

Chapter 9

China Circular Economy towards Environmental, Social and Governance

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Cite this book chapter as a background understanding of what circular economy is all about:

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Abstract

The transition of China's investment led-economy into a more inclusive productivity-led economy has placed prominence on the deployment of Sustainability Development (SD) activities. Circular Economic (CE) and carbon emission neutrality drive (net-zero) represent a synergistic SD focus that any investors need to be aware of while contemplating investment in China. Companies need to understand better the potential ESG (Environmental, Social and Governance) benefits that a Circular Economic Framework can contribute toward meeting global investment and business development trends (including China). Apart from Circular Economic Framework for Regenerative Agriculture, the Circular Economic framework is generally applicable across most business sectors and represents tremendous growth potential. Investors need to consider these critical ESG elements in business development and investment risk profiling in a government-led economy.

Introduction

The current notion of Sustainable Development (SD) activities addressing the global climate change brought on by unabated carbon emissions from economic growth can trace development back to the early 1980s. In 1983 the Ex-Prime Minister of Norway, Ms Gro Harlem Brundtland, was appointed by the United Nations (UN) to chair the World Commission on Environment and Development. The Commission, a sub-organization of the UN, aimed to unite countries to pursue sustainable development collectively with a common objective. That was when the movement for Sustainable Development (SD) began. The report from her Commission, "Our Common Future", was published in 1987, commonly known as the Brundtland Report (Brundtland 1987; Butlin 1989).

"..to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs",

The spirit of Sustainable Development - underlaid the foundation of the United Nations Framework Convention on Climate Change (UNFCCC), which came into force on March 21 1994, for 197 countries and UN Sustainable Development Goals 2030 (UN SDG) launched in 2015 (SDGS 2021).

Over the years, from substantial academic research and industries studies, it has been apparent that the business-as-usual practice of a "take-make-waste" linear economy is not sustainable, significantly when the major economies have been growing for decades due to globalization (EU-Commission 2020). The SD movement has resulted in many Sustainability Intensification (SI) activities/practices that deliver significant economic and environmental benefits. One such development is "Who Cares Wins (WCW)", initiated by the UN Secretary-General and UN Global Compact in 2004-2008 in collaboration with the Swiss government (IFC 2004). There were 23 financial institutions, with US\$6 trillion in assets under management at that material time, involved in the consultations with subsequent recommendations endorsed by the World Bank and International Finance Corporation (IFC). As a result of that consultation, today, the primary SD objective of global Financial institutions is to promote the growth of sustainable capital flows that enable capital market stakeholders to integrate better Environmental, Social, and Governance (ESG) factors. ESG reporting is now mandatory for many listed companies in certain major stock exchanges and specific countries' regulated financial reporting. On the same token, companies that factor in vital ESG elements in their business-as-usual practices, in principle, will be more attractive to institutional investment funds. Numerous successful case studies demonstrate that imbuing ESG as part of a company's drive towards UN SDG can achieve significant multi-facet value creation and

environmental and economic benefits. Effective ESG reporting can be the investment in political and social capital that can build up and maintain an excellent corporate reputation while attracting and retaining talents.

The circular economy (CE) construct stands out as crucial and fundamental within various sustainable development and SI economic constructs. Since circular economy concepts were first mooted in the 1970s, there were many interpretations and definitions of CE (Beaulieu 2015). In general, a close-loop economic construct that promotes and supports the principles of designing-out wastes, keeping material in use and adopting restorative/regenerative processes for the primary inputs would encapsulate the critical elements of CE (Ellen-MacArthur-Foundation 2019). CE framework can be instrumental in the global efforts to migrate the current unsustainable industrial models to models that can decouple economic growth from material inputs and address climate change in the transitions into net-zero carbon emission environments. For specific industry sectors, especially those that involve bio-logical assets, the transition to net-zero or Carbon Neutrality can be painful and challenging. Suppose the affected industries' participations are only for compliance purposes without addressing inclusive stakeholders' engagement coupled with sustainable economic impetus through technological innovations and productivity gains. Then, perhaps such SI activities can be counterproductive and wasted over time. In the CE business model, the same unit of raw material can have multiple revenue generations iterations whereby wastes and biomass can be the inputs for the same industry or other value-chain within the same ecosystem (Di Maio et al. 2017).

The global economic reset and the unprecedented supply chain interruptions brought on by the worldwide pandemic at the end of December 2019 have shaken all the policymakers (Schwab & Malleret 2020). At the time of this writing, the world is experiencing the fifth wave of the mutated Covid-19 virus onslaught. Whether the global pandemic can transition into the best-case scenario of a balanced co-existence endemic stage with economic restarts is yet to be seen. These economic upheavals, wild swings in global commodities markets, inflations, the rout in the debt markets, labour markets gap discrepancies and educational disparities have led to inward-looking national geopolitical protectionism. Apart from the necessitated healthcare services expansions and digital transformations, these unfortunate existential factors have put in motion various government initiatives focusing on resilience infrastructure built up and accelerated in-country sustainable development, as reported in the 2020 OECD Report (Allain-Dupré et al. 2020). The unexpected wake-up call to global policymakers has underscored the urgency to deploy an inclusive circular economy within the country and regional value chains of respective primary industries in addressing food and energy securities. The changed work habits of working virtually and remotely have accelerated many policies and investment decisions processes. These work habits changes are here to stay and should factor this "new norm" in any contemplated business development activities. The advent of digital transformation has opened up a lot more SD opportunities and interesting SI activities. The fast-paced and competitive environment will spur and shape one's company's strategic decisions in the SD transformation towards ESG while meeting the country's SDG.

Economic development data compiled and analyzed by (McKinsey&Co 2019) from 2017-to 2019 has pointed out the trend whereby the economic development growth rate is driven by domestic SD infrastructure build-up rather than international export trade. In the European Green Deal 2019 and Circular Economy Action Plan 2020 (EU-Commission 2020; EU-Commissions 2019), the European Union (EU) legislated Circular Economic development as the primary growth engine for the EU, emphasizing long-term soil remediations measures for existing farmland. Due to aggressive chemical-based farm

inputs, 70% of EU states' arable farmlands are experiencing land degradation trends and need soil ecosystem revitalizations.

"...the transition towards a CE is the opportunity to transform our economy and generate new and sustainable competitive advantages for Europe". – EU Circular Economy Action Plan 2020

The global ESG focus investment and green bond markets trends have set in and become the fabric of any businesses that need to navigate the choppy waters of international markets and disparaged consumer behaviours. With the changing landscape of investment environments, we need to understand and manage a whole host of diverse risks. A steadfast commitment to embracing ESG now at the on-set will avoid the painful transitions to address the regulated, SDG focus, government regulations while establishing a meaningful and beneficial strategic position for a circular economy towards sustainability intensifications and net-zero emissions.

On a separate note, consumer behaviours and expectations have changed dramatically and continue to evolve in the China domestic markets. State and social media have created a new consumer engagement experience and social awareness of CE in their buying selection preference. In certain sectors, the Chinese consumers are trendsetting for the worldwide markets and leading the way in the SD directions. The pandemic has accelerated B2B2C digital and online e-commerce transitions, particularly small and medium-sized enterprises (SMEs) in the supply chains. For most SMEs, digital transformation is an existential decision and not just for operational productivity gains. With many of the giant digital online platforms and players foray into B2B supply chains, ESG disclosure and traceability characteristics of respective company's products and services become the essential business profiling factors influenced by the empowered and informed customer behaviours. The journey for a transition from the traditional business-as-usual linear economy to CE can be daunting; on the flip side, it represents unprecedented business and market opportunities for CE, green tech, renewables and change management Practitioners in the Greater China markets.

China CE and net-zero directives: Implications on a company's ESG

The linear throughput economy model has dominated Chinese economic development since China joined the World Trade Organisation on December 11 2001. The unsurpassed multi-year economic growth has exacerbated environmental degradation, leading to contaminated waterways and loss of biodiversities, affecting the population's livelihood, agriculture outputs, and food security. However, without a doubt, China is the unique growth engine of the global economy that has posted high figures in annual increases in GDP. After more than three decades of the investment-led Chinese economy, the Chinese regulators have now turned towards internal consumption and productivity-led economy spearheaded by CE and net-zero drives. With the Chinese economic momentum and might, coupled with the tenacity towards the CE and net-zero transitions for their inclusive SD and private sector ESG drive, the transitions can be monumental. With China and European transitions to CE and net-zero business models, we can expect to emphasize extending product life cycle, components and material re-use, reintroducing end-of-life materials back as feedstocks into iterative manufacturing cycles, refurbishment, repair, and maintenance. The renewable primary energy source such as solar, wind, biofuels and waste-derived energy utilization become the backbone of any product value chain forming the CE framework and cradle-to-cradle life cycle (Kopnina 2021). In terms of agriculture and ecological services, CE framework is the foundation for preventing deforestation, soil erosion and desertification. Addressing land degradation trends is key to

tackling climate change and ensuring future food and clean water supplies, more so in China, given the necessity to provide food security to its large populations.

CE concepts are not alien to the Chinese regulators, and in fact, China was the first country in the world to enact a law for the circular economy in 2008 (Korhonen et al. 2018). China has adopted a unique philosophical perspective of 'harmonious society' for CE deployment targeting the vast industrial manufacturing complexes and hubs. After decades of consecutive economic growth of more than 5% annually as the global manufacturing powerhouse, the Chinese government recognized the urgent need to address the industrial pollution affecting the country's waterways, population health, and food security. To address these concerns, China launched its new Ecological Development Strategy in 2019 (National Academy of 2019). In crafting inclusive, socially and ecologically beneficial pathways of SD, it is a challenging balancing act between ecological provisioning services to meet the market demands on one hand and environmental regulating services and biodiversity protection on the other. The Chinese policymakers envisage the "ecological civilization" puts forward a compelling drive for CE and aggressive net-zero directives as layout in China's 14th Five Year Plan and Vision for 2035, where China targets to cap peak emissions before 2030 achieve net-zero before 2060 (WEF 2022). Instead of the common bottom-up implementation approach adopted by countries such as EU, Japan and Canada, the China CE policy deployment has been a top-down national political objective with structured CE evaluation systems and methodology (Wang et al. 2021).

Inline with the net-zero transition drive, China's national carbon trading market - Emissions Trading Scheme (ETS), has completed its first compliance period in 2022. The relaunch of China's voluntary carbon credits plan - Certified Emission Reduction (CCER) scheme, will form China's carbon finance infrastructure. The carbon finance infrastructure will further accelerate the CE and net-zero transitions. Apart from the strong narratives from the Chinese leaders both in the international arena and local, regional forums, the promotion of the national carbon-emission trading market mechanism to control and reduce greenhouse gas emissions and institutional innovation for green and low-carbon development are well underway as part of the 14th Five-Year Plan (2021–2025) for National Economic and Social Development with the focus on

- ✓ the green and low-carbon industrial structure and energy consumption of high-emission industries adhering to the carbon-emissions market mechanism targeting of high-emission sectors to take the lead in capping the peak by 2030.
- ✓ the indicative price signals guidance for carbon emission reduction provides economic incentives to guide funds to industries and enterprises with high emission reduction potential and innovative green and low-carbon technologies.
- ✓ building a national carbon market offset mechanism including other carbon-related financial channels to encourage innovative technologies in green and renewable energy, regionally coordinated development and ecological services for arresting land degradation trends

The blend of political aspirations of the Chinese government is closer to Socialist-Capitalism with distinct characteristics of the State leading economic development and interventions in terms of policy deployments. The policymakers dictate the development priorities, regulatory framework, and government-led economic and infrastructure build-up. These policy implementations mechanisms augur well for the Chinese regulators to coordinate social re-engineering with the private sectors to meet such

ambitious climate change goals while preserving economic resilience and growth through CE infrastructure build-up. With the opening up of the capital markets for foreign investors, the Chinese government policies development direction will gyrate between internal economic development priorities, the global SDG objectives and the international ESG standards of the financial and private sectors. It is essential to understand the Chinese government's five-year development plan and the country's development roadmap in the context of SD and China's socialist capitalism. Businesses should leverage the strong government fiscal, policy support and mandate to put in the necessary demonstratable ESG standards to transition into CE and net-zero economy. A government-led, well-orchestrated deployment of industry-wide CE frameworks can provide the focal point and leadership that mitigate the usual cross-disciplinaries challenges and stakeholders silo in the traditional linear value-chains that confront the underserved communities (Bianchini et al. 2019; Lopez et al. 2019).

Any investors in the China market need to factor this State regulatory intervention characteristic into their investment horizon. New business model innovations in the absence of regulatory constraints may not warrant that no new regulations will happen in time to come. There were instances where the government would impose new restrictions or regulations to mitigate risks to social well-being and security interest. For example, State guided reform of the rampant structured non-banking consumer credit finance and termination of social networked direct online educational services are clear indications of such decisive remedial actions. On the same token, given the government's aggressive drive in net-zero and SD, all investments must consider the ESG factors in their intended business profile and the model they intend to deploy in the Greater China markets.

The Government-led SD and CE development represents a tremendous pent-up Chinese market demand for seasoned Practitioners of CE embedded business, innovations, and emission management service providers. Those that have prior SD/CE deployment experience in countries such as the EU, which has been leading the global SD, will be able to put their mark on the Chinese SD regulatory practices. Large scale state-guided structural CE deployment opportunities in China can be instrumental in setting global standards for product sustainability, product design and value-chain management worldwide that other developing and developed countries can mirror. The strategic direction to building a successful CE business in China has the potential to deliver a positive return on investment and inherently environmental and social benefits. It can represent the unique opportunity to be the trendsetters and market movers in China and those other 128 countries participating in the One-Belt-One-Road (OBOR) initiatives: the Chinese government's foray into regional infrastructure development launch in 2013 (Du & Zhang 2018).

The emergence and strategic positioning of unique CE centric business ecosystems that address customers' procurement pain points and distinctive supply chains that keep pace with ESG compliance will create the snowballed social buy-in encouraged by the coordinated State and local social media. These will inevitably result in a long term consumer trend of back-to-basics simplicity consumption, supporting more environmental-friendly products and services. Thus, businesses need to be mindful of these back-to-basic consumption patterns and volume changes. The company's profile and ESG positioning need to be well established within the standard operating procedures and ensure data provenance in keeping these standards. The ESG - "E" as in Environmental factors, upstream feedstock traceability, carbon emissions footprints throughout the product supply chains; "S" as in Social interactions, the ethics, labour conditions, company values that employees, stakeholders, and customers can associate with, social responsibility and benefits derived from the company's business and activities; "G" as in the Governance

of the company's operating procedure, regulatory compliance and the necessity to put in place the data provenance and AI-assisted business transactional data lakes analysis. It is equally important to factor in public and clients' engagement, recognizing effective legal instruments for conducive policy compliance. By integrating ESG criteria in the company's strategic road map, we can expect to improve productivity gains, customer and stakeholders engagement, and fewer regulatory interventions leading to better investment returns through sustainability and resilience build-up. In a sense, ESG investments can alter the stakeholders' behaviour in the business value chain.

Investment in Circular Economy and SI activities

It can be said that the CE constructs support and enhance the worldwide adoption of SDG and support the commitments pledged towards net-zero imperatives during COP26 (UNFCCC-COP26 2022; UNFCCC 2021). The extensive social media coverage and narratives have enabled the social consciousness that inclines toward the policymakers' strategic directives to include CE constructs in many post-pandemic economy recovery packages. Based on the three critical principles of CE, we can envisage a whole host of business development opportunities that arise horizontally and vertically in each of the seven (7) sectors – Agriculture, Energy, Healthcare, Infrastructure, Logistics, Manufacturing and Services. From national central bankers' fiscal policy in support of net-zero imperatives to the financial institutions' ESG drive and the respective governments' infrastructure capital allocation directions, there lie the realities of capital planning and allocations shifts towards SD and SI activities. A CE business constructs done well can have greater access to capital markets and deliver tremendous value extractions.

In our enthusiasm and rush to be in trend and follow the respective governments' economic recovery development packages that focus on net-zero transitions, we have to keep in view the challenges to achieve financial sustainability and resiliency of such endeavour. SD or SI activities that enshrine CE principles can be the yardstick for constructive investment decisions and criteria. Some questions that need to ask by the leadership: Are there markets that are no longer attractive due to these net-zero transitions and ESG requirements? Are the company's innovations and creative processes applicable to meet the new demands? What is the company's strategic positioning in being able to address the rapid changes brought on by the digital transformation and SD trends? What are the company's capital planning and fundraising markets? Will the company has better access and lower cost from the Green Bond or Climate Initiative Bond markets? How can my company's business-as-usual practices be transitioned into CE, and would that meet the ESG standard and practices in the target markets? Can my company's talents make an impact and provide the skill sets and services that enable or facilitate the target markets' transitions to CE and net-zero business practices?

Designing-out wastes.

Given the opportunity to restart where everyone is on equal footing, we can view the approach of designing out wastes into the broader ecosystem that needs to be built around zero waste discharge and low-emissions products. These can represent an entirely new set of markets for new products and services required for the transition and altogether new supply chains and value chains that can take advantage of the pandemic induced digital transformation to achieve higher productivity and efficiencies.

New material inputs in product designs that strive toward zero-wastes can create whole new market demand that the existing products that rely on the linear economy paradigm could not fulfil. For example,

graphene-based batteries that can replace lithium-based batteries for a more efficient charging cycle, life span, and reusability can propel an entirely new supply chain and value chain in e-mobilities and logistics.

The Reverse Logistics approach can be another paradigm shift in how we need to design in re-use, refurbishment, recycling and waste upcycling as part of products lifecycle and support services for an engaging customer experience. In the linear economic cradle-to-grave product life cycle assessment, increasing product profitability is the primary focus of the product design. Management practices promote the production of low-cost consumer goods that have planned obsolescence to pursue higher product profitability and accelerated economic benefits through repeated sales. Thus, the practice of design-in waste encourages increased consumption, making the repair or re-use economically unattractive. To effectively decouple economic growth from resource consumption, ideally, empowered consumers will call for infinitely reusable or recycled packaging; re-use will be the new designing-out waste drive.

In 2022, the EU Commission announced broad and encompassing plans to ensure sustainable products are the norm and improve Europe's resource independence. The plans call for designing-out waste to make almost all physical goods on the EU market have energy-efficient, environmentally friendly and circular design throughout the product lifecycle and value chains with repurposing end-of-life re-use. Particular focus is on a) making textiles more durable, repairable, reusable and recyclable, b) internal sustainable construction products and c) empowering consumers in the transitions (EU-Commission 2022). The EU is one of the major trading blocs of China that will ultimately influence Chinese manufacturers and industrial practices that require a well-coordinated and organized SD movement and transition from various Chinese government initiatives and directives toward CE and net-zero.

Keeping material in use

A good illustration of keeping material in use is the e-mobility market in China. Electric Vehicles (EV) development, batteries productions, and related charging infrastructure are components of new market supply chains and value chains due to an SD's government fiscal and policy support. Of course, the primary electric power sources are renewables in order to make a meaningful impact. A shared e-mobility ecosystem and marketplace are excellent for keeping material in use, e.g. e-hailing, robo-taxi services. The transition of product sales into product-as-a-service, such as shared e-scooters/e-bicycle services, can be the go-to-market strategy of CE business models. For the Chinese markets, the continued acceleration of the product-as-a-services CE model can be challenging in terms of cultural acceptance of the shared services and scalability of the Original Equipment Manufacturers' (OEM) supply chains. The current technology innovation trends in autonomous driving, connectivity, electrification, and smart mobility will inevitably promote the product-as-a-service industry in e-mobility.

From the pledge commitment by China, the United States and the EU during COP26 2021, the global combined EV market will represent close to 45 % of all new vehicles sales by 2030. Over time, when the primary electrical power sources have transitioned predominately into Renewable primary sources, the material and production of EVs will become the dominant sources of carbon emissions, especially for the batteries. The reverse logistics infrastructure for battery refurbishment, recycling, regeneration and recovery can potentially be the next frontier for CE business model for the e-mobility sectors. There are many more product-as-a-service markets potentials whereby the reverse logistics infrastructure is part and parcel of the service deliverables.

Adopting restorative/regenerative processes

Restorative and regenerative elements are of paramount importance to have a meaningful and economically beneficial SD that can provide viable pathways towards net-zero and sustainability. SD that only focuses on emission reductions can only be a short-term measure if the entire value chain cannot decouple economic growth from resource consumption. New materials for batteries fabrication that extend the productive life span and regeneration of the batteries can be such an endeavour that form the foundation of CE framework for the e-mobility industries and ecosystems. To date, China is the largest EV market in absolute terms and the adoption modelling by (McKinsey&Co 2021) projects the Chinese EV share above 70 % of new automobile sales by 2030.

Waste-to-Energy Renewable power generation for municipal waste can be economically viable and contribute toward the net-zero emission target. However, it represents a non-restorative or non-regenerative activity that co-exists within the cradle-to-grave linear economy ecosystem that is non-sustainable in the long run. On the other hand, biomass waste-to-energy as Renewable Energy production is non-regenerative. Biomass can deliver higher environmental, social and economic benefits when utilized as feedstock for farm inputs towards soil organic content and the improvement of the soil ecosystem, ultimately promoting regenerative agriculture. China's Agriculture sectors are facing similar global land degradation trends due to the long term aggressive chemical fertilizers applications and the removal of the massive volume of farm biomass from the land. Thus, CE in Regenerative Agriculture approach will be one of the low hanging fruits for investors looking for solid government policy support.

Reflecting on the distinct resilience goals of governments, communities, and industry value chains will help strategise essential delivery requirements, mitigate systemic vulnerabilities, and embrace the regenerative elements in building up economic sustenance and resilience.

Circular Economy towards Regenerative Agriculture

In mitigating climate change and transitioning towards net-zero, one of the foremost priorities and urgent SI activities are to ensure food security and the ability to support future population growth without compromising the net-zero objectives. In general, land degradation is a complex process in which climate and land-use changes are the two key factors affecting the interaction of the natural ecosystem and the socioeconomic system. The land degradation trends experienced by our farming communities can be attributed to the aggressive agricultural practices of chemical fertilizers inputs since the advent of fossil-based Nitrogen fertilizers in the early 1900s (Zhao 2018). An Intergovernmental Panel on Climate Change (IPCC) report has indicated that improper land management has caused land degradation, deforestation, soil erosion, and desertification, affecting climate change (IPCC 2022). The cost of sustainable land rehabilitations and restorations can bring about three to six times economic, environmental benefits and profitability within three to ten years. Globally, the agriculture activities in the production of food, fibre, timber, feedstock for animal feed and energy have utilized 33% and 70% of available land and freshwater supply, respectively (Shukla et al. 2019). Fertile soil i.e. soil with high soil organic carbon content and thriving soil microbial ecosystem, are non-renewable resources. Hence, the necessary bio-remediation to arrest land degradation and revitalize the soil ecosystem has an existential impact on our food and energy security for generations to come (Nkonya, Mirzabaev & Von Braun 2016).

The UN SDG set a target for governments to achieve Land Degradation Neutrality (LDN) by 2030: by recovering from some of the over two billion hectares of degraded land to compensate for the loss of

approximately 12 million hectares of productive land per annum. In order to achieve this neutrality, there is the need to ensure that the land is utilized sustainably without land degradation. At the same time, there is an urgent need to remediate and revitalize degraded land back to its full potential. Regenerative agriculture mechanisms through upcycling biomass wastes can potentially bridge observable yield gaps from optimum achievable yield. However, the significant of SI through CE framework of upcycling biomass wastes are not recognized by large. One of the challenges is the inefficiency of traditional windrow based composting processes to deliver good quality compost for the production of bio-organic fertilizers for consistent long term soil revitalization. Multi-years case study on effective bio-organic fertilizers productions through the deployment of existing mature in-vessel composting mechanism has demonstrated the improved economic and environmental benefits in addition to better soil ecosystem, plant health and crop yield (Poh et al. 2020). Such deployment represents a significant step toward the UN 2030 Sustainable Development Goal, especially goals 17, 15, 13, 12, 9, and 8.

To illustrate the strategic approach of CE constructs in Regenerative Agriculture, we shall use the scenario of upcycling biomass wastes as bio-organic fertilizers for consistent long term soil remediations/revitalization (See Figure 1). The primary focus and deliverables of applying these bioorganic fertilizers back to the farmland that generates the biomass are to improve plant health and productivities via soil ecosystems improvement. Thus, regenerative agriculture effectively bridges the yield gaps between observable yield and achievable yields for existing underperforming farmland. The traceability factors, the integration of biotech sectors with industrial IR 4.0, and the price premium for organic food production can collectively form the core building blocks of CE toward Regenerative Agriculture trends. Both China and the EU economic bloc have placed Regenerative Agriculture as their bedrock of CE and net-zero transition programs that inevitably set the global farming communities' trends. The strategic approach of improving the production of crops from existing farmland to sustaining and meeting the food demands of population growth – Sustainability Intensifications via crop research and soil ecosystem improvement has been part of the SD (Baulcombe 2010). Inevitably, the role of the soil and sustainable management of food production is of critical importance.

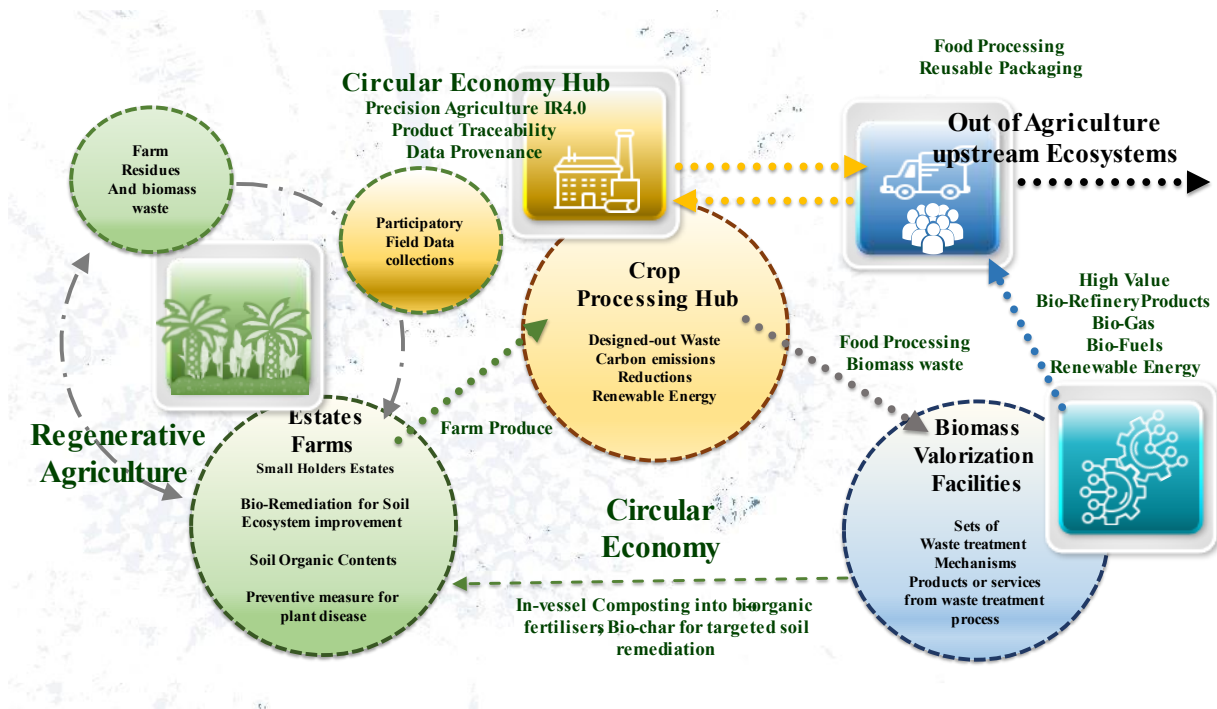


Figure 1: Revitalisation of existing farmland, upcycling biomass wastes as bio-organic fertilizers for consistent long term soil remediations. Regenerative Agriculture

Opportunities where being Circular in constructs pays

The unprecedented change in customer behaviours and market demands at a pace and unheard scale unlocked by the pandemic induced business dislocations has presented a perfect timing to reflect on the current business landscape and the enormous growth potential to restart the stalled economies in a new direction. First and foremost, not all businesses can have the CE characteristics or can transition into a CE business with an associated high risk of disruption to an existing business. As in all investment decisions, there are dimensions to consider before deciding on which industry or geographical location to start:

- key unique value propositions (UVP) that the company is offering to the Chinese CE markets. Is the UVP focusing on CE transitions or a "CE Native" representing a new market and ecosystems that can be a whole new customer behaviour and engagement experience?
- Are these market and sector attractiveness in terms of size and growth, where CE and net-zero transitions can meet the regulatory compliance and still deliver economic sustenance if not better financial performance?
- Readily available and proven technology and innovative solutions that enable the existing business to adopt the transformation?
- Will the CE and net-zero regulatory compliance become existential factors for the continuity of the business-as-usual business practices?
- Can the transitions improve the regenerative or restorative rate of the primary resources inputs?

Regardless of which segment the business is in, ESG compliance and meeting global empowered consumers' demands on sustainable products with data provenance entail re-strategizing business transformation priorities, including digital.

Given that most businesses are linear, which spurs our linear consumptions habits of "used-once-and-throw", the opportunity for transformation to CE and net-zero is vast with potential for explosive growth. The CE principle of "Design out waste and pollution." has been the target of regulators, especially within the context of China's manufacturing powerhouse for the global markets. The current consumer consumption trends in the global markets will impact the Chinese government narrative for state media and social media in promoting zero emissions, reusability and extended life spans of products. The experience and track record of successfully deploying such transformation practices in Europe or other countries will have an unfair advantage in establishing a solid market foothold in China. Suppose such SI activities fall within the focus area of Chinese government directives. Then, the business investment can participate in the government-assisted transformation program, which can address some of the usual challenges encountered in home countries without such government policy and fiscal support. Having built-up such experience and insights from public-private collaborative business activities can further create a window of opportunities back in home countries and those participatory countries in the OBOR initiatives.

Of all these broad spectra of CE opportunities, those that focus on the following trendsetting shifts and new-edge industries have the potential to create new standards and also truly inspire talents and participatory engagement of the social enterprises, public and private sectors

Regenerative Agriculture:

China is experiencing severe land degradation trends due to a multi-year aggressive chemical fertilizer regime similar to other global farming communities. These land degradation trends have led to waterway eutrophication and soil erosions for over 3.57 million km² (Wang et al. 2016). There are various attempts, ecological services and land management practices such as re-forestation to arrest the soil erosion rates. However, Regenerative Agriculture's CE framework and business model for existing farmland to bridge yield gaps between observable yield and optimal achievable yield will represent a holistic approach with significant economic, environmental and social benefits. Upcycling farm residue and associated food processing wastes as farm inputs for soil organic content with bio-remediation can be the least challenging SD pathway within the control of stakeholders along the value chains. Together with State sponsorship and lead, CE toward Regenerative Agriculture programs can be the iconic public-private collaborative initiative to galvanize the local farming communities' support and social engagement in the downstream Food and Beverages markets. With the inclusion of the Internet of Things for precision agriculture, the Industrial revolution 4.0 for wastes and the agro-based farm community's e-platform digital transformation, these public-private programs can be the ideal investment targets for Green Bonds and ESG focus investment funds.

e-Mobility related business:

China is already the single largest manufacturing country for most electric vehicles and renewable energy systems components, including batteries and energy storage devices. We can envisage that the product-as-a-Service paradigm flourishes in the government's shared-prosperity philosophical direction in China's SD drive in CE and net-zero objectives. New battery development with a larger storage capacity with short sub-five minutes recharge time can revolutionize the national recharge stalls infrastructure build and

natural disaster recovery response provisioning. e-Mobility will not be meaningful without addressing the renewable primary energy source connectivity. Hence this renewable energy source will present a whole spectrum of efficient self-sustenance micro-grid for built-up resilience infrastructure. The AL assisted autonomous driving and navigation service provisioning will invigorate the nascent e-Mobility service ecosystems and be competitive when all the automobile industry giants step in.

Electronic or Information and Communications Technology (ICT) Product-as-a-service:

One of the positive outcomes of the business dislocation during the global health crisis is the accelerated adoption of ICT in remote working and e-commerce trade and services. It is apparent that while trading in goods has faltered, service flows have increased and become the glue that gets the global economy ticking. Unlike India and the Philippines in the back-office business outsourcing services, employment in knowledge-intensive services is still in its infancy in China. It is fast becoming another critical market. Instead of the usual sales of ICT equipment and infrastructure, Product-as-a-service can effectively improve the material utilization rate within the CE value chains, including the deployment of reverse logistics within the product life cycle. This CE approach will also represent a transformation of the traditional role of retail shops into service provisioning hubs. Again, this is an enormous opportunity given the large consumer markets with growing disposal income and demand for better user experience.

Data Provenance, ESG monitoring and carbon-emission-footprint management services:

The demand for the audit and reporting of ESG standards will be enormous when such regulatory compliance becomes mandatory. This regulatory reporting demand will inevitably drive up the development of IoT in data provenance for respective ESG indicators and the entire service ecosystem that supports the monitoring and remedial actions tracking. With the accelerated digital transformation of the SMEs and resulting data pools, the AL assisted CE modelling, monitoring and traceability for the entire value chains will be the next frontier for those interested in such CE service provisioning.

Reverse Logistics:

The advent of e-commerce has already transformed the landscape of logistics provisioning, where electronic track and trace with tight integration of third party local last miles delivery has become the new standard of operations. The role of retail shops and product flagship stores is transforming to include re-use, repair, maintenance, refurbishing and recycling service provisioning. Again the Great Reset (Schwab & Malleret 2020) has forced all businesses to re-strategize their go to market positions and provide them with a level playing field for those innovative new services. The other aspect of the role change of retailers to services orientated Product-as-a-Service providers is the opportunity to strengthen customer loyalty through enhancing customer experience both digitally, and the very nature of human touches in reverse logistics loops back upstreams to manufacturers and producers. China is the global leading manufacturing powerhouse, and the provisions of a reverse-logistics network of regional services hubs represent another golden untapped market for CE again.

Textile and fashion in CE:

Apart from the textile industry has a history of the complex waste treatment of hazardous toxic material discharged from colour dyes, such as textile dyeing sludge (TDS) at an annual rate of 21 million MT in China (Wu et al. 2022), the used items of clothing and discarded "old fashion" at municipal dumpsites represent a wasteful of resources. Almost all the input materials for the textile are virgin resources. The replacement of fossil-based synthetic fibres with bio-based cellulose material such as recycled cotton or

bio-degradable source materials is a positive step towards net-zero (D'Itria et al. 2022). However, the textile industry has evolved to be predominately linear and relies on design-in waste, whereas its economic sustenance depends on high consumption and disposal rate. Without a doubt, the industry has a high carbon emission footprint from the production of synthetic fibres, fertilizers for bio-based fibre such as cotton, chemicals production in dyes and carbon emissions in the associated industrial wastewater treatment. The rate of a garment is worn before it is unused – garment utilization rate, has been decreasing over the years due to the affordability of clothing and improvement of disposable income. (EllenMacArthur-Foundation 2017) has outlined a number of potential pathways for redesigning the fashion industry. The EU's Green Deal Initiatives have recently adopted some of these CE development approaches. The new ecosystem and value chain for consumer engagement behaviour and acceptance of re-utilized textile material can be that opportunity.

Circularity in habitat and lifestyle consumption patterns:

Land resources utilization and the build-up of habitat are the consequence of population growth. Without a doubt, one of the most economic impact phenomena of modern china is urbanization. The continuous evolution between human society and nature that the CE and net-zero drive can radically change and influence the habitats in the urbanization process. Suppose the collective social consciousness believes in the spirit of SD and is committed to making the change. In that case, our current over-consumption habits and pattern will ultimately affect how and where we want to live. The Green building index should not be just for compliance but should ultimately reflect the social and environmental benefits of utilizing resources sustainably. UN SDG Goal 11 – Sustainable Cities and Communities, has succinctly recognized the role of communities and cities' ability to facilitate interactions of structural changes, cultural differences and consumption behaviour patterns shift in the transitions to net-zero. The CE framework represents a holistic, participatory engagement approach. CE models are applicable to ease the changes to make our habitats and communities safe, resilient and sustainable. The concept of restorative and regenerative by design represents cities' opportunity to restore and retain the value of existing cultures and resources. The recent rooftop solar power generations promoted by the Chinese government is yet another good showcase of public-private collaborative initiatives.

At the back of this potential SD and CE development markets, there are many funding options available for ESG focus investment. China is one of the world's largest green-bond markets, with the equivalent of US\$59 billion issued in onshore green bonds in 2021, representing a six-fold increase from 2020 (Bloomberg 2022), where the demand is lacking behind the supply. Hence, this China Bond market conditions reflect a unique window of opportunity for those companies that intend to rollout CE and net-zero businesses.

Moving Forward and window of opportunities

Given the aggressive Chinese drive to use sustainable development and hence circular economy as a strategy for domestic GDP growth and productivity-led economy instead of just investment-led economic drive, companies should consider integrating CE and net-zero considerations into their strategies development roadmap and their decision-making frameworks. Some of the industry and trends outlined in this chapter represent a window of opportunity. There will be a need to provide a company-wide narrative to communicate a coherent case for the transitions and upskill required to tap this once-in-a-lifetime opportunity. It is imperative to develop a portfolio of agile and adaptive SD strategy roadmaps that are commensurate with the fast-paced, ever-changing landscape in regulations, consumer behaviour

and competition. Understanding how a net-zero world and the initiatives taken by the Chinese government will affect your investment decisions and associated risks mitigation provisions is essential. In a government-led economy such as China which represents one of the leading powerhouses in international trade, the largest consumer markets and the drag-on economic sphere of influence of OBOR, it is imperative to imbue the CE framework towards ESG to exploit the tremendous opportunity presented. The upcoming economic transformation will be massive in scale in China and worldwide, as will the shift in capital allocations and customer behaviours. All of these will be challenging to navigate and call for an innovative approach to creating your own niche that can be invigorating.

We can envisage that experience gained from the SI activities in China, coupled with consumer behaviour trends and momentum created by the CE infrastructure build-up, can be the most beneficial takeaways for foreign investors to take back to their home countries. It also represents an excellent window of opportunity for innovators to participate and influence the transitions to net-zero and CE in the Chinese economy and the world. Growth with inclusion and sustainability are within our reach, and it starts with CE toward Regenerative Agriculture.

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