsibility (EPR) and the 13th Five-Year Plan for Economic and Social Development of the People's Republic of China were issued. The latter will be examined in sub-section 2.5.2. We can notice the fact that in the last years the production of new laws has stopped, placing the focus on the amendment and revision of previous laws on CE-related matters. The main legal and regulatory measures issued since 2008 are summed up in **Table 9** here below.

Table 9 *Main Chinese legal and regulatory measures related to the spectrum of CE issued since the establishment of the Circular Economy Promotion Law of the People's Republic of China in 2008.*

NAME	YEAR	TYPE
Circular Economy Promotion Law of the People's Republic of China	2008 (amended in 2018)	law

[16] The original version of the 11th Five-Year Plan has been consulted in order to develop this consideration. The source can be found at the following web link: http://www.gov.cn/gongbao/content/2006/content_268766.htm. The complete definition given by the 11th Five-Year Plan for National Economic and Social Development can be translated as follows: "Sustain in equal measure development and conservation, prioritizing conservation; on the basis of the principles "reduce-reuse-recycle", progressively build a system for resource recycling for the whole society, in the areas of resource extraction, production consumption, pollutants generation and consumption" (坚持开发节约并重、节约优先，按照减量化、再利用、资源化的原则，在资源开采、生产消耗、废物产生、消费等环节，逐步建立全社会的资源循环利用体系。*Jiānchí kāifā jiéyuē bìngzhòng, jiéyuē yōuxiān, ànzhào jiǎn liàng huà, zài lìyòng, zīyuán huà de yuánzé, zài zīyuán kāicǎi, shēngchǎn xiāohào, fèiwù chǎnshēng, xiāofèi děng huánjié, zhúbù jiànlì quán shèhuì de zīyuán xúnhuán lìyòng tǐxì.*).

Regulation on the recovery and disposal of waste electrical and electronic products	2009 (amended in 2019)	regulation
Notice on Promoting the Development of a Low Carbon Economy in National Demonstration Eco-Industrial Parks	2009	policy
Opinion on the investment and financing policies for circular economy development	2010	rule
Opinion on Facilitating the Development of the Remanufacturing Industry	2010	rule
Circular on Building Demonstration Bases of City Mining	2010	rule
The 12th Five-Year Plan for Economic and Social Development of the People's Republic of China	2011	plan
Implementation Scheme for Supporting Demonstration Cities for Recycling and Safe Disposal of Urban Kitchen Wastes with the Special Fund for the Circular Economy	2011	rule
Circular on Adjusting and Improving the Value-Added Tax Policies for Products and Labour Services that Comprehensively Utilize Resources	2011	policy
Opinion on facilitating circular economy-oriented upgrading of industrial parks	2012	rule
Development strategy and immediate action plan of circular economy	2013	regulation
Action Plan for air pollution prevention and control	2013	plan
Opinions on facilitating the resource-based co-processing of urban and industrial waste in the production process	2014	rule
National Plan on Climate Change	2014	plan

Implementation Plan of Extended Producer Responsibility (EPR)	2016	plan
The 13th Five-Year Plan for Economic and Social Development of the People's Republic of China	2016	plan
Environmental Protection Tax Law of the People's Republic	2016 (revised in 2018)	law
Resolution of the Standing Committee of the National People's Congress on Comprehensively Tightening Ecological and Environmental Protection and Lawfully Promoting Triumph in the Uphill Battle for Prevention and Control of Pollution	2018	working documents
Several Opinions of the Ministry of Finance, the National Development and Reform Commission, and the National Energy Administration on Promoting the Healthy Development of the Power Generation of Non-water Renewable Energy.	2020	regulation

We can conclude the general overview on Chinese CE implementation tools pointing out that the legal instruments used to implement and encourage CE application are vast: laws, regulations, initiatives, guidelines, pilot projects and demonstration areas, incentives, mandatory and voluntary standards. This miscellaneous mix of policy instruments brings CE legislative framework complexity to light. The complete list of laws, regulations and policies pertaining to CE is presented in Appendix A.

2.4 Circular Economy related laws

The two most prominent laws related to CE application and diffusion in China, the Cleaner Production Promotion Law of the People's Republic of China and the Circular Economy Promotion Law of the People's Republic of China will be analysed here below.

2.4.1 Cleaner Production Promotion Law of the People's Republic of China (中华人民共和国清洁生产促进法, *Zhōnghuá rénmín gònghéguó qīngjié shēngchǎn cùjìn fǎ*)[17]

The Cleaner Production Promotion Law of the People's Republic of China (hereinafter "the Cleaner Production Promotion Law") focuses on the production process of single entities. This document is important in the CE context because it is the first law in which an idea for a more environmental-friendly production is suggested, anticipating many of the concepts related to CE.

The Cleaner Production Promotion Law was introduced on 29th June 2002 (entering into force on 1st January 2003), and later amended on 29th February 2012. The Cleaner Production Promotion Law is composed by six chapters, for a total of forty articles: Chapter 1 General provisions includes Articles 1-8, Chapter 2 Cleaner production introduction contains Articles 9-17, Chapter 3 Cleaner production implementation consists of Articles 18-29, Chapter 4 Promotion measures encompasses Articles 30-34, Chapter 5 Legal liabilities comprises Articles 35-39 and Chapter 6 Supplementary provisions consists of Article 40.

The aim of this law is stated to be the promotion of cleaner production, therefore facilitating the increase of the efficient use of resources, as well as pollution production minimization and avoidance. The law is also aimed at protecting and ameliorating the environment, ensuring people's health and promoting a sustainable development of the economy and the society. Cleaner production is defined as constantly adopting measures such as redesign, the utilization of clean energy and resources, the employment of advanced process technologies and equipment, improved management and comprehensive utilization of resources. These measures are intended to reduce pollution from the source, increase resource utilization rate efficiency, diminish and avoid the production and emission of pollutants generated during the production process or produced during the utilization or service of products, thereby alleviating or eliminating the harm done to human health and to the environment.

[17] In order to analyse the Cleaner Production Promotion Law of the People's Republic of China the official 2012 final draft in Chinese was used, as well as the English translation of the 2002 document; preferring the first for a more accurate analysis. The sources can be found at the following web links:
Chinese version: http://extwprlegs1.fao.org/docs/pdf/chn173871.pdf.
English version:
http://english.mofcom.gov.cn/article/policyrelease/internationalpolicy/200703/20070304471061.shtml.

Cleaner production shall be included in the national economic and social development plans, as well as in the annual plans and other specific plans both at the State Council and at and above county level. Scientific research, technology development, international cooperation on cleaner production and social participation are encouraged. Financing and taxation relative to cleaner production have to be formulated by the State Council. Policies shall be introduced in order to favour cleaner production implementation. The establishment of a cleaner production promotion-oriented information system and technological consulting service system shall be organized and sustained by the government departments at all levels, in order to be able to provide to the public information and services on issues related to the cleaner production policies, for example information on the cleaner production-related methods and technologies, and information on the demand and supply of recyclable waste.

The State Council, together with other departments, namely the ones related to environmental protection, industry, science and technology and agriculture, is required to regularly issue guiding catalogues concerning cleaner production technologies, processes, equipment and products. Relevant departments at all levels have the duty to organize and establish a guide for the implementation of cleaner production in key industries and areas. The State Council shall establish a time-limited system for the elimination of the technologies, processes, equipment and products which result to be outdated and therefore causing resource depletion and severe environmental pollution, additionally a pertaining catalogue shall also be issued. A labelling system for products that protect the environment and resources (e.g. energy- and water- saving products or recycled products) can be established by the responsible departments under the State Council; furthermore, pertaining standards shall be established on the basis of national regulations.

It is important to notice that the document also refers to the fact that cleaner production technology and management courses shall be introduced into higher education, professional education and technical training programs by the education departments under the State Council. In this way knowledge concerning cleaner production of government officials, company managers and the general public will be enhanced, and managerial and technical personnel will be trained on cleaner production.

As a part of cleaner production measures governments at all levels are required to prioritize the purchase of products that favour environmental and resource protection, furthermore they have to encourage the general public to adopt the same purchasing behaviour.

The cleaner production responsible departments at all levels have the duty to publish a list of companies which have not yet achieved the standards for the control of resource depletion and pollutants emissions. Newly built facilities, rebuilding and expansion projects are required to undergo an environmental impact evaluation. All the companies that are undergoing a process of technical transformation have the duty to use non-toxic and harmless materials; use processes and equipment which possess a high resources utilization rate and produce a small quantity of pollutants; comprehensively reuse or recycle waste products, waste water and waste heat generated during the production process; use pollution prevention and control technologies in line with national and local standards on pollution discharge. The Cleaner Production Promotion Law also points out the fact that when designing products and packaging, companies have the duty to ponder the effects that these products and packaging will have on human health and environment, and accordingly prefer to create materials and packaging which are non-toxic, harmless, easily degradable and recyclable.

The Cleaner Production Promotion Law addresses diverse industries and sectors, such as the agricultural industry, service industry, the construction sector and the mining sector. Companies are required to monitor resource depletion and waste generation during their production process and service provision, and conduct cleaner production audits when needed, i.e. when pollutant emissions or total volume exceed national or local standards; when the energy depletion limit per unit is exceeded; when toxic and harmful materials are used or discharged during the production process. Companies subjected to mandatory cleaner production audit have the duty to disclose the result to the competent authority within the limits of business secrecy.

Entities or individuals who have reached significant results in cleaner production implementation are given recognition and are rewarded; financial support is given to those projects that are focused on the research, demonstration and training on the cleaner production issue, as well as those projects for technological transformation based on cleaner production. Preferential tax treatment is given to entities which reuse waste and recycle materials from waste in order to produce new products.

According to the Cleaner Production Promotion Law if the Comprehensive Coordination Department of Cleaner Production or other relevant departments fail to perform their duties, disciplinary action is taken against the people in charge or other responsible actors. A monetary

penalty is charged to those entities who fail to communicate the data concerning energy consumption, pollutants generation and discharge. A pecuniary penalty is charged also to those entities who do not label (or label incorrectly) the materials of the products and fail to adopt corrective measures. Entities that produce or sell toxic and harmful construction and decoration materials that exceed the national standards, will be investigated for administrative, civil and criminal liabilities in accordance with the Product Quality Law and civil and criminal law dispositions. Entities that do not perform the mandatory audit on cleaner production or that recourse to deception, entities that do not report their results or report false information, will incur in a pecuniary penalty if they fail to amend their reports in a given period of time. Disciplinary action will be taken against those individuals that have assessment and approval duties and, in violation of the Cleaner Production Promotion Law, accept a fee from the assessed entity; accept to state false information or take advantage of their position in order to receive benefits.

The Cleaner Production Promotion Law of the People's Republic of China conveys the core ideas of CE, namely resources and energy conservation, reuse and elimination of waste, control and elimination of pollution, and appropriate design of products. CE further elaborates these concepts and provides the idea of "closed circles", cooperation between multiple and diverse industries aimed at the reutilization of resources and elimination of waste. For what concerns China specific case we can identify the fact that attention is moved from the single entity to industrial parks, creating therefore a synergy between industries and companies pertaining to different sectors. We will further analyse the Circular Economy Promotion Law of the People's Republic of China in the following sub-section. Although the anticipation of these themes pertaining CE, we can conclude that the main focus of cleaner production resides in pollution minimisation coupled with a growing concern for human health. Furthermore, it is interesting to point out the fact that multiple times the general public has been mentioned and considered in the Cleaner Production Promotion Law, being regarded as an actor that can have access to training and information on the cleaner production topic.

2.4.2 Circular Economy Promotion Law of the People's Republic of China (中华人民共和国循环经济促进法, *Zhōnghuá rénmín gònghéguó xúnhuán jīngjì cùjìn fǎ*)[18]

[18] In order to analyse the Circular Economy Promotion Law of the People's Republic of China the 2018 official final draft in Chinese and an English translation of the 2008 document were both used, preferring the first if

The Circular Economy Promotion Law of the People's Republic of China (hereinafter referred as "the Circular Economy Promotion Law") was promulgated on 29th August 2008 at the fourth meeting of the Standing Committee of 11th National People's Congress of the People's Republic of China, under the Hu-Wen leadership[19], and entered into force on 1st January 2009. The Circular Economy Promotion Law was later amended in 2018; the amendments are aimed at changing the names of the Ministries which have underwent a renaming process between 2008 and 2018: the MEE (previously MEP) and the State Forestry and Grassland Administration (previously State Forestry Administration). Another amendment involves the introduction of a newly created department, the State Administration for Market Regulation (SAMR), in which converged the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ) and the State Administration for Industry and Commerce (SAIC), which were both cited in the law under scrutiny.

This law presents seven chapters articulated in fifty-eight articles, precisely Chapter 1 General provisions includes Articles1-11, Chapter 2 Basic administrative system contains Articles 12-17, Chapter 3 Reduction includes Articles 18-28, Chapter 4 Reuse and recycle encompasses Articles 29-41, Chapter 5 Incentive measures consists of Articles 42-48, Chapter 6 Legal liabilities comprises Articles 49-57 and Chapter 7 Supplementary provisions consists of Article 58.

The first article of the Circular Economy Promotion Law states that the purpose of this law is promoting the development of CE, raising the recycling rate of resources, protecting and ameliorating the environment and carrying out a sustainable development. The definition of CE follows in Article 2 and recites as follows: "*the broader term that indicates the implementation of reduction, reuse and recycle actions in the production, circulation and consumption processes*", as already mentioned in section 1.6 contained the previous Chapter of this thesis.

CE is afterwards defined as an important strategy for the economic and social development of the Nation; in Article 6, in fact, it is specified that the industrial policies issued by the State must be in line with the requirements of CE development, which must be included in the

discrepancy in translation were found. The sources can be found at the following web links:
Chinese version: http://www.npc.gov.cn/zgrdw/npc/xinwen/2018-11/05/content_2065669.htm.
English version: http://www.lawinfochina.com/display.aspx?id=7025&lib=law.

[19] Hu-Wen leadership refers to the President Hu Jintao and Premier Wen Jiabao Administration, which lasted from March 2003 to March 2013 (covering a period of two consecutive terms).

national economic and social development plans, as well as in annual plans at and above the county-level; furthermore, CE development must also be included in more specific plans, such as the environmental protection and science and technology plans at and above the county-level redacted by the concerning governmental departments.

The provision openly encourages and supports the research, development and promotion of science and technology related to CE, as well as the actions aimed at CE publicity and education on the topic; the State also supports scientific knowledge diffusion and international cooperation on this topic. As we have already pointed out, in the last decade Chinese scholars have followed these instructions, being particularly prolific in scientific research on CE (Geissdoerfer et al., 2017), furthermore China engaged itself in many international initiatives and collaborations aimed at the promotion, diffusion and implementation of CE, such as the 2018 Memorandum with the EU and the UN "Transforming Our World: The 2030 Agenda for Sustainable Development".

Governments at and above county level must adopt measures to promote CE development, such as plans, public finance, investments and procurement measures. Companies must also implement CE-oriented measures, such as reducing resource consumption, the production of waste and emissions and increase the reuse and recycling levels of waste. Citizens and social organization such as the industrial associations are also encouraged to participate to CE development through appropriate actions. The plans for CE implementation that both the Administrative department of CE development under the State Council and the same departments at and above the county level have to issue, must include the objectives of the plan and its scope of application, the major contents, tasks and safeguards; these plans must also fix indicators such as the rate of resource consumption and waste reuse and recycle rate.

The administrative department of CE development under the State Council, together with the statistical department, the MEE and other competent departments must establish and improve a system of indicators for the evaluation of CE. Lower level governments will be evaluated by higher level ones on the development of CE according to fixed major indicators.

According to the Circular Economy Promotion Law enterprises must recycle and/or reuse the waste materials and packaging that are enlisted as recyclable by the administrative department of CE development under the State Council, while disposing safely the ones that are not suitable

for reuse. The organization can also delegate this responsibility to buyers or other organizations. Key industries which exceed the national standards of energy and water consumption and are therefore high-energy and high-water consuming industries, shall implement a supervision and management system related to energy and water consumption. The State and the dedicated departments have the duty to formulate a statistical system and its related indicators; a system of indicators regarding energy, water and resources conservation, waste reuse and recycling and a labelling system able to convey information on resource consumption in products. A list of encouraged, restricted and forbidden technologies, techniques, equipment, materials and products has to be promulgated by authorities. The requirements for reducing consumption and waste must be followed when designing new techniques, equipment, products and packaging, preferring easy to recycle, easy to disassemble, degradable, non-hazardous or low-hazardous materials and design plans. Water consumption reduction must be observed by companies employing pertaining technologies, techniques and equipment, while controlling and monitoring the situation. The use of fuel-saving products in companies is encouraged and sustained by the State.

In addition to the high energy and water consuming industries, the Circular Economy Promotion Law focuses also on other specific industries. Mining activities must be carried out following reasonable procedures and plans. Conservation of energy, water, land and resources, must be applied also in the construction sector: where possible renewable energy shall be used, and non-hazardous materials shall be employed. In the agricultural field the intensive use of land is promoted, as well as a limited use of water, fertilizers and pesticides; energy saving shall be applied for agricultural machinery: an ecological agriculture shall be prioritized.

All the organizations that use government funds should take the lead and economize, eradicate waste and use products, equipment and facilities that are oriented towards saving energy, water, land, resources and protecting the environment. Buildings shall be well managed and maintained in order to extend their service life.

Service companies must use technologies, equipment and facilities that are oriented towards saving energy, water, resources and protecting the environment.

The use of recycled water is encouraged and sustained, furthermore under the premise of products' safety and health, the production and sale of disposable goods is restricted.

In Article 29 industrial parks and zones are mentioned, prescribing that the companies have the duty to pursue the integrated use of resources and promote the development of CE. The companies that are located in industrial parks and zones shall also exchange waste for the purpose of its reutilization; other actions that should be performed are the cascade utilization of energy, the intensive use of land, the classification and recycled use of water, and the joint use of infrastructures and facilities. Newly built or rebuilt industrial zones must conduct an environmental impact assessment; furthermore, ecological protection and pollution control measures should be taken to ensure that the environmental quality of the area reaches the prescribed standards.

The Circular Economy Promotion Law further focuses the attention on the company level, given the fact that a set of provisions dedicated to companies is prescribed. Companies must comprehensively reuse the waste generated in their production processes in accordance with the State provisions; improve the water reuse rate establishing an interconnected and circular water usage system; recover the waste water produced in the production processes. Residual heat and pressure should also be used, thanks to the use of recovery technologies, techniques and equipment. Construction waste shall be reused or safely disposed of. In the agricultural field waste resources, by-products, methane and biomass energy should be used, and ecological forestry shall be developed. A system for the exchange of information about industrial waste shall be promoted, as well as the establishment of a waste recovery system. Reference is also made to the disposal and recovery of electronic devices, appliances, motor vehicles, tyres, batteries and similar products, which should follow the pertaining laws and regulations.

Recovered, remanufactured and reconditioned products must meet the national standards and have a label in an eye-catching place stating that they are remanufactured or reconditioned products. The government at and above county level should plan and establish a system for the classification and recycling of domestic waste, and the relative facilities, both in urban and rural areas. Companies are sustained by the government at and above the county level when building facilities for the recycling and disposal of sewage sludge, in order to increase the rate of their utilization and prevent secondary pollution.

Governments at all levels have the duty to establish special funds for the development of CE in order to sustain the scientific research and the demonstration and promotion of CE technologies

and products, the implementation of CE projects and information services. The government adopts a preferential tax policy for those industrial activities aimed at promoting CE, furthermore it uses similar measures to support the import of advanced technologies, equipment and energy-, water- and resource-saving products; additionally, these measures are also aimed at limiting the export of products that massively consumed energy and dispersed pollutants in the production process. Those companies using or producing technologies, processes, equipment or products that are enlisted in the cleaner production catalogue, comprehensive use of resources catalogue or other encouraged catalogues benefit of the preferential tax.

When deciding and implementing investment plans, the administrative departments of CE development at or above the county level shall identify energy, water, land and resource saving projects and projects concerning the comprehensive use of resources as key investment areas. Financial institutions shall also provide credit support and actively provide supporting financial services to these projects.

The State shall implement price policies that contribute to resource saving and their rational use, guiding entities and single citizens resource usage behaviour.

Waste disposal fees can be applied according to local dispositions; waste recycling is encouraged by the State, which also contributes to CE development through procurement policies that prefer energy-, water- and resource-saving products, eco-friendly products and regenerative products. Recognition and reward are given to those entities or single citizens who have made remarkable contribution to the development of CE.

The Circular Economy Promotion Law includes also a set of legal liabilities, that will be hereafter reported. The administrative departments of CE development or other competent departments that fail to investigate after a violation of the Circular Economy Promotion Law is found or is reported, will be ordered to change their behaviours and disciplinary actions will be taken towards the liable person(s) by the government at the same or higher level. According to the Circular Economy Promotion Law, the production or sale of products or equipment included in the elimination list will be punished according to the Product Quality Law of the People's Republic of China. If a company uses the enlisted technologies, processes, equipment or materials, it will be liable of paying a pecuniary penalty, if the circumstances are serious the activity could be suspended or shut down. If import of the above-mentioned categories happens,

the importer must return the items and a pecuniary penalty may be applied. If prohibited poisonous and harmful materials are used for the design of electrical appliances and similar products that may cause environmental pollution in the disassembly or disposal process, the liable entity will be ordered to change its behaviour, a pecuniary penalty may be given, and under serious circumstances its business license may be revoked. High energy and water consuming industries and mining industry shall follow the provisions aimed at reducing their impact dictated by the Circular Economy Promotion Law. If they fail to implement them, they will be ordered to change their behaviour or a pecuniary penalty (for both industries) and the business license revocation (only for mining industries) may occur. A notice followed by a pecuniary penalty and the license revocation may occur if any entity sells remanufactured and/or reconditioned products without the relative label. If harm has been provoked compensation must be given by the liable party. If in violation of the Circular Economy Promotion Law a crime is committed, the liable entity will be prosecuted for criminal liabilities according to the Law.

In conclusion, after having condensed the contents of the Circular Economy Promotion Law of the People's Republic of China, we can briefly analyse this document as follows. The Circular Economy Promotion Law aims at addressing all the industries and sectors of Chinese economy, giving new impetus to the provisions previously stated in the 2002 Cleaner Production Promotion Law. As we already mentioned in subsection 2.4.1, in fact, the Cleaner Production Promotion Law can be seen as a pioneering legislation in which the main actions and measures pertaining to the CE are considered. The main difference between the two provisions is therefore the fact that the Circular Economy Promotion Law proposes more practical actions for the implementation of the 3R concept, instead of focusing on pollution as its main topic; furthermore, whilst the Cleaner Production Promotion Law addresses single enterprises and single industries, the Circular Economy Promotion Law expands the field of action of the pertaining practical measures, comprising eco-industrial parks and therefore the collaboration between multiple companies belonging to diverse industries. Provisions on waste reuse and recycling are further deepened in the Circular Economy Promotion Law, additionally the issue of recovered, remanufactured and reconditioned products is explored.

2.5 Circular Economy related five-year plans

Before analysing the two most prominent five-year plans that address the issue of CE application and diffusion in China, it is useful to briefly introduce the concept of five-year plans,

its origins and applications in the Chinese context, giving particular attention to their pivotal role in the development of Chinese economy and society.

Firstly, it is essential to provide a definition of the term "five-year plans", which is defined by Encyclopaedia Britannica as a "*method of planning economic growth over limited periods, through the use of quotas, used first in the Soviet Union and later in other socialist states*"[20]. It is therefore clear that five-year plans are a tool used by the State to directly control the economy and the economic development, creating a planned economy. The concept underlying the five-year plans is sharply in contrast with the idea of the existence of a "invisible hand" professed by A. Smith, which encourages a free-market economy, without regulations and restraints introduced by the government, rendering the individuals free to act in the economic arena.

Given this premise, we will now discuss the employment of five-year plans in the PRC. As we mentioned in the introduction to Chapter 2, five-year plans are a soviet import; during the PRC embryonic stage, in fact, the Soviet Union was considered as an important ally, given the fact that both nations were regarded as Socialist countries. Besides a common ideology, the PRC and Soviet Union had a mutual enemy, identified in the USA, which enabled the two countries to further strengthen their relations: China took the soviet leadership style and development pattern as a model, reinforcing the central role of the communist leadership and implementing five-year plans as the vehicle for national economic development (Iliev, Ivanova, & Petreski, 2015). The First Chinese Five-Year Plan covered the period from 1953 to 1957, and focused both on the socialization of the Chinese economy and the development of Chinese industry (Shabad, 1955), with particular emphasis on the growth of heavy industry (C.-M. Li, 1964), and the State control, which were both characteristics of the Soviet Union's planned economy (Samarani, 2008). After attrition between the two countries occurred in 1956-1958 (culminated in the two parties severing bilateral relations in 1960) , China took a new ideological path, Maoism, in which independence and a sense of regeneration through one's own efforts (自力更生 *zìlì gèngshēng*) were its pillars (Samarani, 2008). After the Second Five-Year Plan, known as the Great Leap Forward (大跃进, *dàyuèjìn*), which was completed two years ahead schedule (1958-1960), heavy industry had seen a great growth, nonetheless at the same time a bad famine crisis accompanied these results (C.-M. Li, 1964). Until 1978 Chinese economic development

[20] The relative article in the Encyclopaedia Britannica can be found at the following web link: https://www.britannica.com/topic/Five-Year-Plans.

is seen by scholars as being deficient: China was still an agriculture-based society (J. Qi et al., 2016). A new direction was therefore needed, Deng Xiaoping directed Chinese economy towards an opening-up process and focused on labour-intensive industries (D. Chen et al., 2017), pursuing the "four modernizations" (四个现代化, *sì gè xiàndàihuà*), namely industry, agriculture, science and technology and defence, which was accomplished through the five-year plans (the 5th Five-Year Plan is the first Five-Year Plan moving towards this direction). A critical shift in the Five-Year Plan orientation can be identified in the 11th Five-Year Plan (2006-2010), launched by President Hu Jintao Administration, which paved the way towards a more balanced growth: an essential feature for the attainment of Hu's preached scientific development (科学发展, *kēxué fāzhǎn*). In the 12th Five-Year Plan (2011-2015) Hu's scientific development was coupled with another concept elaborated by the then President of the PRC: ecological civilization (生态文明, *shēngtài wénmíng*), a concept later refined in the 13th Five-Year Plan by the Xi-Li Administration, which elaborates Hu's idea, combining it with two newly developed concepts relating to sustainability and green growth: the beautiful China (美丽中国, *měilì Zhōngguó*) concept and the "two mountains" image, by which literally "*green water and green mountains are mountain of golden hills and silver mountains*" (绿水青山就是金山银山, *lǜ shuǐ qīng shān jiù shì jīn shān yín shān*), implying that a clean environment can be a source for the country prosperity and wealth.

Given this brief analysis it is important to highlight the fact that on the one hand five-year plans are instrumental for the achievement of both economic and scientific growth, on the other hand they are a vehicle for the conveyance of the CCP leadership's ideological thought.

As we already mentioned in the General overview of this Chapter, CE was included for the first time in the 11th Five-Year Plan. Therefore, this section will firstly focus on the 11th Five-Year Plan, and subsequently on the two most recent five-year plans, the 12th and 13th Five-Year Plans, which account for the last ten years of China's economic and social development.

2.5.1 The 11th Five-Year Plan for Economic and Social Development of the People's Republic of China (中华人民共和国国民经济和社会发展第十一个五年

规划，*Zhōnghuá rénmín gònghéguó guómín jīngjì hé shèhuì fāzhǎn dì shí' yī gè wǔ nián guīhuà*)[21]

The 11th Five-Year Plan for Economic and Social Development of the People's Republic of China (hereinafter referred to as "the 11th Five-Year Plan") was adopted by the Chinese government in 2006 and covers the five-year-period between 2006 and 2010. The 11th Five-Year Plan was formulated and enacted by the Hu-Wen Administration.

The 11th Five-Year Plan is divided in fourteen parts comprising forty-eight chapters in total. Chapter 22 "Develop Circular Economy" (发展循环经济, *fāzhǎn xúnhuán jīngjì*), contained in Part 6 "Build a resource-saving and environmental-friendly society" (建设资源节约型、环境友好型社会, *jiànshè zīyuán jiéyuē xíng, huánjìng yǒuhǎo xíng shèhuì*) is the first five-year plan chapter dedicated to CE development. The Chapter contains six sections, namely Section 1 Save energy; Section 2 Save water; Section 3 Save land; Section 4 Save materials; Section 5 Reinforce comprehensive utilization of resources and Section 6 Reinforce the policies and measures that promote economisation. Among the various issues contained in this chapter, energy saving is enlisted as a major project, and a dedicated table is proposed; furthermore, a table containing the theme of pilot projects for CE demonstration is also included.

As already mentioned in Section 2.3, the 11th Five-Year Plan provides the first Chinese definition of CE (see footnote 16), which represents the introductory part of Chapter 22. We will now briefly analyse the content of each of the sections contained in the document. The objective of Section 1 can be summarized in the fact that the orientation of policies has to promote energy saving and energy efficient use: high-energy consuming industries shall be minimized, energy saving technologies shall be developed and promoted, and shall also be included when designing managerial actions. Focus shall be placed on high energy consuming industries, on the standardization of automobile fuel economy, on the development of products that can replace petroleum, and on the promotion of the production of energy efficient products. Section 2 states that water saving shall be pursued in different sectors such as agricultural industry, and high-water consuming industries such as thermal power and metallurgy industries. Water conservation shall also be applied at the city level, by promoting the use of saving water

[21] In order to analyse the 11th Five-Year Plan for Economic and Social Development of the People's Republic of China the official final draft of the document in Chinese language was used. The source can be found at the following web link: http://www.gov.cn/gongbao/content/2006/content_268766.htm.

equipment and machinery, as well as by expanding the use of wastewater. Therefore, the construction of water-saving facilities in both public constructions and residential buildings shall be strengthen. Section 3 comprises the main points regarding land saving: implement the basic policies for the protection of farmland and control the scale at which agricultural land is converted into construction land. Establishing and ameliorating the quota for land use, pursuing the construction of multi-story industrial buildings, and promoting wasteland reclamation, are the main actions proposed by the 11th Five-Year Plan on the matter of land saving. Section 4 is dedicated to material saving. In order to save materials, the guidelines comprise different actions: implement products' eco-design, promote techniques and processes that save materials, encourage the use of small, light, and recycled materials. Furthermore, the quality of construction materials shall be risen, and their life prolonged. A minimalist and functional way of construction and renovation shall be encouraged. This section additionally states that over-packaging is forbidden; attention is also given to disposable goods: their production and use shall be standardized and minimized. Moving forward to Section 5, the main actions aimed at reinforcing the comprehensive utilization of resources are the following: the comprehensive utilisation of coal and non-ferrous metal associated mineral resources and the promotion of the utilization of industrial and agricultural waste. Furthermore, an extended producer responsibility system shall be established. Recycling is another key objective of this section, which comprises the promotion of the recycling of paper, old metals, old tyres and old electronic equipment; and the reinforcement of the recycling of household waste and sludge. In order to promote the implementation of the transition of different industries (e.g. metallurgical, energy, chemical industries) to circular economy, demonstration enterprises shall take form, furthermore pilot projects for the development of CE in key industries, areas, industrial parks and cities shall be launched. Section 6 concerns the promotion of policies that target economisation, which include speeding up the institution of a CE law. The provisions also address the fact that energy and water saving standards shall be ameliorated, as well as energy efficiency standards for energy products and construction materials, together with the development of design rules aimed at saving energy. Old processes, technologies and equipment that are high energy and water consuming shall be eliminated. A mandatory energy-saving labelling system and an energy-saving products certification system shall be implemented. Moreover, Section 6 also includes the implementation of tax, price and investment policies that benefit the conservation of resources, the comprehensive utilization of resources and the development of products that replace petrol. In conclusion, awareness on the issue of resource depletion and resource conservation shall be raised at all levels of society.

To sum up, we can state that Chapter 22 "Develop Circular Economy" in the 11th Five-Year Plan sets many actions that, as we have seen in the previous section, are further elaborated in the 2008 "Circular Economy Promotion Law". Being this the first chapter ever dedicated to CE in the five-year plans of the PRC, the government clearly defined the areas of application of CE, further nominating strategies and actual projects as insights contained in the tables on energy saving and CE demonstration pilot projects. Attention is particularly given to an "economisation" behaviour, that is in line with the definition of CE given by the 11th Five-Year Plan, which places attention on conservation. In the document this attitude is stressed by giving attention to the conservation of energy, water, land and materials; other than practical actions, the use of pertaining technologies and equipment is encouraged in this area. One of the most interesting section is Section 5, whose theme is the comprehensive utilization of resources; in this section the issues of extended producer responsibility, recycling and pilot projects for CE development are discussed as actions enhancing the comprehensive utilization of resources and helping the economy moving towards CE, creating therefore the idea that the effort towards the achievement of CE has to be shared among the industries (extended producer responsibility, recycling), the general public (recycling) and the institutions (creation of pilot projects for CE development in key industries). In conclusion, it is important to notice the fact that the CE theme is adapted to the various sectors of the economic arena, conveying the idea of CE capillarity and of its role as a national economic strategy.

2.5.2 The 12th Five-Year Plan for Economic and Social Development of the People's Republic of China (中华人民共和国国民经济和社会发展第十二个五年规划, *Zhōnghuá rénmín gònghéguó guómín jīngjì hé shèhuì fāzhǎn dì shí'èr gè wǔ nián guīhuà*)[22]

The 12th Five-Year Plan for Economic and Social Development of the People's Republic of China (hereinafter referred to as "the 12th Five-Year Plan") was adopted by Chinese government in 2011 and covers the five-year-period between 2011 and 2015. The 12th Five-Year Plan was drawn up by the Hu-Wen leadership and remained invariably effective after the

[22] In order to analyse the 12th Five-Year Plan for Economic and Social Development of the People's Republic of China the official final draft in Chinese and an English summary of the document were both used, preferring the first for a more accurate analysis. The sources can be found at the following web links:
Chinese version: http://www.gov.cn/2011lh/content_1825838_7.htm.
English version: https://www.greengrowthknowledge.org/sites/default/files/downloads/policy-database/CHINA%29%20The%2012th%20Five-Year%20Plan%20%282011-2015%29.pdf.

change of leadership in 2013, that saw President Xi Jinping rise to power and the beginning of the Xi-Li Administration[23].

The above-mentioned plan is remarkably different from the previous plans: it comprises matters such as sustainable and inclusive growth, environmental protection (listed as one of the Seven Emerging Industries), energy efficiency and domestic consumption; furthermore resource and environmental targets represent 33.3% of the total targets contained in the document (D. Chen et al., 2017; Hilton et al., 2012), demonstrating a more concrete engagement in the transition towards a more sustainable development path and launching China's green development era (Hilton et al., 2012). Until the formulation of the 12th Five-Year Plan, in fact, the economic growth of the country had been Chinese Administration's number one target: although in the 11th Five-Year Plan the government tried to introduce some targets to address the growing environmental concerns, they were overshadowed by the continuous attention paid to economic growth (Hilton et al., 2012).

The 12th Five-Year Plan is divided in sixteen parts comprising sixty-two chapters in total. In relation to this thesis the most relevant part is identified in Part 6 "Green Development- Build a resource-saving and environmental-friendly society" (绿色发展 建设资源节约型、环境友好型社会, *lǜsè fāzhǎn jiànshè zīyuán jiéyuē xíng, huánjìng yǒuhǎo xíng shèhuì*) which comprises six chapters, from Chapter 21 "Actively respond to global climate change", to Chapter 26 "Strengthen the construction of water conservancy and disaster prevention and mitigation systems". The remaining four chapters are: Chapter 22 "Strengthen resource conservation and management", Chapter 23 "Vigorously develop CE" (大力发展循环经济, *dàlì fāzhǎn xúnhuán jīngjì*), Chapter 24 "Strengthen environmental protection" and Chapter 25 "Promote ecological protection and restoration".

Chapter 23 is fully dedicated to CE development in China. Firstly, the three guiding principles (3Rs: reduce, reuse and recycle) are mentioned, particularly highlighting the importance of the "reduce" principle. The overall goal is identified in incrementing the efficiency of resource production. Four main actions are defined: implement circular production methods, improve

[23] Xi-Li Administration refers to President Xi Jinping and Premier Li Keqiang Administration, which started in March 2013, and has been re-elected in 2018 for unlimited terms, given the constitutional amendment of the same year that removed the presidential two-term limit.

the circular use of resources and recycling system, popularize the green consumption model, strengthen policy and technical support. Concerning the first action, the Plan determines the need for rapid implementation of cleaner production, the control of pollution production and disposal from the beginning and through all the processes, and the reduction of resource depletion. Another point is the strengthening of the comprehensive use of raw mineral resources and waste. The comprehensive utilization rate of industrial solid waste was set to reach 72%. Industrial parks and areas shall be planned, constructed and renovated on the basis of CE requirements. The circular combination of industries is promoted, in order to build a circular industrial system. The second action focuses on the amelioration of the renewable resources recycling system, building urban communities' and villages' recycling network, comprising recycling centres, sorting centres and distributive centres. Remanufacturing industry development shall be carried forward, and a sorting waste and recycling system shall be built and perfectioned. The third action is based on the idea of a civilized, conservative, green and low-carbon consumption. The adoption of green lifestyles and consumption patterns on the basis of the national conditions is promoted. The consumers are encouraged to use energy- and water- saving products, buy energy-saving and environmental-friendly cars and houses designed following energy- and land-saving principles. The use of disposable goods must be reduced, unnecessary packaging limited and the irrational consumption restrained. Governmental green procurement must be implemented while gradually incrementing the proportion of the usage of energy- and water-saving products and remanufactured ones. The fourth action comprises strengthening support policies in areas such as planned guidance, taxation and finance, as well as improving laws, regulations and standards, implementing the extended producer responsibility (EPR), listing circular technologies and products, building both a labelling system for remanufactured products and a statistical evaluation system of CE. National CE demonstrations must be promoted, such as the existing pilot areas in Gansu, Qinghai and Shanxi provinces.

Seven key projects aimed at CE implementation are identified in this chapter: comprehensive use of resources, waste and old products recycling system models, "urban mines" demonstration bases, remanufacturing industrialization, food waste recycling, circular transformation of industrial parks and zones, popularization of resource recycling technologies. The first project consists in the comprehensive use of both industrial solid waste and waste produced by agricultural and farming activities. The second one focuses on the construction of 80 demonstration cities with recycling system of waste and old goods. The third project

concerns the construction of 50 “urban mines” demonstration bases, i.e. bases in which resources such as waste or old metals, electronic devices, paper and plastic are being reused, used on a large- scale- basis and used for higher-value purposes. The fourth initiative presents the construction of remanufacturing industry clusters at the national level, and the improvement of a standardization system for remanufactured goods. The fifth project focuses on the construction of high-tech facilities in one hundred cities, that are aimed at food waste recycling and safe disposal, being at the same time beneficial to the economy. According to the sixth disposition circular transformation of key industrial parks, zones and clusters shall take place. In the end, the seventh disposition prescribes the construction of major demonstration project and service platforms for the application of CE-related general and specific technologies and complete sets of equipment.

To sum up, compared to the CE chapter contained in the 11th Five-Year Plan, the 12th Five-Year Plan chapter dedicated to CE, does not focus on resource-saving measures as its main topic, and does not provide indications on the industries involved. The CE-related chapter of the 12th Five-Year Plan stresses CE application, rather than the single areas targeted for resource- saving measures (e.g. water, energy and land conservation). Industrial parks and areas, recycling systems and remanufacturing industry, coupled with a green consumption model and ad-hoc supporting policies and demonstration areas are the major actions proposed by the 12th Five-Year Plan. The focus is therefore placed on the reuse and remanufacture theme, more than on the conservation of resources one. The issue of demonstration projects that was introduced in the 11th Five-Year Plan is further developed in the 12th Five-Year Plan, in which the topic of “urban mines” is also introduced. In conclusion, we can identify the main difference between the two Five-Year Plans in the fact that in the 11th Five-Year Plan the CE issue is addressed by focusing mainly on resource conservation, while in the 12th Five-Year Plan, the CE topic is analysed by proposing actions aimed at remanufacturing, together with the reuse and recycle of both resources and waste and their comprehensive use. Nonetheless, resource-saving actions are also encompassed, although not being the main theme addressed.

2.5.3 The 13th Five-Year Plan for Economic and Social Development of the People’s Republic of China (中华人民共和国国民经济和社会发展第十三个五年

规划, *Zhōnghuá rénmín gònghéguó guómín jīngjì hé shèhuì fāzhǎn dì shísān gè wǔ nián guīhuà*)[24]

The 13th Five-Year Plan for Economic and Social Development of the People's Republic of China (hereinafter referred to as "the 13th Five-Year Plan") was adopted by the Chinese government in 2016 and covers the five-year-period between 2016 and 2020. This represents the first five-year plan redacted by the Xi-Li Administration since its advent in 2013.

The 13th Five-Year Plan can be seen as the perpetuation of the previous five-year plan, expanding Chinese path towards green development under the key concepts of "ecological civilisation" (生态文明, *shēngtài wénmíng*) and "moderately prosperous society" (小康社会, *xiǎokāng shèhuì*) (Beijing Review, 2016; Ng, Mabey, & Gaventa, 2016). The plan identifies a new deal for the Nation's development; the key features of the Chinese development under the 13th Five-Year Plan are: innovation, coordination, being green, opening up and sharing. Seven key objectives are determined: reach a medium-high rate of growth (by 2020 China's 2010 GDP and per capita income shall be doubled); pursue an innovation-driven development (science and technology shall become deep-rooted in the economy); coordinate development (improve internal and external coordination); improve living standards and life quality (improve public service and public health systems, narrow the income gap, and alleviate poverty); improve the quality and civility of society (the Chinese dream and the core socialist values shall be embedded in people's life); improve the quality of environment and ecosystems (more eco-friendly and low-carbon modes of production, as well as efficient extraction and use of energy and resources); guarantee more mature and better established institutions (modernize the governance system and complete the formation of a rule of law government).

The sixth objective, improve the quality of environment and ecosystems, is the target which is most in line with the content of this thesis, comprising the topic of eco-friendly and low carbon production modes and the issue of resource extraction and resource utilization. As far as the goal of a low-carbon economy is concerned, scholars have pushed forward the evidence that in order to reach it a pivotal role is played by both the internal and the external market, thanks to

[24] In order to analyse the 13th Five-Year Plan for Economic and Social Development of the People's Republic of China the official final draft in Chinese and the English translation compiled by the Compilation and Translation Bureau of the Central Committee of the Communist Party of China were both used, preferring the first for a more accurate analysis. The sources can be found at the following web links:
Chinese version: http://www.gov.cn/xinwen/2016-03/17/content_5054992.htm.
English version: https://en.ndrc.gov.cn/newsrelease_8232/201612/P020191101481868235378.pdf.

the vastness of Chinese internal market and to the programmes related to the Belt and Road Initiative (BRI)[25] (Ng et al., 2016). In terms of energy and resources consumption, after the conclusion of the 12th Five-Year Plan, China became the country with the largest installed capacity of hydro, wind and solar energy (Andrews-Speed & Zhang, 2019), but it is still the largest energy consumer globally, with a 160% increase for primary energy demand since 2000 (Y. Zhang, Tang, Liu, Wang, & Wu, 2019).

The 13th Five-Year Plan is divided in twenty parts comprising eighty chapters in total. The chapters are further divided in sections, pertaining to specific matters. In relation to this thesis the most relevant content is identified in Part 10 Speed up and improve the ecological environment (加快改善生态环境, *jiākuài gǎishàn shēngtài huánjìng*), Chapter 43 Promote resource conservation and intensive use (推进资源节约集约利用, *tuījìn zīyuán jiéyuē jíyuē lìyòng*), Section 5 Vigorously develop CE (大力发展循环经济, *dàlì fāzhǎn xúnhuán jīngjì*).

Section 5 prescribes the implementation of a CE development guiding plan, in order to link the production system to society and speed up the recycling of waste. Measures relative to this section comprise: circular transformation of industrial parks and areas, the construction of hybrid industrial and agricultural CE demonstration areas, the promotion of symbiosis between companies, industries and inside industrial parks and areas. The development of city-mines shall be encouraged, as well as the recycling of solid waste and the construction of food, construction and textile waste recycling and safe disposal systems, together with the standardized development of remanufacturing. An extended producer responsibility (EPR) system shall be enacted, as well as the strengthening of the connection between domestic waste classification and recycling and the recycling of renewable resources.

In the five major projects for conservation, intensive and circular use of resources, the 13th Five-Year Plan enlists a guidance for circular development. This project comprises the circular transformation of 75% of the national industrial parks and areas, and of 50% of the provincial-level industrial parks and areas; the construction of 50 industrial bases for the comprehensive

[25] The Belt and Road Initiative (BRI) (一带一路, *yīdài yīlù*) is a global development project launched by Xi Jinping in 2013, which owes its name to the structure of the trade routes designed for the implementation of the project: a terrestrial route based on the ancient network of trade routes known as the Silk Road, connecting Central and West Asia, the Middle East and Europe; and a maritime sea route corridor connecting Southeast Asia, Oceania and Africa.

use of industrial waste, recycling demonstration centres in 100 cities at and above the prefecture level; the construction of platforms for the online recycling of urban waste, the management of resources in industrial parks and areas and waste trading.

Summing up, the 13th Five-Year Plan follows the path traced by the previous plans, apparently suggesting no new proposals on the content level. The focus is placed once more on the reuse, recycle and remanufacture actions. Particular attention is given to those topics that suggest collaborative actions between industries, such as industrial parks and areas. Additionally, we can state that CE is considered as part of the broader resource conservation objective, given the fact that the topic is handled in a section of the Chapter 43, which encompasses the resource conservation and their intensive use issue. The actions proposed by the CE-related section, therefore, do not focus on the general theme of the above-mentioned chapter, that is conservation practices (which was the main topic faced in the 11th Five-Year Plan); on the contrary, as we mentioned earlier, we can observe the tendency of the 13th Five-Year Plan to focus mainly on the reuse, recycle and remanufacture actions previously developed by the 12th Five-Year Plan. In conclusion, it is evident the fact that the CE issue is no more developed separately as an independent chapter, but it is handled as a part of the resource conservation and intensive use discourse. This has inevitably affected the length of the CE-related content provided by the 13th Five-Year Plan.

2.6 Critical issues in translating CE-related legal documents

When translating legal documents, it is important to contextualize the object of the documents. In this case the specific terminology has been difficult to translate either because different times the same term was used to indicate diverse actions (e.g. recycle-circular use) or because of the fact that different translations for the term “recycling” exist in Chinese. This subsection, therefore, will firstly present the 3R principles, in order to assess whether uniformity exists amid the different legal documentation on CE; subsequently a practical example of issues in translation is presented: the different terms used to indicate “recycling”.

A first analysis is focused on the 3Rs principles, and their usage pattern. Firstly, we take in consideration the Circular Economy Promotion Law. The three principles are hereby defined as:

减量化 *jiǎn liàng huà*	reduce
再利用 *zài lìyòng*	reuse
资源化 *zīyuán huà*	recycle

The same terminology is used in the 11th and 12th Five-Year Plans in order to describe the 3R principles. We can therefore affirm that uniformity is given in the translation of the 3Rs in the Chinese legal context.

Moving towards a second analysis, when approaching the term "recycling", there are different alternatives for its translation in Chinese, comprising three diverse terms: 资源化 (*zīyuán huà*), 再循环 (*zài xúnhuán*) and 回收 (*huíshōu*). All these three terms refer to "recycling", amid them the vocabulary 回收 (*huíshōu*) has also the acceptation of "recovery". Recycle and recovery are similar but do not refer to the same action: recovery has a broader meaning, and refers to *"any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy*", while recycling can be identified in "*any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations*"[26], hence being a limitation of the broader concept of recovery. In the documents analysed in this thesis the term 再循环 (*zài xúnhuán*) is not present, however it is frequently used the term 循环, *xúnhuán* (which indicates "cycling, circulation") in relation with other words, such as 使用, *shǐyòng* (use, employ) or 利用, *lìyòng* (use, utilization). This reasoning pertains to the second analysis hereby presented: in **Table 10** we will introduce the different usages of these vocabularies in relation

[26] These two definitions are retrieved from the "Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives". These definitions were chosen because of the officiality of the document.
Available at the following web link: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008L0098-20180705.

with other terms; all the examples are contained in the diverse documents[27] that this thesis has taken into consideration.

Table 10 *Usages of the terms referring to "recycling" contained in the legal documents presented in this thesis.*

	"RECYCLING" TERMS		
DOCUMENTS	资源化	(再)循环	回收
Cleaner Production Promotion Law	废物的**资源化**	**循环**使用	**回收**利用
Circular Economy Promotion Law	**资源化**水平 **资源化**率 **资源化**利用体系 **资源化**利用设施	**循环**使用 矿山水**循环**利用率 **循环**用水体系	废物**回收**体系
11th Five-Year Plan	污泥**资源化**利用	资源**循环**利用产业链	**回收**利用 **回收**处理
12th Five-Year Plan	道路废弃物以及农林废物**资源化**利用 垃圾**资源化**利用	资源**循环**利用体系 资源**循环**利用**回收**体系 废水**循环**利用	资源**循环**利用**回收**体系 再生资源**回收**体系 **回收**站点 **回收**网络 再制造旧件**回收**体系 垃圾分类**回收**制度 分类**回收**
13th Five-Year Plan	废弃物的**资源化** **资源化**利用	–	再生资源**回收**利用网络 垃圾分类**回收**

A first issue can be spotted in the term 循环使用 (*xúnhuán shǐyòng*), this term may be translated into three different ways: "circular use", "reuse" or "recycle". This is in turn connected to a second issue: also the other word pairs containing usage 利用 / 使用 (*lìyòng*/ *shǐyòng*) such as 循环利用 (*xúnhuán lìyòng*), 资源化利用 (*zīyuán huà lìyòng*) and 回收利用 (*huíshōu lìyòng*) have the same "recycling" meaning, highlighting the complexity of the translation of the documents, given the usage of different terms to indicate the same "recycling" action. The vocabulary shall possibly be unified in order to convey a univocal and unambiguous message,

[27] In order to conduct this analysis, the full texts of both the Clean Production Promotion Law and the Circular Economy Promotion Law were taken into consideration, meanwhile when analysing the Five-Year Plans only the sections pertaining CE which have been already mentioned in the previous subsections were taken in account.

rendering the interpretation and translation of the documents clearer. The third and last example to be put forward is the composition of the vocabulary "recycling system", which contains the term "system" 体系 (*tǐxì*) and "recycling", which -as we already mentioned- has diverse possible translations; as a result of this issue the vocabulary "recycling system" has been translated with four diverse terms: 回收体系 (*huíshōu tǐxì*), 循环利用体系 (*xúnhuán lìyòng tǐxì*), 资源化利用体系 (*zīyuán huà lìyòng tǐxì*), 资源循环利用体系 (*zīyuán xúnhuán lìyòng tǐxì*), all of them are equally valid.

These three examples have been highlighted in order to make some observations on the complexity of the terminology used in the legal documents presented by this thesis. This complexity is particularly stressed by the fact that whereas some terms are unified (e.g. the 3Rs), other concepts are expressed through the usage of a heterogeneous vocabulary. Even though these observations are personal and may not reflect an actual diffused difficulty in the translation of the above-mentioned legal documents, further research may be conducted on this topic.

Chapter 3 CE implementation in Chinese businesses

In Chapter 2 we defined how CE is perceived in China, and which are the legal implementation tools and the strategies formulated by the Chinese government for the adoption of CE at different levels. This chapter will focus on the implementation of CE at the micro-level of companies. Governments and institutions have been long considered important actors in sustainable development, however, being CE a new economic development and innovation path, being economic actors, entrepreneurs should also be considered as having an important role in order to drive innovation-oriented activities (Q. Zhu, Jia, & Lin, 2019). As we have mentioned in the previous chapter the main path for CE implementation is the top-down approach, which comprises the usage of command and control measures. As we move our reasoning towards a more specific area of implementation such as the business level, some questions arise: is top-down approach enough? Which role plays the environmental manager and its motivation in the implementation of CE at the corporate level? What role do firm's internal and external factors play in the implementation of CE at the micro-level of companies? In this chapter we will try to examine these queries, and after having presented our hypothesis we will provide a practical case study, regarding the perception of CE principles according to various Guangdong-based companies, which was investigated in a research project to which the author of this thesis took part[28].

3.1 The role of the environmental manager in companies

In order to understand the duties and the role that an environmental manager plays in companies, it is important to firstly define what is an environmental management system; which can be defined as: "*a system that a company uses for making certain that it does everything possible to protect the environment and obeys all laws relating to the environment*" [29]. The environmental manager, therefore, is a professional who works in companies and is in charge of all the duties concerned with the implementation of specific programs and strategies that take in account the compliance with national environmental regulations and the pertaining provisions issued by the company itself. This practitioner has both an administrative role and a

[28] The research project cited in this thesis is Dr. Marco Pesce's Individual Research Project funded by NNSFC "Methods and Tools for the Implementation and Assessment of Circular Economy at the Micro Level of Businesses and Organizations in China". The author of this thesis took part to this research project as Project Assistant Intern and contributed to the analysis of data and to the draft of the research paper "Circular Economy in China: Translating Principles into Practice", which is available at the following web link: https://doi.org/10.3390/su12030832.

[29] The definition is retrieved from the Cambridge Dictionary.

technical one; he/she is charge of managing the companies' activities in the field of occupational and consumers' health and safety, climate change mitigation and adaptation (Greenwood, Rosenbeck, & Scott, 2012), pollution reduction, environmental issues (T. Liu, Liang, Zhang, Song, & Xing, 2019), environmental sustainability, social responsibility, environmental awareness projects (Greenwood et al., 2012) and sustainable development. We can observe that these issues can be ascribed also to the CE agenda, given the fact that these actions pertain to the sphere of CE implementation. The role of these professionals gained proactiveness in the 1990s, nowadays being more and more integrated in the organization's sustainable development leading positions (Greenwood et al., 2012); furthermore, in recent years environmental management -per se- has moved towards an opportunity-seeking approach, meaning that from an attitude focused on the compliance with environmental laws, regulations and standards, environmental management is now making efforts in the innovation and market competition areas, suggesting a transition towards a proactive approach (Boucher, Jenny, Plummer, & Schneider, 2018).

It is useful to point out that three different types of environmental managers have been individualized by Boucher et al.: the "norm-driven environmental manager", the "innovation-driven environmental manager" and the "institution-driven environmental manager". The first type embodies the "compliance approach", the manager seeks to comply with external and internal laws, regulations and standards and is resistant to change. The second type of environmental manager, on the contrary, is the personification of the "proactive-approach" in the field of environmental management, change is the key objective that drives the practitioner's behaviour. The third type of environmental managers find themselves in a transition phase, they are trying to develop an appropriate strategy and are therefore in need of advice and consultation (Boucher et al., 2018). The same research pointed out the fact that, regardless of the type, environmental managers are somewhat disconnected to the rest of the company's operations, their role and duties are not clearly defined, as well as the environmental objectives, this way responsibility for the implementation of the pertaining strategies is not easily attributable to any figure in the organigram. The environmental managers who were interviewed in the research showed that they were seeking more responsibilities and power, on the one hand to integrate environmental management with the rest of the organisation's activities, and on the other hand in order to emerge from their actual condition, which forced them to be in a sort of independent silo, disconnected from the other operations (Boucher et al., 2018). In fact, as a study has found out, even if the environmental manager is driven by great

satisfaction and therefore he/she is able to be more committed to his/her actions, consequently becoming a role model for other employees, when we approach the theme in terms of decision-making, the overall process is bounded also to other organizational managers, leaving the environmental manager with a minor decisional power also in those decisions strictly regarding environmental investments, this way diminishing the role that personal satisfaction can play in decision making when environmental actions are under scrutiny (Daddi, Iraldo, Testa, & De Giacomo, 2019). In reality, the environmental managers are regarded as being able to play an active role in the organizations, more precisely a facilitator role, aimed at creating an internal network of relations in order to integrate environmental actions throughout the firm, pursuing sustainability goals (Greenwood et al., 2012). The willingness of participation and responsibility that Boucher et al. have seen in environmental managers is hence justified by the fact that these professionals have the capability of playing a key role in the all-around sustainable objective at the company level.

Given the engagement of the environmental manager in the company's overall sustainable development, and the fact that the promotion of CE falls in the sustainability discourse, it is reasonable to conclude that the environmental manager shall include CE promotion and development in their duties. CE implementation, in fact touches many levels of the company management, in this way the environmental manager is able to express their integrated and facilitating role inside the organization.

Another aspect that is worth being analysed is the relationship between the environmental manager's commitment and proactive behaviour and the successful implementation of sustainability-oriented measures at the company level. As we have already reported, in fact, researchers have found that environmental managers shall play a more proactive role in their organizations in order to spread the scope of action of environmental management. As a matter of fact, scholars have found that managers' proactive behaviour, can contribute to the company's environmental performance, with their personal psychological motivation and contextual factors as antecedents of their proactive behaviour (T. Liu et al., 2019). Corporate social responsibility (CSR) activities and environmental-related activities have been found to be influenced by personal values and attitudes (Luque-Vílchez, Mesa-Pérez, Husillos, & Larrinaga, 2019).

In order to focus this reasoning on China, it is worth to firstly introduce that to be able to understand the Chinese business environment it is useful to focus the attention on the fact that in the Chinese context there is a cultural dimension[30] which shall not be underestimated: power distance. Power distance can be defined as "*the extent to which less powerful members of institutions and organizations accept that power is distributed unequally*"[31]. Organisations located in countries with high-power distance are usually highly centralized, with a strong hierarchy and tall organizational structures (Pontiggia, 2016). In this view, the psychological motivation of Chinese managers can strongly affect business development and lead their behaviour (T. Liu et al., 2019).

It has been proved that Chinese firms have a general knowledge of CE, regard it as positive and are keen to apply it; but at the same time the actual situation showed a lack of implementation of the CE principles[32], showing that although the organizations gained awareness over the topic, this was not a strong precondition to implement CE, given the fact that external factors prevented its actual implementation i.e. regulations and incentives shall contribute more in building a corporate governance system that facilitates CE adoption, with credible penalties and incentives. A stricter market regulatory mechanism and consumer awareness towards green consumption shall also be enacted (Y. Liu & Bai, 2014).

[30] Reference here is made to the Dutch researcher Geert Hofstede, who in 1980 identified four dimensions of culture in order to explain why people in specific cultures behave the way they do. The 1980 four dimensions of culture are: "high vs low power distance", "high vs low uncertainty avoidance", "individualism vs collectivism" and "masculinity vs femininity". In 1988 a fifth dimension was included: "time orientation" (long term vs short term orientation); in 2010 the last dimension was elaborated: "indulgence vs restraint". (Pontiggia, 2016)
[31] The definition is retrieved from "International Organizational Design and Human Resources Management to China" (Pontiggia, 2016).
[32] This situation, which emerged from the research of Liu & Bai, also emerged from the case study that will be analysed in Section 3.4.

Figure 6 *Factors influencing the environmental manager performance.*

Starting from these considerations, both the relationship between firms and external factors, in particular environmental authorities, and the managers' awareness on CE principles will be object of discussion in the following sections of this Chapter. As we have already seen, external factors contribute to the implementation of environmental actions in companies, which entail measures connected to the CE; in this regard, we will know analyse how the relationship between firms, the central government and local governmental authorities influences the implementation of environmental actions at the company level in the Chinese context.

3.2 The relationship between businesses, the government and the local authorities in China: a focus on the environmental issue

After Deng Xiaoping's Reform Era and the Nation entrance in the WTO[33], China has become the factory of the world for manufactured goods (Mees, 2016), it is therefore important to take in consideration the fact that consequences arose from the environmental point of view. For

[33] World Trade Organization (WTO).

example, given the Foreign Direct Investment (FDI) negative impact on the Chinese environment, the hypothesis concerning China being a "pollution heaven" is considered as plausible (Hao, Deng, Lu, & Chen, 2018); in this regard Hao et al. study suggest that it shall be the government's duty to better oversee environmental regulations implementation effectiveness and efficiency, thanks to adequate supervision coupled with quality-oriented FDI promotion (Hao et al., 2018). The government, in fact, is an important external stakeholder in the Chinese business context, this section will be therefore focused on introducing and explaining how the government is engaged in the relationship with companies on Chinese soil (comprising both SOEs[34] and private enterprises). Lau et al. reports that firms engage in corporate responsibility and environmental management activities on the basis of three types of motivations: instrumental, relational and moral; we will focus on relational motivations, which entail the pursuit of relations with stakeholders, i.e. the government. The relationship with the governmental authorities is an important aspect for any kind of firm: enterprises which do not meet the expected results could be shut down or their activities be restricted (Lau, Bergman, & Bergman, 2019), rendering the Chinese manufacturers choices highly dependent on the government (Y. Yang, Lau, Lee, Yeung, & Cheng, 2019). Moreover, Mao & Wang point out that strict environmental regulations coupled with high environmental supervision transparency generate an external competitive environment that drive organizations towards the pursuit of a greener behaviour (Mao & Wang, 2018).

As we have previously discussed, CE fosters diverse activities that are related to the broader spectrum of the environmental area, moreover as we have analysed in Chapter 2, the laws and plans pertaining to CE follow the same top-down approach as the measures enacted for the environmental issue, comprising central dispositions that are enacted at different levels by local authorities. The considerations that will be presented in this section are therefore valid in order to better understand the relationship between the firms and the environmental authorities, although not specifically regarding CE[35], the mechanism can be identified as similar, due to the fact that the same approach is used both for environmental regulations and CE ones, as we pointed out in the discussion contained in Chapter 2.

[34] State-owned enterprise (SOE).

[35] No researches have been found that address either the topic of the relationship between firms and environmental authorities on the CE issue, or the topic of the relationship between firms and administrative departments of CE development. For this reason, this section's discourse is mostly focused on the more general topic of the relationship between environmental authorities and firms, and the connections between the government, environmental regulations and firms. Therefore, reference to CE and reasonings on the issue will be made starting from considerations retrieved from the situation that exists in the environmental field.

In order to describe China's approach towards the environmental issue, we can use the term "authoritarian environmentalism", meaning that environmental policies are designed by the central government. Notwithstanding, the duty for final implementation is given to local authorities (X. Li, Yang, Wei, & Zhang, 2019), this way giving large responsibilities to the local government for the attainment of predetermined goals (Tian, Xu, & Zhang, 2019) (this suggests that the local authorities are given the duty to deal with local enterprises). Studies have found that the results obtained using a top-down approach in environmental governance are not adequate (Luo, Hu, Li, Yang, & Wen, 2019), but in China the de facto decentralization implies other drawbacks: the existence of opposite interests, collusion and limited resources lead to the generation of the principal-agent problem[36], therefore failing in addressing the environmental issues (B. Zhang, Chen, & Guo, 2018). Diverse studies point out that even though a certain commitment of the central government exists, at the local level the pursuit of economic growth results stronger, therefore penalizing the implementation of environmental policies (Hao et al., 2018; Pang, Zheng, Shi, & Zhang, 2019). One of the factors that has had great impact in the behaviour of local government is fiscal decentralization that provides local officials with incentives for economic growth, leading to local protectionism and to the practice of prioritizing economic growth and only later investing in the environmental field (Pang et al., 2019), furthermore the promotion of local government authorities is made by higher authorities on the basis of the results of a top-down assessment, which has economic growth as its core indicator for local officials performance appraisal (Hong, Yu, & Mao, 2019). To sum up, local authorities have to cope with centralization of political power (which means that their promotion is bounded with their performance appraisal results evaluation made by higher officials), decentralization of economic growth and environmental authoritarianism, in which policies are decided by the central government but their implementation is delegated to local officials (Hong et al., 2019). In this particular situation a dilemma arises: should local authorities be pursuing economic growth or environmental protection?

Environmental regulations can be divided in two clusters: command and control regulations (laws, legislations, rules, standards, plans) and market-incentive regulations (environmental taxes, tradeable emission permits system, payment for ecosystem services); plans in particular have been identified as the main source for the successful implementation of environmental

[36] The principal-agent problem occurs when there are conflicting interests between two actors: an entity and its representative, which is in charge of acting in the entity's behalf (Eisenhardt, 1989).

protection actions (X. Li et al., 2019; Lo, Chen, Ka-yin Lee, & Qianqing Mai, 2020; Tian et al., 2019). Together with the MEP institution in 2018 provincial environmental agencies have been upgraded to departments of environmental protection, and investigations and sanctions against polluting companies have become more frequent (Xu, Xu, & Gui, 2019). The role of local authorities is therefore crucial, albeit the central government maintains specific ties with SOEs; central SOEs in particular are used by the central government to implement new policies more rigidly, in exchange for protection from regulatory enforcement (Xu et al., 2019). Provincial SOEs on the other hand, are linked to provincial leaders, who are appraised for their performance, more precisely on the basis of economic growth[37], inevitably suggesting that provincial SOEs are usually in the service of the goals that provincial leaders have to obtain (Xu et al., 2019).

Political connections have been identified as an element that can bring major advantages to firms, in fact, due to this reason SOEs are subjected to preferential treatment[38] (Maung, Wilson, & Tang, 2016). Although SOEs generally have more bargaining power (Hua Wang, Mamingi, Laplante, & Dasgupta, 2003) and pay lower environmental taxes than non-SOEs, differences do exist: in particular Maung et al. identifies higher environmental taxes in SOEs located in more developed provinces, highlighting a striking difference with those located in less-developed provinces, in which local environmental agencies have less strong political position compared with the ones in developed provinces (Maung et al., 2016). The enterprises with higher governmental structural and relational interference [39] tend to conform more to governmental policies (Y. Yang et al., 2019). Other researches focused on the bargaining power of companies when pollution taxes are taken in consideration: companies with a difficult financial situation have more bargaining power and the authorities' enforcement of tax payment results alleviated; the bigger the social impact of a firm's emissions the less the bargaining power benefitted by the company (Hua Wang et al., 2003). Heavy polluting firms are the organizations that the government target the most, for this reason they are willing to seek political connections in order to diminish the actual regulations enforcement, resulting in a less

[37] Local officials' appraisal is mostly based on economic growth, which may hinder the pursuit of environmental protection goals (Hong et al., 2019; Tian et al., 2019; B. Zhang et al., 2018).
[38] The second reason for the special treatment benefited by SOEs is identified by Maung et al. in the fact that they provide social goods, and are therefore favoured by the government, which sustain their survival.
[39] Governmental interference can be defined as "*the degree to which the government can determine business decisions and work methods in firms*"; it can be divided in structural governmental interference, which refers to the level of government ownership, and in relational governmental interference, which is represented by the closeness of the firm's *guanxi* (relationship) with the government (Y. Yang et al., 2019).

negative effect on their stock-value (Tian et al., 2019). Tian et al. suggest that political connections are not useful only for receiving a preferential treatment from local authorities, therefore diminishing environmental levies, but also for obtaining regulatory information in an easier way and acquire more market power (Tian et al., 2019). In addition to the differences between SOEs and non-SOEs and the differentiations existing between SOEs themselves, different mandatory emission reduction targets exist between Chinese provinces, resulting in differences in the strictness of environmental regulations among them (Fan, Graff Zivin, Kou, Liu, & Wang, 2019).

Although some of the environmental economic instruments that were considered successful in the West such as cap-and-trade systems[40] and environmental information disclosure, had not the same impact in China, on the other hand a diverse instrument, namely the green credit policy, which has been implemented by the Chinese government since 2007, has had a valuable impact on the environmental issue (J. Sun, Wang, Yin, & Zhang, 2019). Under this policy, in fact, all banks are required to base their loan decisions on firms' environmental performance, this way firms have been motivated to prevent pollution at its source, because the green credit policy encompasses a long-term credit restriction on pollution (J. Sun et al., 2019). This could suggest that the government is not the only external factor to influence the firms' environmental performance, given this evidence, the government could reinforce its influence on enterprises through initiatives similar to the green credit policy, by partnering with or using the firms' other external stakeholders (in this specific case represented by banks).

To sum up, in order to understand how environmental-related policies, regulations and laws (including CE-related ones) are implemented, it is necessary to put under scrutiny the relationship between the governmental authorities and the enterprises. As the vehicle for economic growth, firms play a pivotal role in the implementation of green practices, in order to achieve the Chinese government expected "green development", in view of this the government has established a close relationship with firms, specifically through its local delegates. Indeed, we have seen that on the one hand firms can be used by the government in order to obtain certain objectives listed in its green agenda, on the other hand the governmental

[40] Cap and trade is "*a system designed to reduce pollution in our atmosphere* […] *the government sets the cap cross a given industry or* […] *the whole economy* [and] *decides the penalties for violations*" (Environmental Defense Fund, 2020). "*Within the cap, companies receive or buy emission allowances, which they can trade with one another as needed*" (European Commission, n.d.-c).

authorities have also the duty to supervise and restrain firms' unsatisfactory behaviour through diverse methods enacted by local authorities, being them market-oriented solutions or top-down command and control regulations. Local authorities are therefore responsible for coordinating the efforts towards the implementation of the provisions issued by the central government in the environmental field (comprised CE), nonetheless, at the same time local officials are evaluated for their overall performance, which is mainly evaluated on the basis of economic growth. In conclusion, even though the central government issues environmental regulations of various types, these are enacted with a certain degree of flexibility by local authorities, who are generally more focused in maintaining and boosting economic growth rather than concentrating their efforts on the implementation of environmental measures, given by the fact that incentives to pursue economic growth are higher than the ones dedicated to environmental protection, causing local authorities to relax the control over polluting firms (Hong et al., 2019), and therefore contributing to decoupling practice from theory.

3.3 The business environment in Guangdong and its relationship with local authorities: a focus on the environmental issue

The Guangdong Province (广东省, *Guǎngdōng shěng*) is a Chinese province located in South China, facing the South China Sea to the south. The Guangdong Province borders the following Chinese provinces and regions: Fujian Province (east), Jiangxi Province (north), Hunan Province (north), Guangxi Autonomous Region (west), Macau Special Administrative Region[41] (south) and Hong Kong SAR (south). It is part of the Greater Bay Area (also known as Guangdong-Hong Kong-Macau Greater Bay Area; 粤港澳大湾区, *Yuè Gǎng Ào dàwānqū*), a megalopolis consisting of the Guangdong Province and the two special administrative regions of Hong Kong and Macau located in the in the Pearl River Delta (珠江三角洲, *Zhūjiāng Sānjiǎozhōu)*. Guangdong's capital is Guangzhou, which is considered to be the third largest city in the PRC and the biggest one in South China[42].

[41] Its acronym is SAR.
[42] This data is available at the following web link: https://worldpopulationreview.com/world-cities/guangzhou-population/.

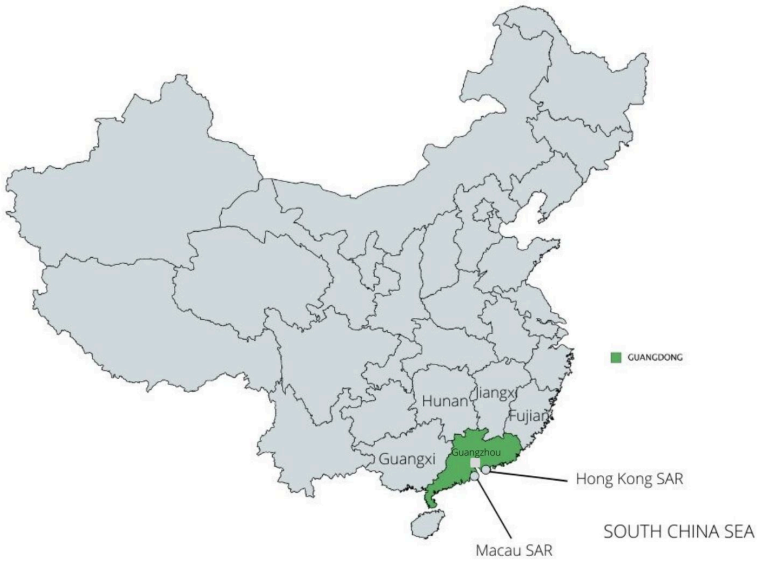

Figure 7 *Map showing the geographical location of the Guangdong Province (green). The map was elaborated by the author.*

In 1979 the Central Government decided to enact more permissive economic policies and in 1980 instituted three Special Economic Zones (SEZs)[43] in the Guangdong Province (China Briefing Media, 2004): Shenzhen, Zhuhai and Shantou (Standing Committee of the National People's Congress, 1980); followed by two open coastal cities, Guangzhou and Zhanjiang, in 1984 (The China Internet Information Center, 2000). After one year the Pearl River Delta Economic Zone (珠江三角洲经济区, *Zhūjiāng Sānjiǎozhōu Jīngjìqū*) was established (The China Internet Information Center, 2000), comprising nine cities and four

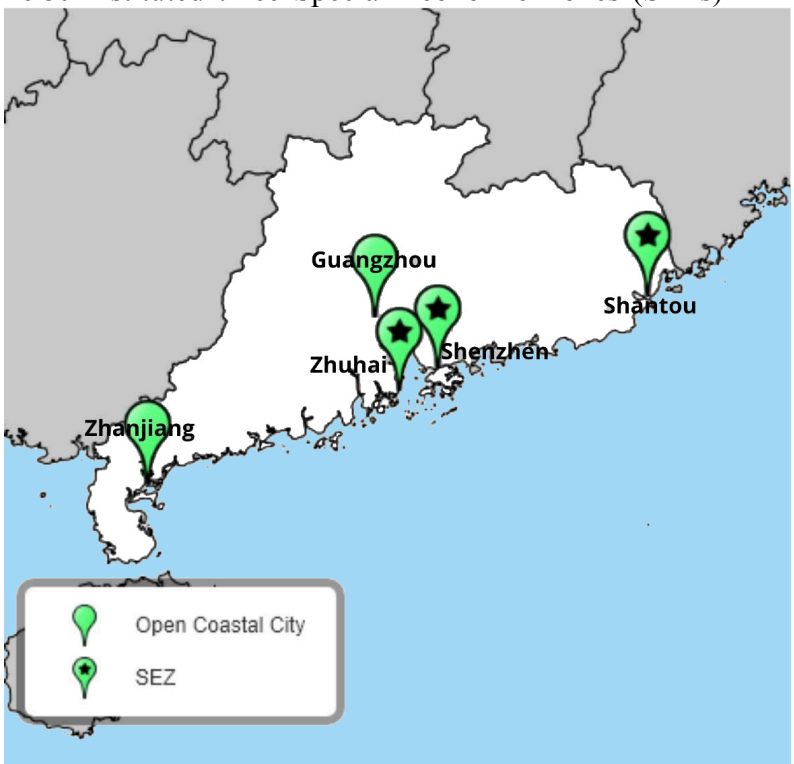

Figure 8 *Map showing the location of Guangdong-based SEZs and Open Coastal Cities. The map was elaborated by the author.*

[43] Special Economic Zones, also known as SEZs (经济特区, *jīngjì tèqū*), are Chinese territorial areas in which less restrictive and more market-oriented economic measures were enacted. The mind behind the establishment of SEZs was Deng Xiaoping, SEZs were in fact part of his program of Reforms and Opening up (改革开放, *gǎigé kāifàng*), which he started in 1979.

counties of the Guangdong province. The cities are namely Guangzhou, Shenzhen, Zhuhai, Foshan, Jiangmen, Dongguan, Zhongshan, Huizhou and Zhaoqing, while the counties are Huidong, Boluo, Gaoyao and Sihui (the first two are under the administration of the prefecture-level city of Huizhou, while the last two are administered by Zhaoqing prefecture-level city) (K. Wang & Chen, 2009).

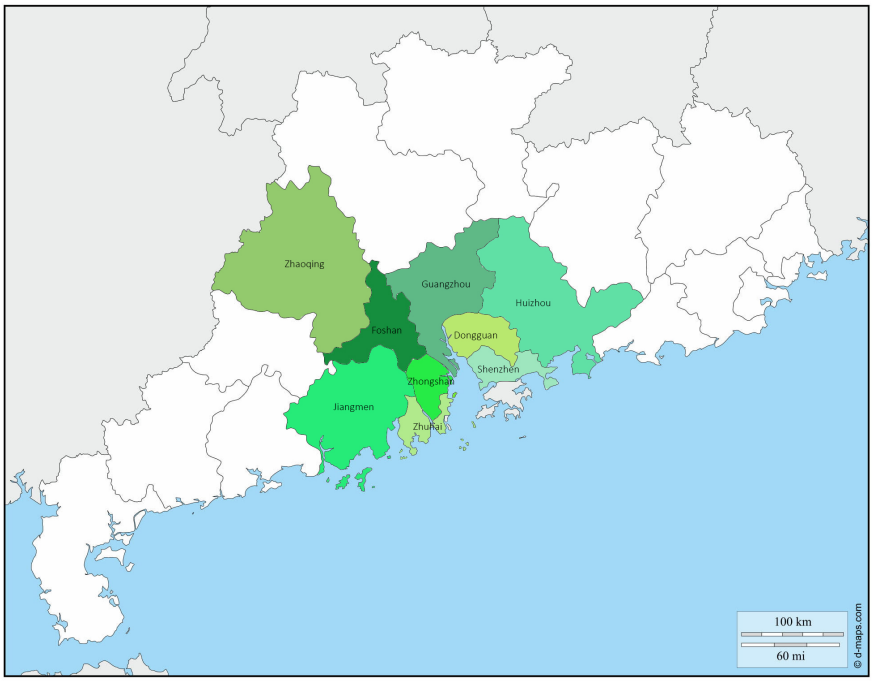

Figure 9 *Map showing the Pearl River Delta Economic Zone. The map was elaborated by the author.*

It is clear that the Guangdong province has played a key role in the economic development of the PRC for over forty years and it is an interesting hub that comprises different businesses and industries. The rapid economic growth experienced by the province has inevitably led to a deterioration of the natural environment; inter alia, industrial waste water pollution appears to be the most alarming data concerning environmental degradation in the province (M. Zhang, 2017). In regard of industrial environmental performance, we can say that although the environmental performance of the firms operating in the Pearl River Delta is diverse (Yee, Lo, & Tang, 2013), the Guangdong Province ranks second as the area attracting most polluting companies (Xu, Xu, & Xu, 2018). In the Guangdong province SOEs, non-SOEs and foreign enterprises coexist, rendering it a vibrant economic zone to take in consideration for case studies. It is indeed for this reason that the Guangdong province has been chosen to be the focus of this in-depth analysis regarding the relationship between businesses, the central government and local authorities, with a particular focus on the environmental issue, and more specifically on CE development.

The development of CE in the Guangdong Province has been identified as having a big margin for improvement (F. Chen & Yao, 2020). The implementation of CE, as for the year 2017, was mainly focused on scale efficiency (F. Chen & Yao, 2020), meaning that gaining the optimal

scale of implementation was the objective of the Guangdong Province. A recent study by Gao et al. examined the best way to boost CE development in the Guangdong Province through the utilization of different scenarios; the results point out that the population growth rate should be controlled by the government, while raising awareness on the green consumption issue among the inhabitants and developing tertiary industry together with a relative CE-oriented support system. The establishment of CE industrial parks and demonstration cities was also considered as being a key factor in CE development in the province (Gao, Gao, Song, & Fang, 2020). Another data that sheds light on the progresses towards a sustainable and green development in the area is that Guangdong was the province with most ISO 14001[44] certificates in 2017 in mainland China (Pesce, Shi, Critto, Wang, & Marcomini, 2018), marking the commitment of Guangdong-based firms in corporate sustainability. Furthermore, Guangdong fosters many industrial parks, some of which have been selected by the local authorities to undergo circular renovation (de Bie, 2016), it is useful to remind the fact that the circular transformation of industrial parks and areas was itself one of the actions issued by both the 12th and the 13th Five-Year Plan. Guangdong is the Chinese province with most waste and power generation, and it is therefore considered as one of the areas with the greater potential of energy recovery obtained through waste to energy technologies potentials and emission mitigation potentials (Hanning Wang, Wang, Song, Ren, & Duan, 2019), both of which are CE-oriented actions.

The Guangdong Province is one of the most economically developed areas of the PRC[45], on the basis of the previously introduced findings by Maung et al., and given the fact that in this province Environmental protection Bureaus (EPBs) tend to follow legal dispositions in a stricter way (Yee et al., 2013), we can therefore suppose that more pressure on firms' environmental compliance is exerted. In a study conducted by Yee et al. local government and local EPB were identified by Guangdong-based firms as the most demanding in respect to environmental requirements, while market and society stakeholders ranked lower. The study pointed out that the practice of local government officials promoting their own interests instead of pushing the implementation of environmental protection is perceived to have become less diffused in the Guangdong Province, on the other hand the rising of a more formal, inflexible and standardized behaviour conducted by local EPBs officials in applying the norms was noted. The most

[44] ISO 14001 family of standards establish the criteria for an environmental management system (EMS); companies can follow a framework in order to build the EMS and can apply for certification. Further information can be found at the following web link: https://www.iso.org/iso-14001-environmental-management.html.
[45] The Guangdong Province has the highest regional GDP according to the National Bureau of Statistics of China. Data are available at the following web link: http://data.stats.gov.cn/english/easyquery.htm?cn=E0103.

virtuous companies are selected as models by local EPBs on the one hand to prove to their superiors their efforts in environmental protection, and on the other hand to let the other firms learn from the chosen firms' example. Cooperation between the local EPBs and the enterprises can also take place and is regarded to be a way for firms to establish a solid relationship with the government. At the same time, a strict enforcement of the environmental policies pursued by the local government has caused the failure of diverse SMEs, which struggled in coupling productivity and environmental protection. The consideration supporting the fact that the government, and particularly local officials, play a key role in influencing the firms' environmental performance, has been proved to be true for the Guangdong Province as well, given the above-mentioned evidence identified by the study of Yee et al..

Another study by Zhang & Zhu focused specifically on one specific industrial sector in the Guangdong Province: the automobile industry; this industry has been shaped by international market actors rather than the actions undertook by the government. This example conveys us the idea that on the one hand in the Guangdong Province the relationship between this sector and the central government is less strong, but on the other hand this specific private sector results being organized, with spread networks and associations, therefore meaning that the business-government relationship can be identified as a networked-style relationship[46] (X. Zhang & Zhu, 2018). No studies targeting the relationship between Guangdong Province's local government and other industrial sectors have been found by the author of this thesis, rendering it difficult to assess whether other industrial sectors benefit of the same business-government relationship mentioned above and how this specific kind of relationship influences the application of policies related to the sustainability area, such as environmental- and CE-related ones.

As regards the sustainability field, an interesting example of the cooperation and the establishment of ties between the firms and the government has been analysed by the research by Lo et al. and can be seen in the implementation of the emission trading scheme (ETS) in the Guangdong Province, which officially started in 2013, and is conducted by diverse actors, comprising representatives of the local government, enterprises and the academia (Lo et al., 2018). The ETS can be seen as a policy pertaining to both the environmental area and the more

[46] As introduced in Chapter 2 a networked style business-government relationship entails limited authoritative governance coupled with a leading role undertook by businesses, which establish intra- and inter-sector alliances for industrial development.

specific CE one, the reduction of emissions is in fact one of the key areas addressed by the implementation of CE (in the Chinese context we can refer to the Cleaner Production Promotion Law and the Circular Economy Promotion Law when identifying specific provisions related to the CE sphere in which emission reduction is mentioned). The ETS is implemented through a top-down approach, meaning that the regulated enterprises are forced by authorities to modify and correct their trend. At the beginning the willing to cooperate was reported as being low, especially in larger firms, and the knowledge on the topic as being scarce. What has been observed is that the State continued to exert pressure on the firms, which eventually started implementing actions in line with emissions reduction, together with smaller firms which began to move towards this direction. In spite of the constant pressure received from the government, the change and the rising interest in trading was actually motivated by the market. Moreover, the study points out that fallacies have been found in the communication system: the various governmental agencies in charge for ETS implementation, in fact, did not coordinate, this becoming a possible cause of problems at the firm managerial level, especially when approaching the reporting phase (Lo et al., 2018). A lack of coordination both in the central-local government relationship and in the relationship between local governmental agencies themselves may in fact hinder the implementation of this specific environmental protection measure, moreover, as we already analysed in the previous section, the difficulties in the coordination between governments at different levels is a diffused problem in the implementation of measures decided by the central government such as the environmental- and CE-related ones; we can therefore deduce that also the implementation of other environmental- and CE- related measures that imply the coordination of different governmental agencies and a connection with targeted firms may face the same problems identified by the study by Lo et al. in the implementation of ETS in the Guangdong Province.

In conclusion, we can summarise that the Guangdong Province provides us with a miscellaneous scenario for the observation of business-authority relationships and for the development of CE. It is in fact clear that the intervention of the State boosted the economy of the province through the establishment of SEZs in the early Eighties, giving to the Guangdong Province the opportunity to become an industrial excellence through opening-up reforms and FDI opportunities (Barbieri, Sarcina, Bazzucchi, & Di Tommaso, 2013). As diverse studies pointed out the relationship between businesses and the local authorities is not homogeneous, but it has been reported that to some extent local authorities influence the environmental performance of businesses in the Guangdong Province. At the same time the difficulties

encountered in the communication area and in the establishment of solid ties between different level of governmental authorities are still an obstacle to the implementation of sustainability-related actions such as ETS. More studies should be conducted in order to assess the specific extent to which the business-authority relationship can influence the companies' CE implementation. The case study proposed in the following section aims at reporting how Guangdong-based firms view CE principles, helping us closing our reasoning on how the implementation of sustainability-, environmental- and in particular CE-oriented activities at the micro-level of companies, are influenced by both the company's external factors, such as the government and the role of important external stakeholder, and internal factors, such as the enterprise's managers' willingness and commitment.

3.4 Case study. A research project on the micro-implementation of CE in Guangdong: how do businesses perceive CE principles?

After having discussed the external factors influencing the firms' environmental performance (in which CE-related actions are also included) at the general level and afterwards specifically referring to the Guangdong Province in the PRC, we will now continue the discussion by approaching the topic of internal factors influencing the companies' environmental performance, which was introduced in the first section of this Chapter. More specifically, we will examine the topic of the firms' internal awareness on the issue of CE, with a specific focus on the companies of the Guangdong Province[47].

This section is based on the findings of the research project to which the author of this thesis took part, only already published data will be disclosed, as the research is still ongoing. The results that will be discussed in this section are retrieved from the paper cited in the introduction to this Chapter, namely "Circular Economy in China: Translating Principles into Practice" (Pesce et al., 2020).

The research was conducted in Summer 2019 therefore it depicts the recent business reality of the Guangdong Province. The participants were representatives of companies from miscellaneous industries, belonging to both the manufacturing and the service sector. The participants were asked to fill a questionnaire anonymously in order to evaluate their understanding of CE and the company's current efforts towards circularity. The survey was

[47] The majority of the nineteen participants is based in the Guangdong Province (13 out of 19).

composed by both a SWOT analysis and a Likert scale analysis, with the objective of assessing the participants' attitude towards the CE principles proposed by the BS8001:2017[48] and the relative practical actions. More precisely, the SWOT analysis objective was to point out the thoughts that the participants had on the CE principles proposed, while the Likert-scale analysis was oriented towards a self-assessment that the participants made on the basis of the actual implementation of the principles' related actions at the company level.

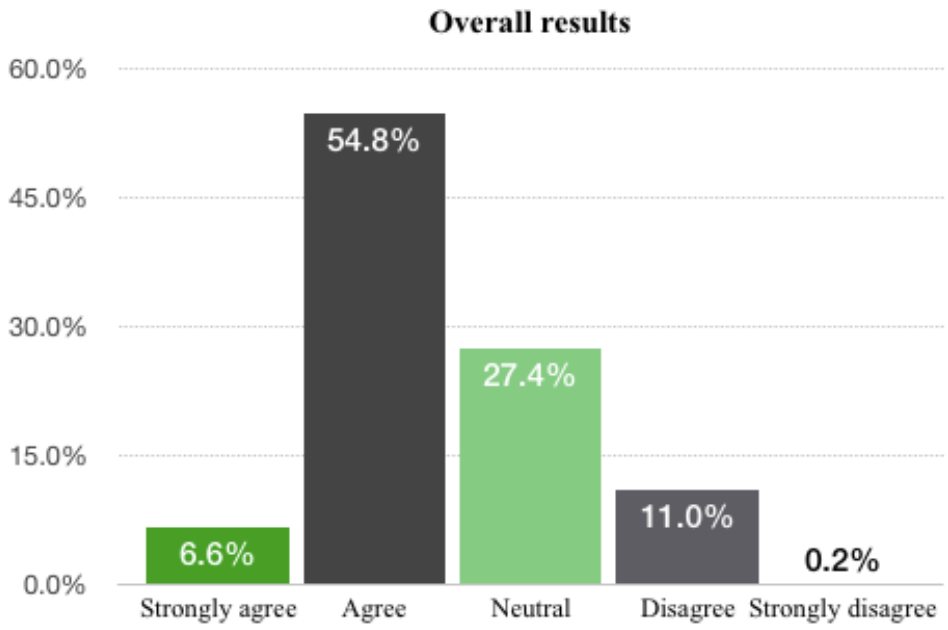

Figure 10 *Overall results of the answers to the Likert-scale survey. Bar chart elaborated by the author.*

What emerged from the study is that the interviewed companies held diverse opinion when approaching the SWOT analysis of the principles, suggesting that awareness on the principles of CE is present at the company level, moreover the Likert-scale self-assessment provided an optimistic scenario: the majority of the companies seemed to agree with the statements that provided the description of CE-related actions that are expected to be enacted when following the BS8001:2017 principles, indicating that the actions were practiced at the company level. In fact, although weaknesses and threats have been spotted for every principle, what emerges is that overall these seem not to hinder the implementation of the actions related to the principles, in fact a percentage of 61.4% of the respondents' answers were either agreeing or strongly

[48] The principles were already presented in **Table 2** contained in Section 1.4, They are six: systems thinking, innovation, stewardship, collaboration, value optimization and transparency.

agreeing with the statements proposed by the survey in relation to practical actions enacted by the company in order to pursue the six principles of the BS8001:2017. It is however interesting to point out that a conspicuous percentage of the participants' answers showed a neutral attitude towards the survey (27.4%). We can partly explain this data by analysing cultural factor that influence the people's way of thinking, their lifestyle and therefore the way to face questions and problems. Although culture may not be the answer to every behaviour, it is useful in intercultural communication and in international business in order to better understand some of the differences that may arise between diverse cultures and trends that may be specific to one cultural cluster. Even though Chinese culture appears to be the result of many different school of thoughts, one of the elements that remain invariable is the concept of "face" (面子, *miànzi*) and "losing someone's face" (丢脸, *diū liǎn*), which can be assimilated to the concept of reputation, which is important to be preserved and not be lost, by doing or saying something inappropriate. In the business environment this concept is well eradicated, and can also be applied when a "yes" or "no" choice or decision making is needed to be done: a straight "no" is avoided, in order to maintain the face of both parties, elusive answers are also preferred in order to always have enough leeway (Monfret, 2011). This may explain the amount of neutral answers received and also the low amount of negative answers to the survey, in fact, disagreeing and strongly disagreeing answers counted for a total of 11.2% of the answers. This hypothesis suggests that instead of directly disagreeing, the participants preferred to avoid a direct dichotomous answer by choosing to maintain a neutral attitude.

We will now analyse more in depth the situation of CE principles implementation that emerged from the firms' answers to the Likert-scale survey. The graphs contained in the paper by Pesce et al. showing the results of the Likert-scale questionnaire are attached to this thesis and can be found in Appendix C. Participants agreement was the most consistent in the answers related to the systems thinking principle actions, highlighting the fact that companies are self-aware of the place they occupy and the connections that exist in the broader system they are part of. The practical actions proposed by the value optimization and collaboration principles, on the other hand, showed more disagreeing ideas, this issue has to be addressed, because these two principles help the company find a new configuration, by embracing a transformation of its structure. For example, the collaboration principle favours the birth of industrial parks, which are a useful tool in applying CE at the company level: resources are shared through diverse types of industries, the waste of one company can become the input for another one, a supply

chain can be created inside the industrial park, rendering simpler the tracing of the practices used by the firm's suppliers. This last point is useful to understand that the selection of partners that are engaged in CE actions and follow sustainable criteria, and the identification those organizations which are non-compatible with the firm's own CE and sustainability goals are a difficult and insidious practices; in fact, these are the action with which respondents disagreed when assessing whether the actions of the collaboration principle were implemented in their company or not. What emerged is that a lack of flexibility in the organizational structure is present, and this fact may contribute to hinder the implementation of the collaboration principle itself. Collaboration, in fact, is considered to be both internal and external, and the configuration of the company's organizational structure influences the capacity of collaborating both internally and externally. The actions that the companies find the most difficult to implement are the ones related with the products' end-of-life and life-prolonging measures, which constitute two of the actions proposed by the value optimization principle. The first issue is particularly under-addressed by the participants, and this can be driven by the problems of communication and collaboration that companies have to face when managing the value chain: when companies adopt a systemic approach and undertake a behaviour based on stewardship, they have to actively engage in the value chain management, which implies that the companies that engage in the journey to become circular have the duty to trace their products' value chain, starting from the supplier, passing through the production facilities and ending with the vendors and consumers, ensuring that the members of the value chain are themselves applying CE and sustainable principles. Final customers may be other organizations or people, according to the value optimization principle companies have to take responsibility for their products' correct disposal at the end-of-life stage, by informing correctly the final customer. Programs that include and incentivize the end-of-life return can also be seen as a policy sustaining companies' awareness on their products' end-of-life management. Another action which triggered the respondents' disagreement was a transparency-related action, which expects the company to provide information about issues such as risks for the environment or human heath on the packaging or on the products themselves and render this information accessible for free through diverse communication means. Only half of the participants agreed with the statement, meaning that only half of the participants perform these actions in their companies; the remaining respondents either remained neutral (five out of nineteen) or disagreed (four out of nineteen). The transparency issue is a central topic in CE implementation, these actions are particularly important in order to build the firm's relationship with consumers. Furthermore, rendering these pieces of information always freely available on the one hand helps external stakeholders in the

evaluation of the company and on the other hand aids possible partners in the partner selection process. The selection of partners that follow CE and sustainability standards in their operations is itself an action contained in the collaboration principle with which not all companies agreed, meaning that currently not all the interviewed companies are able to perform this selection process. Without a certain degree of public transparency, companies may face difficulties in assessing whether their partners are involved in the CE adoption process or not. Two actions related to innovation have highlighted a degree of disagreement between participants as well. This is particularly true for the fact that the identification of stakeholders able to foster circular innovation has not been developed by four companies out of nineteen. Moreover, four companies out of nineteen also have still not considered CE as strategic for innovation and have not set pertaining clear objectives yet, showing that although the vision of a more circular and sustainable mode of operation has been considered by the majority of the respondents (only two companies out of nineteen disagreed and five out of nineteen gave a neutral response), the value of CE for innovation is still not fully recognized.

After this comprehensive analysis of the respondents' attitude towards the CE principles' critical actions, we can observe that the situation that emerged from the Likert-scale self-assessment highlights the fact that the majority of the problems in the implementation of the CE principles arises when actions that involve third parties are included; for example: the stakeholder assessment procedure, the partner selection process and the products' end-of-life issue. It is in fact visible from the results that the companies' internal actions related to CE received more positive answers than the ones regarding actions that imply the connection with third parties.

Figure 11 *Graphical representation of the overall results of the SWOT analysis. Doughnut charts elaborated by the author.*

When directing the discussion towards the CE principles' SWOT analysis, we can say that overall the positive items (strengths and opportunities) outnumber the negative ones (weaknesses and threats). When dividing the SWOT analysis in internal (strengths-weaknesses) and external (opportunities-threats) factors, weaknesses outnumber strengths, and opportunities exceed threats. Moreover, it is immediately visible a specific trend: the respondents have identified more opportunities than any of the other three categories of internal and external factors (strengths, weaknesses and threats), while strengths appear to be the most difficult to be pointed out. Collaboration is the principle which fosters the most ideas per-principle (38 divided in: 2 strengths, 9 weaknesses, 14 opportunities, 7 threats), while systems thinking is the one

that has the least (16 divided in: 3 strengths, 7 weaknesses, 5 opportunities, 1 threat). Collaboration is the principle that the participants identified as having the least strengths (2), while value optimization is the one with most strengths (6). Weaknesses are identified in a more homogeneous way, the principles with most weaknesses are collaboration and value optimization (9 each), the other four principles have been identified by the companies as having the same amount of weaknesses (7 each). From the answers given by the participants, collaboration is the principle which fosters more opportunities (14), while systems thinking and stewardship the ones with less opportunities (5 each). Systems thinking is also the principle that entails the least threats (1) according to the respondents, while collaboration and transparency are the principles that have been identified as the ones that may hide the most threats (7 each). Overall, aggregating positive internal and external factors and negative internal and external factors, we can observe that respondents have identified stewardship and transparency as the least appealing principles, given the fact that negative factors outnumber positive ones: stewardship counts 10 positive factors and 12 negative factors, while transparency fosters 12 positive factors and 14 negative factors. Systems thinking and collaboration emerge as "neutral principles", given the fact that each of them has the same amount of negative and positive factors. The remaining two principles have been identified as having more positive factors than negative ones (innovation: 14 positive factors, 13 negative factors; value optimization 15 positive factors, 14 negative factors).

We can set forward some interpretations of the results that the SWOT analysis has rendered available. The fact that stewardship and transparency have been identified as the principles in which the negative aspects outnumber the positive ones, remarks the difficulty in the implementation of theses specific CE principles; stewardship, in fact, implies a deep understanding of both the internal and external environment, and a strong action coming from the firm's leadership. The negative internal and external factors that the companies find to be present in the implementation of stewardship are diverse, and are linked to the reasoning we have just put forward: a certain degree of awareness (both at the company and the consumers' level), resources, and ability to communicate are needed, furthermore respondents noted that when people find themselves in financial constraint tend to value more the quality-price ratio when buying a product, rather than the company's stewardship efforts. The positive internal and external factors that the participants pointed out regarding the implementation of the stewardship principle are identified in the fact that applying this principle contributes to triggering the commitment of diverse actors of the value chain, therefore enabling people to

take on responsibilities, moreover respondents noted that through the adoption of stewardship a better understanding of the external environment is favoured and the relationship with external stakeholders is improved. Transparency falls in the category of the least appealing principles because although positive factors are dominated by opportunities (9 opportunities and 3 strengths), the firms identified seven key points for each of the two negative factors (weaknesses and threats), outnumbering the positive ones by two points. The positive factors that encourage the implementation of transparency are diverse, for example the companies highlighted the fact that transparency adoption brings internal benefits to the company, in particular it boosts communication, collaboration and awareness, as well as external benefits, i.e. the implementation of the transparency principle conveys a positive company image, increases trust and collaboration opportunities and decreases complaints made by the local community. The companies identified also multiple negative factors discouraging the companies from implementing transparency measures. First of all, companies have highlighted the fact that the implementation of transparency is linked to two variables: internal and external factors. Indeed, transparency can be fully achieved only if information disclosure is perpetrated along the whole value chain; specific monitoring system are also needed, but are not always available, moreover transparency is also linked to law requirements, which the company has to follow strictly, even though they can change very quickly, this way contributing to the company's failure in keeping up with them. In addition to these concerns, the participants suggest that once information has been disclosed the firm may result vulnerable, the disclosure of information can possibly turn out to be against the business strategy, in some cases facilitating the rise of legal concerns.

Systems thinking and collaboration can be seen as neutral principles, because the respondents have identified the same amount of positive factors and negative factors for each of them; this balance may suggest the fact that companies have a comprehensive vision of the principles and are aware of both positive and negative factors that can influence the decision on the implementation of the principles. Systems thinking presents 8 positive factors and 8 negative factors, when analysing more in depth the results it emerges the fact that the respondents have mostly focused on weaknesses (7) and opportunities (5). Systems thinking is positively seen by many of the organizations as a guidance for CE implementation and is regarded as being easy to implement especially in small firms, moreover the respondents have identified in system thinking a consistent opportunity for the amelioration of internal management and performance, for earning economic benefits and new business opportunities, as well as a mean to strengthen

the collaboration with stakeholders in the CE field. On the other hand, the respondents are afraid of the fact that the economic benefits earned from the implementation of systems thinking will not be able to meet the expectations, this is coupled with the fact that constant support and collaboration is needed, both internally and externally. Collaboration is viewed by participant as a principle fostering numerous opportunities (14), but at the same time they are concerned with the possible threats (7) and intrinsic weaknesses (9) that the principle contains. Flexibility, coordination and CE-knowledge are seen as necessary in order to establish profitable collaborations, moreover the respondents highlighted the fact that not all companies have the same opportunities when it comes to establish useful collaborations (e.g. collaborations with the governmental authorities). Participants are afraid of the drawbacks that collaborations may foster, for example an increase in the organisation's costs, the rise of legal concerns and the possibility of the unsuccess of the collaboration. The respondents struggled in identifying collaboration's intrinsic strengths (2), but diverse firms agreed on the fact that one strength of collaboration is the ability to facilitate the dialogue between internal and external stakeholders. Opportunities balance the numerous negative factors, the respondents suggested that collaboration may improve the company's situation in many areas, as well as creating a collaborative environment at the local level between the firms of the same geographical area; another opportunity is identified in the possibility of gaining a certain degree of flexibility and competitive advantages, moreover collaboration with diverse internal and external stakeholders may improve diverse areas of the company's business, especially CE performance.

Despite the fact that value optimization is seen as a principle fostering diverse difficulties in its implementation, the companies pointed out more positive factors regarding its implementation than negative ones. As we already pointed out, value optimization implies the modification of many processes and practices used by the company, from the products' initial design to the products' end-of-life. The all-around commitment that is needed for the implementation of this principle is therefore viewed by companies as high in terms of costs and expertise, moreover, although value optimization contribution in promoting the implementation of CE and diminishing waste and costs, firms are afraid that the business profit may fall; this fear is corroborated by the fact that the implementation of value optimization fosters a certain degree of uncertainty: the practice is not all the times 100% effective. On the other hand, the opportunity of gaining new collaborations, external customers-related benefits and internal employees-related benefits are an incentive for companies to implement the value optimization principle. In conclusion, companies have also identified more positive factors than negative

ones when analysing innovation's strengths, weaknesses, opportunities and threats. Eight respondents identified the same intrinsic strength of the innovation principle: innovation is seen as a strategy which is often supported by the top management. Top management support, in fact, has been identified as having a strong role in the implementation of green practices and innovation (El-Kassar & Singh, 2019; Ilyas, Hu, & Wiwattanakornwong, 2020; Lee, Kim, & Kim, 2018). Innovation is seen as a mean to trigger the growth of new ideas and the adoption of new tools and technologies. Through innovation companies are able to attract new investors, partners and customers by fulfilling more and diverse demands, therefore gaining economic benefits. Innovation itself is seen as a way to test CE feasibility. On the other hand, respondents agree with the fact that innovation requires both resources and motivation, moreover it is highlighted the fact that sometimes theory and practice do not coincide. Almost half of the respondents (9) pointed out the fact that innovation does not always bring economic benefits. Participants are also concerned with the fact that competitors may copy the innovative ideas of their companies, and with the fact that launching an immature innovation could cause legal concerns.

Confronting the opinions on the CE principles given by the companies through the SWOT analysis with the self-assessment of the CE implementation level obtained through the use of the Likert-scale questions, we can notice that not always the principles that fostered more positive reasons for their implementation are actually already implemented by companies.

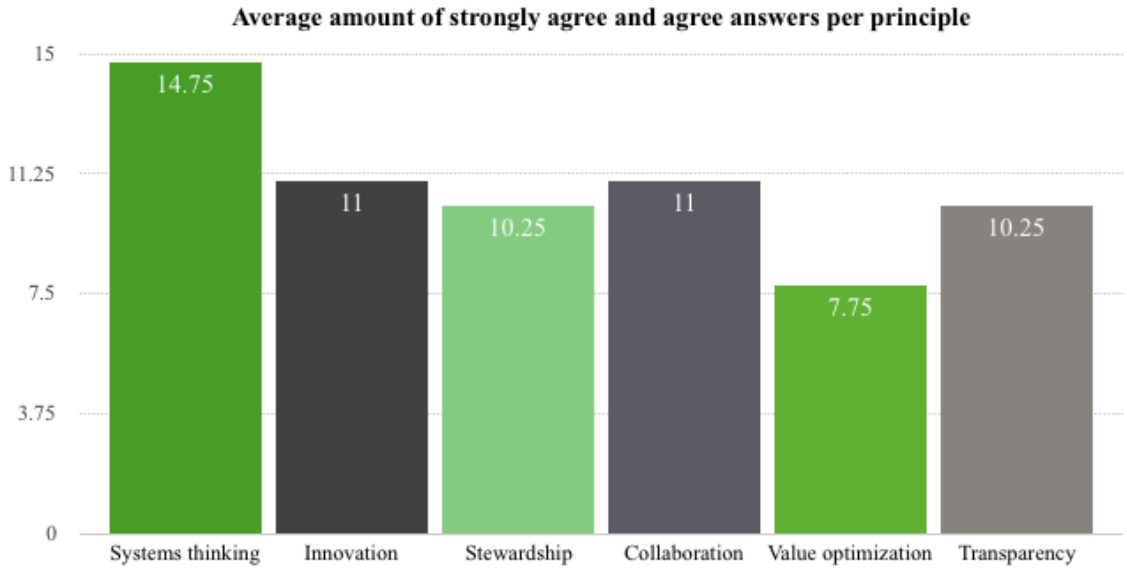

Figure 12 *Average amount of strongly agree and agree answers per principle. Bar chart elaborated by the author.*

For example, according to the results of the SWOT analysis, value optimization's positive aspects outnumbered negative ones, but when self-assessing the implementation at the company's level of the actions related to value optimization by calculating the average amount of companies which agreed or strongly agreed with the actions of every principle, a contrasting data emerged: only an average of less than 8 companies (namely 7.75) accounting for 40.79% of the companies are actually implementing those actions. An average of 10 companies (precisely 10.25), meaning 53.25% of all the participants, implement stewardship and transparency actions, while an average of 11 companies (57.89% of all the companies) implement innovation and collaboration actions, in conclusion on average an amount of 77.63% of the companies implement systems thinking actions, which means almost 15 (14.75) out of 19. Systems thinking and collaboration were seen as neutral principles when analysing the answers to the SWOT analysis, however they result as being the two most applied principles by the companies on the basis of the Likert-scale survey. Value optimization is the only principle whose actions are not implemented by at least half of the participants, this situation can be partly explained by the difficulties that the companies pointed out in the SWOT analysis, but at the same time it highlights the fact that even though principles are seen as fostering more positive factors pushing for the implementation of pertaining circular actions, than negative factors, these may be seen by the organization as having a stronger impact on the firm than the impact that the positive factors may be able to generate, this way driving the company's choice towards the non-implementation of the principle's related actions. The confrontation of the data retrieved from the two surveys helped us understand that the quantity of positive features is therefore not a valid indicator to predict whether or not the companies are going to implement CE principles-related action; however, this research rendered us able to better understand how CE is conceived at the company level in China, particularly in the Guangdong Province. Although the sample is narrow, the research suggests that companies have acquired the knowledge to identify CE principles and to elaborate a reasoning related to the positive and negative sides of implementing CE actions, the answers have proved that CE actions are currently taking place in the organizations, but the frequency of their implementation seems not related to the thoughts that the companies disclosed on the principles.

In conclusion, Chapter 3 was conceived as a section aimed at analysing CE implementation at the micro level of companies, with a particular reference to the Chinese reality of the Guangdong Province. The environmental performance of a company is proved to be influenced

by internal and external factors, therefore we examined how the relationship between the companies and the governmental authorities at the central and local level play a key role in the implementation of environmental measures and CE ones, we focused our attention on the implementation of these interrelated measures in the Guangdong area, firstly investigating the relationship between companies and governmental authorities in this location, and afterwards presenting the results of a research on how CE principles are conceived at the company level, therefore pointing out the role of knowledge and commitment played by the organizations' managers in the implementation of these actions. A complex reality emerged, in which the business-government relationships play a key role in the implementation of environmental measures, especially at the local level. While trying to process this reasoning we figured out that the academia has not focused yet on the role of this kind of relationship in the implementation of CE measures; studies, in fact, are generally directed towards the more general and comprehensive themes of sustainability and of the environmental issue. When tailoring the discourse to the Guangdong Province, similar results and issues have emerged; in addition, the discussion of the findings of the research project, was essential to formulate a more accurate overview on the topic, giving the fact that it specifically targeted CE implementation at the micro-level of companies and fostered the opinions of managers, it helped us figuring out whether the opinions held by managers on CE reflected the actual implementation of circular measures at the company level, this way analysing the impact of the existing internal factors related to the managers' proposition and knowledge on the CE performance. What emerged was that even though the managers identified a principle as having more positive features than negative ones pushing for its implementation, this was not automatically reflected in the actual implementation of the pertaining CE actions inside the company. In one case, in fact, although the principle's positive features outnumbered the negative ones, the pertaining circular actions emerged as being implemented by an average of less than half of the respondents. To sum up, this chapter pointed out how in China both firms' internal and external factors have a pivotal role in the implementation of CE measures at the micro-level of companies, also in a vibrant and varied business reality as the one represented by the Guangdong Province.

Conclusions

This thesis followed a linear development, by starting from the identification of the main issue, CE, and then focusing on a more specific application of the CE discourse: the situation of the implementation of CE in the PRC, specifically analysing the related legal framework, comprising pertaining laws and plans. In conclusion a third level of analysis has been set forward by analysing the implementation of CE at the micro level of companies, particularly referring to a specific case study based on a research conducted in the Guangdong Province to which the author of thesis took part.

In Chapter 1 the topic of CE has been introduced, outlining the reasons why this issue has gained momentum and presenting the different solutions proposed by the scientific community, consisting in diverse schools of thought on the topic of CE. All these different schools of thought have contributed in expanding the discourse on CE practical application, which features the existence of multiple sets of principles, these principles assist the organizations (be them private or public) in the application of CE measures at three different levels: macro, meso and micro. Following the discourse introduced in Chapter 1, Chapter 2 focuses on the Chinese CE implementation reality at the macro level, that is exploring the actual scenario of CE implementation in the PRC by considering the resolutions adopted at national level, which comprise laws and five-year plans. Chapter 2 paid attention to the last three five-year plans, the Cleaner Production Promotion Law and the Circular Economy Promotion Law, which is the most recent among the dispositions taken in analysis (it was last amended in 2018). For what concerns the contents of the five-year plans, we have observed that the general discourse moved from being focused on the resource conservation practices to actions oriented towards reuse, recycle and remanufacture. The Circular Economy Promotion Law and the Cleaner Production Promotion Law are strongly interconnected, the Circular Economy Promotion Law aims at addressing all the industries and sectors of the Chinese economy, giving new impetus to the provisions previously stated in the Cleaner Production Promotion Law (which comprises resources and energy conservation, reuse and elimination of waste, control and elimination of pollution, and appropriate design of products), but with the tendency to put a strong accent on the adoption of the 3R principle in order to implement CE. CE is considered in China as being a national strategy for the country's development, therefore the implementation of CE measures follows a top-down approach, meaning that the directives are decided at the central level.

Although the actions are issued by the central government their implementation is then delegated to local governmental authorities. With respect to this mechanism Chapter 3 investigates the role of internal and external actors in the implementation of the firm's environmental plans, including CE; more precisely the chapter focuses the relationship between the government and businesses (external factor) and on the firms' managers' perception and knowledge of CE (internal factors). The findings highlight the fact that governmental authorities play a key role in the implementation of environmental measures (which also comprise CE-related actions) to the extent of having the capability to influence the computing of the final amount of taxes that the companies are subjected to. Moreover, SOEs particularly feel the pressure exerted by the governmental authorities, being them local or central, which instrumentally use SOEs in order to reach their objectives. Facts have showed that the influence that the governmental authorities play on companies is present in the Guangdong Province, which we took as case study in order to investigate the internal and external factors issue. What emerged from the internal managers' knowledge and motivation point of view is that companies have understood the principles governing CE implementation and have started to apply CE actions as well, although the implementation of CE actions is not homogeneous throughout the diverse companies and it appears to have no linkage with the managers' perception of positive factors pushing for the implementation of the CE principles, suggesting that in those cases in which positive consequences of CE actions implementation outnumber the downsides, although managers are conscious of the positive benefits brought by the implementation of CE actions, there could be other factors hindering their full implementation. Internally the problem may be traced back to the fact that the decision making includes diverse managers, and to the fact that the possible role of the environmental manager as a facilitator is often not exploited (both of these two insights were investigated in section 3.1); on the other hand, external forces like the governmental authorities exert a certain influence on companies when environmental initiatives are taken into account, this could result in the prioritization of some actions over others, rendering the implementation of some actions more effective than others.

We conclude our reasoning by making some concluding remarks. This thesis has defined general key points to help the public understand the current situation of CE implementation in China. Firstly, the Chinese government commitment to CE implementation, being it considered a national development strategy, as well as an international duty, which is confirmed also by the signing of the 2018 Memorandum of Understanding (MoU) between China and European Union on the theme of CE. Secondly, the importance of a top-down strategy combined with

local responsibility in the implementation of CE. Thirdly, the idea of a miscellaneous group of internal and external forces influencing the environmental performance of a firm. This topic has been investigated by using the Guangdong Province reality as a case study. This investigation has confirmed the importance of the role of the governmental authorities in the field of the firms' environmental performance, as well as the fact that firms are aware of CE principles and have developed personal reasoning sustaining or hindering their implementation, which although do not determine the actual implementation or avoidance of implementation of CE practices at the company level, suggesting a more complex environment linked to the decision making process, to the role of the environmental manager and to the external forces' pressure.

The research can be further expanded by choosing case studies located in the diverse Chinese provinces and confronting the results with the ones obtained through the research conducted in the Guangdong Province. In particular, there is room for studies investigating the relationship between businesses and governmental authorities with regard to CE implementation, particularly focusing on the influence exerted by the government in this specific field of action.

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Appendix A

Table 11 *Chinese legal and regulatory measures related to the spectrum of CE issued since 1979.*

NAME	YEAR	TYPE
Environmental Protection Law of the People's Republic of China (中华人民共和国环境保护法, *Zhōnghuá rénmín gònghéguó huánjìng bǎohù fǎ*)	1979 (amended in 1989 and 2014)	law
Water Pollution Prevention and Control Law of the People's Republic of China (中华人民共和国水污染防治法, *Zhōnghuá rénmín gònghéguó shuǐ wūrǎn fángzhì fǎ*)	1984 (amended in 1996, 2008, 2018)	law
Interim Provisions on Several Issues Concerning the Comprehensive Utilization of Resources (关于开展资源综合利用若干问题的暂行规定, *Guānyú kāizhǎn zīyuán zònghé lìyòng ruògān wèntí de zhàn háng guiding*)	1985	regulation
Law on Prevention and Control of Atmospheric Pollution of the People's Republic of China (中华人民共和国大气污染防治法, *Zhōnghuá rénmín gònghéguó dàqì wūrǎn fángzhì fǎ*)	1987 (amended in 1995 and 2018, revised in 2000 and 2015)	law
China's Agenda 21 (中国 21 世纪议程, *Zhōngguó èrshíyī shìjì yìchéng*)	1994	plan
Law of the People's Republic of China on the Prevention and Control of Solid Waste Pollution (中华人民共和国固体废物污染环境防治法, *Zhōnghuá rénmín gònghéguó gùtǐ fèiwù wūrǎn huánjìng fángzhì fǎ*)	1995 (revised in 2004, and later mended in 2013 and 2016)	law
Energy Conservation Law of the People's Republic of China (中华人民共和国节约能源法, *Zhōnghuá*	1997 (revised in 2007, and amended in 2016 and 2018)	law

rénmín gònghéguó jiéyuē néngyuán fǎ)		
Cleaner Production Promotion Law of the People's Republic of China (中华人民共和国清洁生产促进法, *Zhōnghuá rénmín gònghéguó qīngjié shēngchǎn cùjìn fǎ*)	2002 (amended in 2012)	law
Law of the People's Republic of China on Environmental Impact Assessment (中华人民共和国环境影响评价法, *Zhōnghuá rénmín gònghéguó huánjìng yǐngxiǎng píngjià fǎ*)	2002 (amended in 2018)	law
Interim Provisions for National Eco-Industrial Parks Demonstration Application, Naming and Management (国家生态工业示范园区申报、命名和管理规定（试行）, *Guójiā shēngtài gōngyè shìfàn yuánqū shēnbào, mìngmíng hé guǎnlǐ guīdìng (shìxíng)*)	2003	regulation
Provisional Guideline for Planning National Eco-Industrial Parks Demonstrations (生态工业示范园区规划指南(试行), *Shēngtài gōngyè shìfàn yuánqū guīhuà zhǐnán"(shìxíng)*)	2003	regulation
Renewable Energy Law of the People's Republic of China (中华人民共和国可再生能源法, *Zhōnghuá rénmín gònghéguó kě zàishēng néngyuán fǎ*)	2005 (amended in 2009)	law
Opinions on Accelerating Circular Economy Development (关于加快发展循环经济的若干意见, *Guānyú jiākuài fāzhǎn xúnhuán jīngjì de ruògān yìjiàn*)	2005	regulation

The 11th Five-Year Plan for Economic and Social Development of the People's Republic of China (中华人民共和国国民经济和社会发展第十一个五年规划, *Zhōnghuá rénmín gònghéguó guómín jīngjì hé shèhuì fāzhǎn dì shíyī gè wǔ nián guīhuà*)	2006	plan
Evaluation Index System for Circular Economy Development (印发循环经济评价指标体系, *Yìnfā xúnhuán jīngjì píngjià zhǐbiāo tǐxì*)	2007 (amended in 2017)	index
Guide for Circular Economy Development (循环经济发展规划编制指南, *Xúnhuán jīngjì fāzhǎn guīhuà biānzhì zhǐnán*)	2007	regulation
Evaluation Index System for Eco-Industrial Parks (生态工业园评价指标体系, *Shēngtài gōngyè yuán píngjià zhǐbiāo tǐxì*)	2007	index
Guideline for the Construction Plans of Eco-Industrial Parks (生态工业园区建设规划编制指南, *Shēngtài gōngyè yuánqū jiànshè guīhuà biānzhì zhǐnán*)	2007	regulation
Circular Economy Promotion Law of the People's Republic of China (中华人民共和国循环经济促进法, *Zhōnghuá rénmín gònghéguó xúnhuán jīngjì cùjìn fǎ*)	2008 (amended in 2018)	law
Regulation on the recovery and disposal of waste electrical and electronic products (废弃电器电子产品回收处理管理条例, *Fèiqì diànqì diànzǐ chǎnpǐn huíshōu chǔlǐ guǎnlǐ tiáolì*)	2009 (amended in 2019)	regulation
Notice on Promoting the Development of a Low Carbon	2009	policy

Economy in National Demonstration Eco-Industrial Parks (在国家生态工业示范园区中加强发展低碳经济的通知, *Zài guójiā shēngtài gōngyè shìfàn yuánqū zhōng jiāqiáng fāzhǎn dī tàn jīngjì de tōngzhī*)		
Measures for the Administration of Records on Local Environmental Quality Standards and Pollutant Discharge Standards (地方环境质量标准和污染物排放标准备案管理办法, *Dìfāng huánjìng zhí liàng biāozhǔn hé wūrǎn wù páifàng biāozhǔn bèi'àn guǎnlǐ bànfǎ*)	2010	regulation
Opinion on the investment and financing policies for circular economy development (关于支持循环经济发展的投融资政策措施意见的通知, *Guānyú zhīchí xúnhuán jīngjì fāzhǎn de tóu róngzī zhèngcè cuòshī yìjiàn de tōngzhī*)	2010	rule
Technical manual on domestic wastes disposal (生活垃圾处理技术指南, *Shēnghuó lājī chǔlǐ jìshù zhǐnán*)	2010	policy
Circular on Organizing the Pilot Efforts of Recycling and Safe Disposal of Urban Kitchen Waste (关于组织开展城市餐厨废弃物资源化利用和无害化处理试点工作的通知, *Guānyú zǔzhī kāizhǎn chéngshì cān chú fèiqì wù zīyuán huà lìyòng hé wú hài huà chǔlǐ shìdiǎn gōngzuò de tōngzhī*)	2010	rule
Opinion on Facilitating the Development of the Remanufacturing Industry (关于推进再制造产业发展	2010	rule

的意见, *Guānyú tuījìn zài zhìzào chǎnyè fāzhǎn de yìjiàn*)		
Circular on Building Demonstration Bases of City Mining (关于开展城市矿产示范基地建设的通知, *Guānyú kāizhǎn chéngshì kuàngchǎn shìfàn jīdì jiànshè de tōngzhī)*	2010	rule
Outline of China's Policies on Resource Recycling Technologies (中国资源利用技术政策大纲, *Zhōngguó zīyuán lìyòng jìshù zhèngcè dàgāng*)	2010	policy
Circular on Carrying Out Pilot Statistics on the Circular Economy (关于开展循环经济统计试点工作的通知, *Guānyú kāizhǎn xúnhuán jīngjì tǒngjì shìdiǎn gōngzuò de tōngzhī*)	2010	rule
Administrative Measures for Eligibility License for Disposal of Waste and Discarded Electrical and Electronic Products (废弃电器电子产品处理资格许可管理办法, *Fèiqì diànqì diànzǐ chǎnpǐn chǔlǐ zīgé xǔkě guǎnlǐ bànfǎ*)	2010	rule
The 12th Five-Year Plan for Economic and Social Development of the People's Republic of China (中华人民共和国国民经济和社会发展第十二个五年规划, *Zhōnghuá rénmín gònghéguó guómín jīngjì hé shèhuì fāzhǎn dì shí'èr gè wǔ nián guīhuà*)	2011	plan
Implementation Scheme for Supporting Demonstration Cities for Recycling and Safe Disposal of Urban Kitchen Wastes with the Special Fund	2011	rule

for the Circular Economy (循环经济发展专项资金支持餐厨废弃物资源化利用和无害化处理试点城市建设实施方案, *Xúnhuán jīngjì fāzhǎn zhuānxiàng zījīn zhīchí cān chú lèsè zīyuán huà lìyòng hé wú hài huà chǔlǐ shìdiǎn chéngshì jiànshè shíshī fāng'àn*)		
Circular on Adjusting and Improving the Value-Added Tax Policies for Products and Labour Services that Comprehensively Utilize Resources (关于调整完善资源综合利用产品及劳务增值税政策的通知, *Guānyú tiáozhěng wánshàn zīyuán zònghé lìyòng chǎnpǐn jí láowù zhìhuàn zhèngcè de tōngzhī*)	2011	policy
Guideline for Comprehensive Utilization of Resources and Implementation Scheme for Comprehensive Utilization of Massive Solid Wastes During the 12th Five-Year-Plan Period (关于印发“十二五”资源综合利用指导意见和大宗固体废物综合利用实施方案的通知, *Guānyú yìnfā “shí'èrwǔ” zīyuán zònghé lìyòng zhǐdǎo yìjiàn hé dàzōng gùtǐ fèiwù zònghé lìyòng shíshī fāng'àn de tōngzhī*)	2011	rule
Implementation Scheme for Comprehensive Utilization of Crop Straws During the 12th Five-Year-Plan Period (“十二五”农作物秸秆综合利用实施方案, *“Shí'èrwǔ” nóngzuòwù jiēgǎn jiēgǎn zònghé lìyòng shíshī fāng'àn*)	2012	rule
Opinion on facilitating circular economy-oriented upgrading of	2012	rule

industrial parks (关于推进园区循环化改造的意见, *Guānyú tuījìn yuánqū xúnhuán huà gǎizào de yìjiàn*)		
Provisions on the collection and management of funds for the disposal of waste electrical and electronic products (废弃电器电子产品处理基金收集使用管理办法, *Fèiqì diànqì diànzǐ chǎnpǐn chǔlǐ jījīn shōují shǐyòng guǎnlǐ bànfǎ*)	2012	policy
Interim measures on management of special funds for circular economy development (循环经济发展专项资金管理暂行办法, *Xúnhuán jīngjì fāzhǎn zhuānxiàng zījīn guǎnlǐ zhànxíng bànfǎ*)	2012	policy
Administrative measures for the comprehensive utilization of coal ash (粉煤灰综合利用管理办法, *Fěn méi huī zònghé lìyòng guǎnlǐ bànfǎ*)	2013	rule
Development strategy and immediate action plan of circular economy (循环经济发展战略及近期行动计划, *Xúnhuán jīngjì fāzhǎn zhànlüè jí jìnqí xíngdòng jìhuà*)	2013	regulation
Regulation on the prevention and control of pollution from largescale breeding of livestock and poultry (畜禽规模养殖污染防治条例, *Chù qín guīmó yǎngzhí wūrǎn fángzhì tiáolì*)	2013	regulation
Action Plan for air pollution prevention and control (大气污染防治 行动计划, *Dàqì wūrǎn fángzhì xíngdòng jìhuà*)	2013	plan
National strategy for Climate Change Adaptation (国家适应气候 变化战	2013	plan

略，*Guójiā shìyìng qìhòu biànhuà zhànlüè*)		
Opinions on facilitating the resource-based co-processing of urban and industrial waste in the production process (关于促进生产过程协同资源化处理城市及产业废弃物工作的意见，*Guānyú zài shēngchǎn guòchéng zhōng cùjìn yǐ zīyuán wèi jīchǔ de chéngshì hé gōngyè fèiwù xiétóng chǔlǐ de yìjiàn*)	2014	rule
National Plan on Climate Change (国家应对气候变化规划（2014-2020年），*Guójiā yìngduì qìhòu biànhuà guīhuà (èr líng yīsì-èr líng èr líng nián)*)	2014	plan
Urban Action Plan for Urban Climate Change Adaptation (城市适应气候变化行动方案，*Chéngshì shìyìng qìhòu biànhuà xíngdòng fāng'àn*)	2015	plan
Implementation Plan of Extended Producer Responsibility (EPR) (生产者责任延伸制度推行方案，*Shēngchǎn zhě zérèn yánshēn zhìdù tuīxíng fāng'àn*)	2016	plan
The 13th Five-Year Plan for Economic and Social Development of the People's Republic of China (中华人民共和国国民经济和社会发展第十三个五年规划, *Zhōnghuá rénmín gònghéguó guómín jīngjì hé shèhuì fāzhǎn dì shísān gè wǔ nián guīhuà*)	2016	plan
Environmental Protection Tax Law of the People's Republic of China (中华人民共和国环境保护税法，*Zhōnghuá rénmín gònghéguó huánjìng bǎohù shuìfǎ*)	2016 (revised in 2018)	law

Resolution of the Standing Committee of the National People's Congress on Comprehensively Tightening Ecological and Environmental Protection and Lawfully Promoting Triumph in the Uphill Battle for Prevention and Control of Pollution (全国人民代表大会常务委员会关于全面加强生态环境保护 依法推动打好污染防治攻坚战的决议, *Quánguó rénmín dàibiǎo dàhuì chángwù wěiyuánhuì guānyú quánmiàn jiāqiáng shēngtài huánjìng bǎohù yīfǎ tuīdòng dǎ hǎo wūrǎn fángzhì gōngjiānzhàn de juéyì*)	2018	working documents
Several Opinions of the Ministry of Finance, the National Development and Reform Commission, and the National Energy Administration on Promoting the Healthy Development of the Power Generation of Non-water Renewable Energy (财政部、国家发展改革委、国家能源局关于促进非水可再生能源发电健康发展的若干意见, *Cáizhèng bù, guójiā fāzhǎn gǎigé wěi, guójiā néngyuán jú guānyú cùjìn fēi shuǐ kě zàishēng néngyuán fādiàn jiànkāng fāzhǎn de ruògān yìjiàn*)	2020	regulation

Appendix B

This Appendix consists of a table containing relevant vocabulary pertaining to CE that the author of this thesis has gathered and selected during multiple occasions: while translating documents and surveys for the research project in Guangzhou, while translating the Chinese legal documents for Chapter 2 of this thesis and while elaborating the introduction of this thesis in Chinese language. The table presents the term in Chinese, the pinyin and the English translation.

Table 12 *Vocabulary pertaining to CE.*

CHINESE	PINYIN	ENGLISH
A		
-		
B		
-		
C		
拆解	*chāi jiě*	disassemble
产业园区	*chǎnyè yuánqū*	industrial park
处理	*chǔ lǐ*	dispose of
D		
低碳	*dī tàn*	low-carbon
E		
-		
F		
翻新	*fānxīn*	refurbish
废弃物	*fèiqì wù*	waste
废物	*fèiwù*	waste
废物的资源化	*fèiwù de zīyuán huà*	waste recycling
G		
工业园区	*gōngyè yuánqū*	industrial park
高耗能	*gāo hào néng*	high energy consuming
H		
环境	*huánjìng*	environment
环境保护	*huánjìng bǎohù*	environmental protection
环境/健康/安全经理/主管	*huánjìng/ jiànkāng/ ānquán jīnglǐ /zhǔguǎn*	EHS* manager/supervisor *environment, health and safety
环境影响评价	*huán jìng yǐng xiǎng píng jià*	environmental impact assessment
回收	*huíshōu*	recycle/ recover

回收利用	*huíshōu lìyòng*	recycle
回收体系	*huíshōu tǐxì*	recycling system
J		
减量化	*jiǎn liàng huà*	reduce
节能	*jiénéng*	energy saving
节约材料	*jiéyuē cáiliào*	material saving
节约土地	*jiéyuē tǔdì*	land saving
节约用水	*jiéyuē yòngshuǐ*	water saving
K		
可持续发展	*kě chíxù fāzhǎn*	sustainable development
可持续性	*kě chíxù xìng*	sustainability
L		
垃圾	*lājī*	garbage
垃圾分类	*lājī fēnlèi*	garbage classification
垃圾分类回收制度	*lājī fēnlèi huíshōu zhìdù*	garbage classification and recycling system
垃圾管理	*lājī guǎnlǐ*	waste management
厉行节约	*lìxíng jiéyuē*	economize
零排放	*líng páifàng*	zero emission
绿色发展	*lǜsè fāzhǎn*	green development
绿色消费模式	*lǜsè xiāofèi móshì*	green consumption model
M		
目标责任制	*mùbiāo zérèn zhì*	target responsibility system
N		
能耗	*néng hào*	energy consumption
能耗标准	*néng hào biāozhǔn*	energy consumption standard
O		
-		
P		
-		
Q		
清洁生产	*qīngjié shēngchǎn*	cleaner production
R		
-		
S		
生产者责任延伸	*shēngchǎn zhě zérèn yánshēn*	extended producer responsibility
生活垃圾	*shēnghuó lājī*	domestic garbage
生态保护	*shēngtài bǎohù*	ecological protection
生态工业园区	*shēngtài gōngyè yuánqū*	eco-industrial park
生态设计	*shēngtài shèjì*	eco-design
生态文明	*shēngtài wénmíng*	ecological civilization
水耗	*shuǐ hào*	water consumption
水耗标准	*shuǐ hào biāozhǔn*	water consumption standard

T		
-		
W		
温室气体	*wēnshì qìtǐ*	greenhouse gasses (GHG)
温室气体排放	*wēnshì qìtǐ páifàng*	GHG emission
无害化处理	*wúhài huà chǔlǐ*	safe disposal
污泥	*wūní*	sludge
污泥资源化利用	*wūní zīyuán huà lìyòng*	sludge recycling
污染	*wūrǎn*	Pollution
污染控制	*wūrǎn kòngzhì*	pollution control
污染物	*wūrǎn wù*	pollutant
污染物排放	*wūrǎn wù páifàng*	pollutant emission
X		
循环经济	*xúnhuán jīngjì*	circular economy
循环利用	*xúnhuán lìyòng*	recycle
循环利用体系	*xúnhuán lìyòng tǐxì*	recycling system
Y		
延长使用寿命	*yáncháng shǐyòng shòumìng*	extended service life (of products)
Z		
再利用	*zài lìyòng*	reuse
再生材料	*zàishēng cáiliào*	recycled materials
再循环	*zài xúnhuán*	recycle
再制造	*zài zhìzào*	remanufacture
资源	*zīyuán*	resource (s)
资源化	*zīyuán huà*	recycle
资源化利用	*zīyuán huà lìyòng*	recycle
资源化利用体系	*zīyuán huà lìyòng tǐxì*	recycling system
资源循环利用体系	*zīyuán xúnhuán lìyòng tǐxì*	recycling system
资源综合利用	*zīyuán zònghé lìyòng*	comprehensive/ integrated use of resource

Appendix C

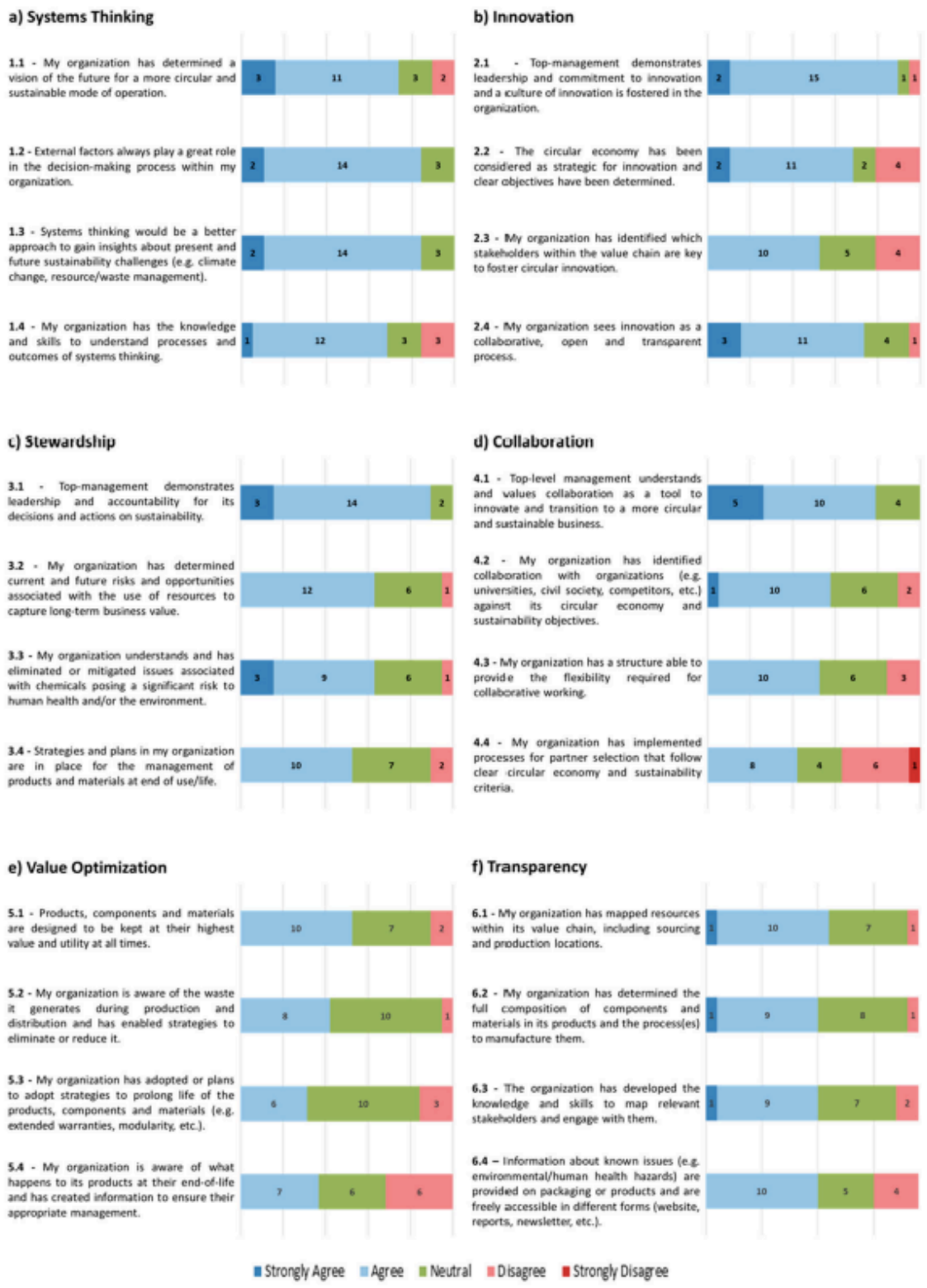

Figure 13 *This figure shows the results of the Likert-scale survey conducted in the research by Pesce et al. This content is not an original content elaborated for this thesis, it is contained in the paper "Circular Economy in China: translating principles into practice, all credits are given to the authors of the paper.*

Acknowledgments

This thesis symbolises the natural conclusion of a path that began in 2015, when I enrolled in Ca' Foscari University in order to obtain my bachelor's degree. My bachelor's degree final dissertation was focused on corporate social responsibility (CSR) in China, specifically targeting the environmental issue. It is in fact the ongoing interest on the environment and sustainability that fuelled my curiosity on how China was responding to the critical environmental situation both at national and international level.

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