



**BUSINESS
SWEDEN**

CIRCULAR ECONOMY IN CHINA OPPORTUNITIES FOR COMPANIES

Business Sweden

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Circular Economy in China - Executive Summary

China's rapid development during the past four decades has been fuelled by an intensive use of resources which has, as a consequence, taken a heavy toll on the environment and led to a depletion of the country's natural resources. Yet the development towards a circular economy was promoted by the Chinese government already in its 11th five-year plan and since then the government has continuously presented policies to increase the sustainability of the economy. The transition of the economy has in recent years also been led by technological breakthroughs that have enabled companies to overcome barriers that previously restricted the use and spread of business models related to a circular economy.

In several industries, Swedish companies have already contributed to increasing the sustainability of their value-chains. Yet the impact of Swedish solutions outside these value-chains has been limited as the sales and application of Swedish sustainable technologies has been relatively low in China. In spite of this, in the coming years, the Chinese market will provide a multitude of business opportunities for many Swedish companies in the country's transition towards a circular economy, due to factors such as the market size and the technological climate. The promotional efforts of Team Sweden can enable companies to take part in these opportunities.

Suffering from acute environmental problems, China is in dire need of changing its growth model to promote sustainable development. Despite the fact that the country has in the last decades been able to heavily reduce the resource intensity of its economic output, in absolute terms, the resource use has increased as the economic activity has soared. Although policy changes to reduce the environmental impact and to promote circular economy activities have been presented in the last three five-year plans, real progress has been limited.

In the latest (13th) five-year plan, five areas related to sustainability and effective resource use were presented. These areas include energy and water conservation as well as circular development. The latter is in China spearheaded by large-scale testing at demonstration sites and the country's industrial parks. Sustainability programmes in the latest five-year plans have entailed policies in the circular economy related areas of recycling, reuse and remanufacturing. However, application is still low and most Chinese industries are still in early development stages.

Recent policies from the central government are focused on testing solutions in designated industries as well as industrial parks. Other reforms include fiscal subsidies such as waste appliance and electronic products processing funds to companies that make use of recycling. The funds for this scheme are provided by the manufacturers, as part of an extended producer liability. The most ambitious of the presented pilot projects for circular economy solutions is Xiongan, a new city that will be built 100 kilometres to the south-west of Beijing, in Hebei province. This new city is intended to serve as a role-model for sustainability by implementing a circular economy on a large scale. The plans of creating a large sustainable city that could serve as a model for building or remodelling cities in China for decades to come is highly ambitious and will call for a multitude of technical solutions not yet implemented on a large scale in China.

Despite the good intentions of the government's efforts, short-term growth still rules supreme in the country and economic progress still often equals increased quantitative output with little concern for exhausting vital resources and damaging eco-systems. Finding coherent policies that can be implemented on a national level is difficult when considering the vast fragmentation of economic policy and practices, in the country where differences exist not only between provinces but also between the cities within them. The policies that have been advocated by the central government have in many areas yet to materialize in legislation and are often guidelines that have still not provided a real impact on the overall economy.

For several reasons, the possibilities for companies to make use of the business models associated with a circular economy in China are abundant. Rather than being limited to a narrow range of industries these opportunities are applicable to companies operating in many sectors. The prospect for companies to have a positive impact on the environment is probably greater in China than most other markets. Several factors underlie this proposition. Firstly, technological breakthroughs have enabled the wider application of circular economy business models, such as sharing platforms and increased recovery of resources. This has enabled companies to overcome the barriers that previously hindered their application. Secondly, China's large market size and the varying conditions in the country between regions provides the scale and basis for broad application of new solutions. Thirdly, the concentration of many companies' value-chains in the country is what makes China an excellent testing ground for circular economy solutions and business models.

By owning and utilizing technologies and business models that combine economic growth with practices that are environmentally sustainable, many Swedish companies are well positioned to find business opportunities on the Chinese market. Companies can also have a positive impact on the sustainability of Chinese industries, something that already has been achieved by several Swedish companies as they have been able to change their value-chains, promoting circular solutions in all stages of the value chain. Leveraging the digital development in China as well as partnerships with companies holding complementary competencies will enable Swedish companies to take part of the multitude of business opportunities provided on the Chinese market.

However, for Swedish companies there are still hindrances that limit the full implementation of their solutions. Many Swedish companies hold the technology that could be used in the many public works in China, yet, the export of these solutions to China has been limited. While various governmental functions of the Chinese government previously have shown interest in Swedish solutions, the efforts of Swedish companies, as well as Team Sweden, has often fallen short, stunted by a too general focus and not aimed at solving a particular problem in the Chinese context. The lessons learned from previous efforts suggest that the most effective way of working for both Swedish companies as well as for Team Sweden is concentrating on solving a narrowly defined problem rather than focusing on general promotion of technologies and services. In order for many companies to be able to solve these kinds of problems they need to partner up with other companies to deliver solutions that are suitable to the Chinese context. Team Sweden can aid companies by helping them forming consortia or in finding other forms of collaboration, both with other Swedish or foreign companies that can complement their offer.

Acknowledgments

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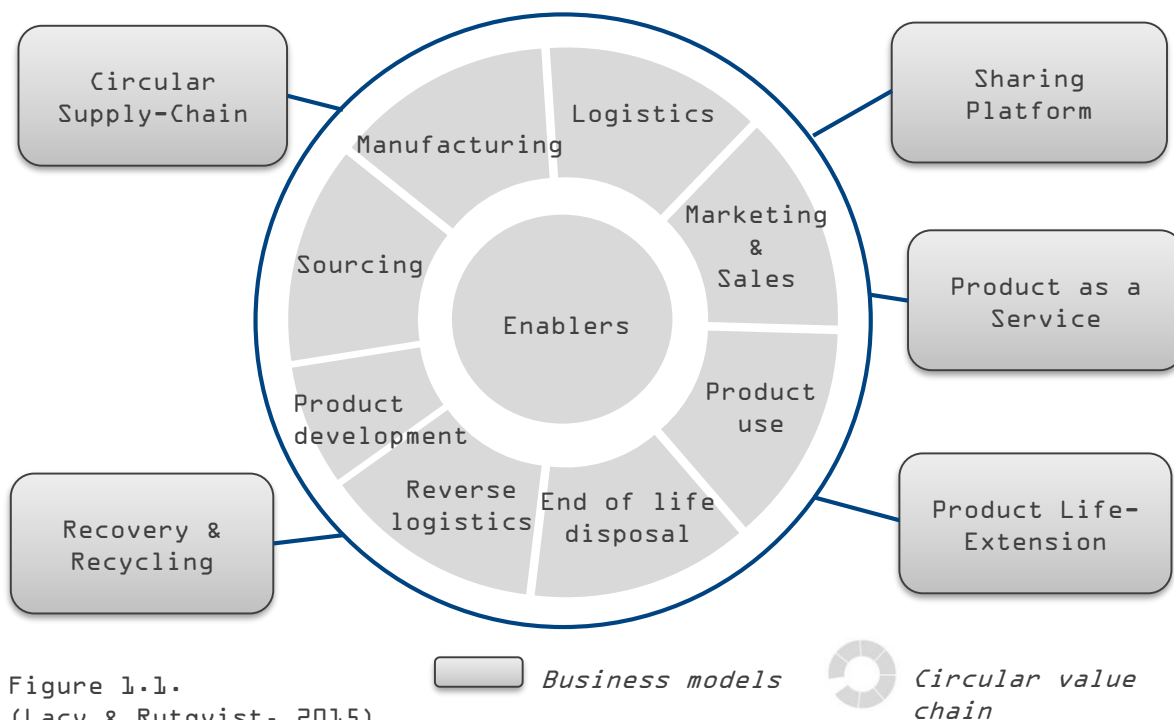
A Circular Economy is Characterised by Being Restorative and Regenerative

The concept of circular economy has been around in some form for decades and can be defined as an economy that by design is restorative and regenerative, where products, components and materials always should be maintained at their highest value and utility (Ellen MacArthur Foundation, 2017). The report *Towards a Circular Economy*, released in 2012 provided the foundation for the business opportunities related to a circular economy and listed the business models (Figure 1.1) that enable the transition to a circular economy (Ellen MacArthur Foundation, 2012). However, business models related to circular economy have been applied long before the subject was conceptualized. One example is Volvo Group that implemented several of these business models for decades and had them fully embedded in their value chain.

The Chinese government was one of the early adopters of the concept, making the transition towards a circular economy a national policy already in the 11th five-year plan. The plan intended to promote resource saving and to preserve the environment and achieve a harmonious balance of economic growth, resources as well as the population and the environment (Feng & Yan, 2006).

“Circular Economy is a buzz word now, but it has been implemented for decades at Volvo - it's fully embedded in our value chain” - Volvo Group

Circular Economy Business Models



The business models that are associated with a circular economy are the circular supply-chain, recovery & recycling, sharing platform, product service and product life-extension. The use of these business models can provide companies with the opportunities to cut-costs, increase differentiation, find new revenue streams and also reduce risks (Lacy & Rutqvist, 2015).

The Strategies of the Chinese Government to Shift Growth Model Towards a Circular Economy

China's development has been driven by a rapid industrialization fuelled by the heavy use of resources while relying on coal as the main source of energy. The consequence is that the country is now the world's largest energy consumer as well as the largest emitter of CO₂. The awareness of the problems that this growth model has brought is increasing and the government is taking action in introducing measures to improve the environment and increase the sustainability of the economy (Business Insider, 2017). The 13th five-year plan lists several policies that can increase the sustainability of the economy by moving away from a linear economy. These policies include a focus on conservation of energy and water, as well as the establishment of demonstration sites and industrial parks intended to serve as examples for circular operations (13th Five-year Plan of the People's Republic of China). As such, these demonstration sites are a key component of the strategies of the Chinese government in the move towards a circular economy.

The largest and most ambitious of the demonstration sites for circular solutions is the planned new city located outside of Beijing in the Hebei province, called Xiongan. The city is intended to serve as a role-model for city-planning and for sustainable solutions in China in the coming decades (China Daily, 2017). From its inception the city will adopt international standards and intends to make use of the latest technologies in smart-cities. The city's construction will require the use of sustainable solutions on an unprecedented scale in China (Ministry of Environmental Protection PRC).

The real impact on the overall economy by the measures introduced and the demonstration sites has been limited and is likely to remain limited during the entire 5-year period that is included in the current 13th five-year plan as these policies often serve more as guidelines and tests rather than having general applicability in the country. One problem of general application are the large disparities between the maturity and acceptance of sustainable solutions and circular economy business models between various regions of China, where it is likely that the inland provinces will lag behind the richer coastal areas for decades to come in terms of moving from a linear economy to approaching a circular economy.

The problems that China is facing have been aggravated by faulty incentives for local and regional leaders throughout the country. By having measured the achievements of these officials on short-term GDP growth within their regions, leaders have been encouraged to utilize resource intensive approaches and investments to boost the growth numbers. However, recent reports indicate that the central government is also taking environmental aspects into account when measuring the performance of local officials, in particular air quality (National Geographic, 2017), (China Daily, 2016).

Further, the reuse and recycling of products are severely hampered by flawed policies and a lack of control mechanisms (Interview, Swedish EPA). Necessary incentives for companies and producers to decrease their waste are lacking as well as a holistic approach of the waste eco-system, where strategies are created individually by separate industries thus making cross-sectorial initiatives harder to implement (Growth Analysis-Interview).

However this is changing with a combination of governmental policies and innovation from the private sector. An example of where governmental efforts are augmented by technological innovation is e-waste recycling. Subsidies directed at increasing the recycling of electronic products are complemented by products such as Baidu's recycle app that connects consumers, dismantlers and manufacturers. The app enables consumers to receive compensation for their used products while directing them to nearby legitimate e-waste pick-up stations (UNDP, 2016). This type of innovation is an encouraging sign that technical innovation can serve as a tool to aid the development towards a circular economy in China by enabling the use of associated business models.

One of the circular economy business models that shows the greatest promise in China is the sharing economy. The diffusion of mobile payments systems such as AliPay and WeChat Pay efficiently allow consumers to make transactions of very small amounts. The systems for mobile payments have enabled the incredibly rapid development of sharing services, an area where Chinese companies are breaking new ground. Ride-sharing services are the pioneers of the sharing economy but other products are quickly adopting the same business model. Sharing services were already estimated to be worth 500 BUSD in China in 2016 and the Chinese government expects that the sharing economy will grow quickly to account for 10% of GDP in 2020 (Bloomberg, 2017).

Integrated Components of the Chinese Government's Strategies to a Transition Towards a Circular Economy

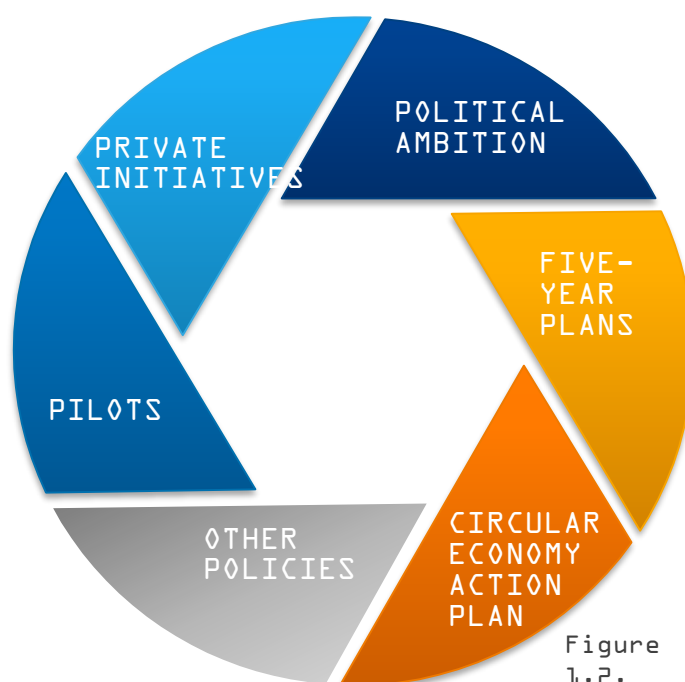


Figure 1.2.

Circular Economy Initiatives in China's 13th Five-Year Plan

In China's 13th five-year plan, the government presents five areas related to sustainability and making China's economy more circular. These areas are considered to be key to reducing the environmental impact of China's industries and the better use of strategic resources.

Society-Wide Energy Conservation Efforts

- Implement a plan for catching up with and exceeding international energy efficiency standards with a focus on six major energy-intensive industries - electric power, iron and steel, building materials, chemicals, petroleum and petrochemicals, and nonferrous metals industries
- Support the demonstration of comprehensive energy efficiency improvement efforts by 500 major energy consumers

Water Conservation Efforts

- Adopt a district metering area (DMA) approach and upgrade water pipes to reduce leakage in 100 cities
- Promote the upgrading of water-saving equipment in industrial parks and in five major water-consuming industries - the thermal power, textile, papermaking, petrochemical, and chemical industries
- Implement 100 trials for water-conservation performance-based contracting
- Launch demonstration projects for the desalinization of seawater to meet the demand for water on islands

Economical Intensive Use of Land Designated for Construction Purposes

- Improve inspection and evaluation techniques concerning the economical and intensive use of land designated for construction purposes
- Establish a national database of such evaluations for land designated for construction purposes in cities, development zones, institutions of higher learning, towns, and villages
- Promote the application of land-saving techniques and modes of development

Demonstration Zones for Green Mining

- Encourage innovation in mining techniques and in modes of management
- Guide the transformation and upgrading of traditional mining industries
- Select 50 key mining areas in regions with rich mineral resources and a strong capacity for management and innovation to develop demonstration zones of the green mining industry

Circular Development

- Work towards that 75% of the national industrial parks and 50% of provincial level industrial parks are upgraded to promote circular operations
- Build 50 industrial centres that comprehensively utilize industrial waste
- Arrange for the construction of resource recycling demonstration centres in 100 cities at or above the prefectural level
- Establish platforms for online recycling of urban waste, resource management in industrial parks, and waste trading

Barriers to a Transition Towards a Circular Economy in China

By introducing stricter environmental policies the Chinese central government intends to reduce the environmental impact and improve the sustainability of the country's economy. However, policy and laws alone do not automatically lead to an improved environment. Nor does it mean that the business opportunities for companies supplying related technologies are abundant, or that companies utilizing circular economy business models and value chains will thrive. Rather, the possibilities for consumers, companies and governments to make use of sustainable technical solutions and circular economy business models are contingent on a range of factors and barriers. The development towards a circular economy is not driven primarily by policy changes or incentives presented by the government but rather a combination of business opportunities provided by customer preferences, the economic viability of these solutions, the available technology and infrastructure as well as policies.

Policies and Regulations

Despite the government's intentions to improve policies, there are still a number of policies that restrict the transformation to a circular economy. For example, one problem for companies in China is that recycled materials are often considered to be waste, rather than a resource, thereby restricting their use as well as import. This limits companies when sourcing sustainably used resources.

The Barriers towards the implementation of circular economy business models and sustainable technology

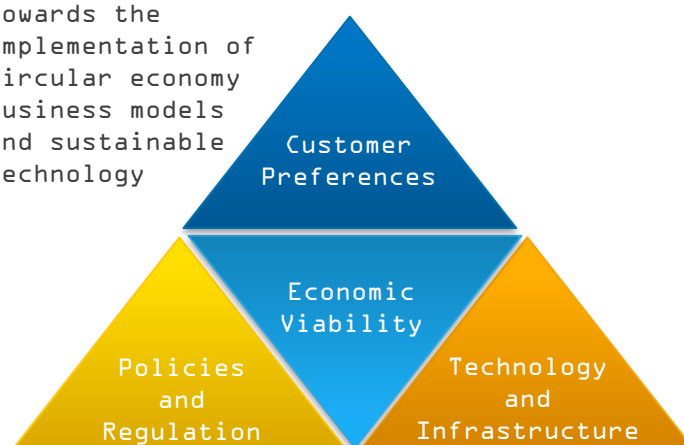


Figure 1.3.

The reason for the country's restrictive stance is multi-layered and is in part motivated by the limited control mechanisms that exist for tracing of material. Labels are often forgotten or deliberately left-out. As imported recycled material also is subject to these same stringent standards and with high tariffs imposed on their import, the utilization of several types of recycled materials in manufacturing processes is economically unviable in China. The lack of control systems also hampers the reuse of products for a purpose that has less stringent quality requirements. For example, steel that has been used in buildings could have been reused in sectors with lower demands. Another example, plastics that make use of hazardous ingredients are being sent to incinerators rather than being reused in similar new products that instead are created with virgin plastic and a mixture of the same hazardous ingredients. Consequently, the inadequate control systems for traceability hinder companies from reusing material or products that more than well meet the requirements of the new product.

Technological breakthroughs with increasing digitalization in the sector will provide multiple opportunities for improvements. For example, increased traceability of products and the substances that they are comprised of can improve the knowledge of how to recycle or reuse them. Digitalization also provides the opportunity to transform raw materials into something that is connected to a producer where the responsibility or opportunity to take care of the resource, allowing for example metals or plastics to be rented as a service while providing the producers with material to be used in remanufacturing. The applicability of such technical solutions is dependent on policies that either enable or stifle them from being used.

Another specific example of where policy changes could have very positive effects is in the area of rare-earth minerals. Since these minerals often are valuable and their extraction has a very negative environmental impact, policy changes that can increase the recycling levels of the minerals would be very beneficial. The technology is not yet ready to effectively recycle these minerals, rather they are sent to incinerators. Policies that would allow companies to deposit the minerals for the future could have a very positive impact as a greater proportion of the minerals can be recycled with emerging technologies.

Economic Viability

Progress has been made in increasing the effectiveness of sustainable solutions in many areas. However, sustainable solutions often lack the economic viability to compete with more resource intensive alternatives or those using unsustainable input materials. This is true not only for local governments making one-time financial investments in infrastructural developments such as wastewater treatment technology and waste incinerators. It is also true for companies attempting to improve the sustainability of their operations. For example, in the textile industry there are still some technical challenges that need to be solved before the recycling of fabrics can be an economically justified alternative to using virgin fibres. The reason for this is that separating mixed fabrics on a large scale is very complicated, where mechanical recycling will break fibres and they will become shorter than virgin fibres. A problem in China in particular is that many Chinese companies currently lack an understanding of the benefits of using recycled and reused resources from a cost perspective. However, as one of the interviewees for this study pointed out, when cost benefits become evident, Chinese companies are often very agile in adjusting their processes.

Consumer Preferences

The possibilities to make use of circular solutions in a market is largely dependent on the demands of the customers and the social acceptance of these solutions. In China there is often still a lack of acceptance for reused or recycled products among consumers who often have strong preferences towards new products made by virgin materials. However, the acceptance for reused products or products containing recycled materials is growing. In this regard, there are large disparities between generations as well as between parts of the country. Young affluent customers living in Tier-1 cities have a greater acceptance of reused and recycled solutions and they often demonstrate more altruistic values with a greater focus on how their purchases affect not only themselves but also the society. For these customers sustainability is a selling point. However, greater marketing efforts are needed in order to change consumers' perceptions regarding recycled products on a larger scale across China. Baring this in mind it may seem counterintuitive that Chinese people are in general more willing than Europeans to use products and services being shared by others (Nielsen, 2014) something that has contributed to the boom of sharing services in the country (Bloomberg, 2017).

In B2B industries there is still a focus on the physical product in China, with a limited understanding of service aspects as well as of life cycle assessments, although the awareness of the importance of the latter is increasing in the premium segments.

Technology and Infrastructure

The available technology and infrastructure can serve as major bottlenecks in the development towards a more circular economy in China. For example, the infrastructure for recycling is severely hampering the efficient use of resources in the country. Today most of the recycling is performed by scavengers without access to adequate technology. This makes it very difficult for companies to source high quality recycled resources.

Larger companies that dominate their industries can sometimes change the infrastructure within their sectors to better accommodate their sustainability demands, but are however still dependent on governmental policies and guidelines. Smaller companies lack the same possibilities to change their conditions. At the same time, technical breakthroughs show great promise in improving the overall situation in many parts of the value chain, from material sourcing to changing the behaviour of end-consumers.

Swedish Companies' Contribution to the Development of a Circular Economy

The development and implementation of circular economy solutions are often not driven by governments but rather by companies in their strife to differentiate. Swedish companies are known to be at the forefront in making use of sustainable solutions where several Swedish companies have very ambitious plans for increasing the circularity of their processes and have made large investments in R&D in the area. This has often turned them into leaders in the field of sustainability in their respective industries. The companies that were interviewed for this study all make use of one or several of the circular economy business models. Other Swedish examples are Ericsson and Lync & Co. The former is contributing to the development of the sharing economy for cars, where Chinese-owned Lync & Co, a car brand developed in Gothenburg, makes use of technology provided by Ericsson to promote the car as a service rather than a product owned by the user (Ericsson, 2017).

H&M, one of the leading companies in sustainability, has the ambition of having a value chain that is 100% circular by 2030. The company believes that this is not only beneficial for the environment but also that it can be beneficial from a cost perspective. H&M intends to use circular measures in the design phase, in the choice of materials, production processes as well as the use-phase where they hope that most customers will return old clothes to their recycling stations. In their efforts, the company is working actively to stay ahead of regulations in their demands. This is not only beneficial from a promotional perspective but also as they do not need to adjust to changes in regulation where they are already at the forefront.

Stena Metall works closely with customers to make their products more sustainable from the design phase to making sure that the material used can circulate as many times as possible. For the company it is important to create products that can remain as high up in the value chain as possible for as long period of time as possible. For Stena Metall the when, where and how one can make products from "waste" are key questions for the company.

The company has stipulated clear and ambitious goals for sustainability where for example 100% of plastics used should be made from recycled sources in 2020. However, the company's sustainability efforts are also costly where IKEA is yet not able to make the short-term business case for their circular economy solutions.

"In the short term we are investing in product development, technology, new services, design and working to change the customer mind-set. But in the long-term we are confident that this will improve efficiency and reduce cost" - IKEA

Volvo Group works with circular economy solutions on several levels, in the design phase, in their collaboration with Tier-1 and Tier-2 suppliers as well as in the afterlife, re-manufacture and at the customer level. They also operate their own remanufacturing centres to prolong the life cycle of their products.

IKEA has a sustainability strategy called Circular IKEA that is divided in three areas. These are product design, operations as well as customer services. The aim of the former is to adjust the design to provide the best value for customers and a long lasting product while at the same time making efficient use of resources. In their operations they aim to turn waste generated from their processes into resources, such as turning plastic wrapping/packaging into material for new products. Customer services include take-back services for mattresses to increase customers' propensity to recycle as well as a component replacement service.

More investments are needed to scale-up IKEA's efforts, in order to be able to drive down the costs of for example the spray bottles that are made from recycled plastics and reach cost parity to when using virgin plastics. In spite of their struggles IKEA firmly believes that there is a business case to be made in the long-run.

Billerud Korsnäs make products from a resource that is not only one of the most sustainable input materials but that is also derived from one of the world's sustainable forestry sectors. This increases the sustainability of their own operations and allows their customers to reduce their environmental impact. For Billerud Korsnäs it is important to increase awareness among companies and governments of the importance of the input material to improve sustainability, as the circle of recycled material will eventually break down without the input of new materials. Thus, the right input material is key to increasing sustainability of value chains. However, policies are often directed towards increasing recycling levels by putting additional charges on input materials. Therefore, it is significant for the company that their product is not treated equal to all other types of input materials but rather that potential customers as well as policy-makers understand that the company's product in itself is circular. Therefore, a key issue is that regulations should not disadvantage sustainable input products in favour of recycled ones but that demands on materials should be in parity with their environmental impact.

Partnerships

In order for companies to have a more profound impact on the sustainability of their value chain, their strategies include leveraging their partners, as they would otherwise only be able to influence a certain segment of the value chain. For H&M, that has no production of their own, they need to work suppliers as well as distributors to be able to increase the circularity of their processes. Fortunately for H&M, they have big opportunities to influence their suppliers as the company has a lot of bargaining power. In their efforts to increase their circularity the company is attempting to reduce the quantities of water used in their suppliers' production as well as increase the quality of the discharged water. The company is also working with external partners for the collection of used garments, where H&M believes that there is great potential in increasing garment circularity as well as increasing the use of recycled input materials. For the company it is more difficult to influence its customers, a group instrumental to the goal of closing the circle of their own operations. In order to affect their potential customers and promote more sustainable behaviour H&M works with influencers such as celebrities, musicians and bloggers.

For Volvo Group the involvement of customers and other partners is essential to reduce their environmental impact, where they believe that they have an important role to play in helping their customers reduce their environmental impact. In China they also work with SOEs in order to be able to leverage their own impact. For Volvo, a multilevel and long-term collaboration with stakeholders and partners is key to succeeding with their strategies. Furthermore, the company is partnering with academia in China where they collaborate with Tsinghua University's Sustainability Centre to explore new business models related to circular economy.

IKEA is also dependent on their partners to improve sustainability, where their partners also serve as co-innovators providing solutions to help the company to increase the circularity of their operations. For this reason the company is always assessing new possible partnerships that can help them improve. IKEA also emphasizes the need for close and stable relations with their partners in order to reach their goals for sustainability. As a company at the forefront of sustainable development, IKEA strives to be part of setting standards and creating labelling systems. In China this could mean getting involved in shaping the standards around "green products".

Akzo Nobel cooperates with partners to reduce their footprint and decarbonize all across the value chain. Their collaboration with their suppliers helps them reach their targets in becoming more sustainable in terms of energy efficiency and decarbonisation, as well in turn helping their customers to reduce their footprints. In Sweden and the Netherlands they are also working with partnerships with actors outside of their value chain. These collaborations have been formed with companies that have similarly high ambitions with regards to sustainability. For example, they have formed a consortia with Phillips, DSM and Google to build wind-power. The reason for choosing these partners is their strong sustainability profile, perseverance, as well as the strong managerial back-up in their efforts. The company would like to make use of the consortia setup in China as well where they are seeking partnerships with other companies to collectively increase the circularity of their processes.

Business Opportunities related to China's circular economy transition

China's circular economy transition brings with it many business opportunities: four areas stand out particularly and should be subject to greater consideration by Swedish enterprises. The opportunities lie in concrete actions which will be detailed in greater depth below.

Integrating circular solutions in major new state investments offers numerous opportunities as the Chinese state opts for major new infrastructural projects in building new cities, fuelling city upgrades, expanding the transport network etc.

More concretely, going forward opportunities have been identified in, as a first example, the construction of the Xiongan New Area - 100km south-west of Beijing in the heart of the prominent Jing-Jin-Ji area; this city will be set up through the amalgamation of the three towns Anxin, Rongcheng and Xianxiang. The Xiongan New Area is aimed at becoming an innovation center in northern China and a lead example of a city built with a strong emphasis on sustainability and green solutions. In this regard, Sweden and China have signed a memorandum of understanding to further specific areas of cooperation such as sustainable and integrated urban development (including smart solutions for liveable and healthy cities) and energy efficient, green and sustainable buildings. The agreement was signed by Karolina Skog, on behalf of the Swedish Ministry of the Environment and Energy as well as the Ministry of Enterprise and Innovation, and Wang Menghui, on behalf of the Chinese Ministry of Housing and Urban-Rural Development. It is aimed at furthering sustainable development with state-of-the-art Swedish solutions.

Other examples include the One Belt One Road - aimed at constructing direct transport links between China and Europe through two channels, overland and maritime, this initiative represents a major opportunity for Swedish companies - and the construction of the Olympic Village preceding the Beijing Winter Olympic Games of 2022. The latter will see the launch of considerable public procurements going forward.

Within all these major new investments, there are certain areas of Swedish comparative advantage and expertise which house a greater potential, including, waste management, renewables, transports and smart buildings. Companies should participate in public procurements and actively seek out business partners to further their circular solutions.

Providing circular solutions to Chinese industry is an area of growing potential as, firstly, Chinese domestic enterprises face tougher targets and demands on efficiency from regulators influencing their operating environment. Stringent regulation and policy has made it imperative to give greater weight to externalities and in extension enables a more prominent business case for Swedish companies. From another perspective, as Chinese domestic companies reach a greater degree of maturity their investment decisions will see an extended life-cycle perspective.

An example of demands set on a central level which industries throughout the country will be forced to adapt is the selection of 50 mining areas in regions with rich mineral resources to develop demonstration zones for a green mining industry. Another example is that the government has chosen to work towards the target that 75% of the national industrial parks and 50% of provincial level industrial parks are upgraded to promote circular operations.

Opportunities for Swedish companies lie in acting as a partner and supplying Chinese companies put under these new requirements to enable them to meet their targets. Companies within mining, oil recycling, water, metal recycling and life-cycle extension should scout for concrete opportunities and find partners to leverage this comprehensive push for a more circular approach.

Offering recovery and recycling models for circular flows via consumers is an area which presents a multitude of possibilities. Opportunities are not limited to a group of industries; instead, companies within a wide range of sectors will find possibilities of making use of their circular models owing largely to the huge market size as well as different social and infrastructural conditions in China. For instance, problems associated with the lack of infrastructure for recycling and material reuse in the country provide opportunities for companies to test innovate and sustainable solutions and circular economy business models. Another enabling factor in this regard is the widespread and rapid diffusion of mobile technology. For instance, sharing services enabled by mobile technologies can help optimise resource use and recycling.

A domestic example is Dian Dian Hui Shou, an app which can help increase recovery and recycling by rewarding those who recycle. Recycling is also becoming more prioritized within e-commerce with both governmental support as well as initiatives by giants such as Alibaba and JD; the two companies currently generate enormous packaging waste when sending goods throughout the country. For instance, Cainiao Network Technology, the smart logistics network of Alibaba will, by cooperating with carton manufacturers, carry out carton recycling in several key cities including Beijing, Shanghai, Guangzhou, Shenzhen and Hangzhou during the major 11 November shopping festival.

A Swedish example is presented by IKEA that makes use of a take-back scheme where used beds and sofas are collected from customers and disposed of in an environmentally friendly manner. In order for the company to find applications for the reused materials from this takeback-program it works closely with its suppliers. Taking a value-chain perspective and forming such partnerships are important aspects of helping companies leverage their reach in the country.

Participate in the rapidly expanding sharing economy is an action of growing importance in China. Opportunities in this regard are ample and many Chinese firms have adopted sharing models with great success. For instance, the number of bike sharing apps have exploded and bikes are now widely used and available. Also ride-sharing apps like Didi Chuxing have accumulated more than 400 million users in over 400 cities.

Two aspects should be highlighted in this regard, firstly, Swedish companies should enable local enterprises with technical solutions, and secondly, Swedish companies should directly employ life extension and sharing economy models. Exemplifying the former, Ericsson found an opportunity in providing the bike-sharing service company Mobike with low-power Internet of Things technology on a live network enabling push-bikes to be more accurately located and coverage to be expanded typically out of reach for traditional networks. Exemplifying the latter, Volvo Cars has started including car sharing while IKEA has offered a wide range of slipcovers for their sofas to increase their lifecycle and to enable customers to share different covers. Companies within most consumer-facing industries should consider adopting elements of the sharing economy into their services and offering.

Recommendations for Companies

There are plenty of possibilities for companies to contribute to the development towards a circular economy in China and the opportunities in utilizing associated business models are abundant. These opportunities are not limited to particular sectors but rather provide possibilities for companies in all types of industries. The extensive use and popularity of mobile technologies in China is one of the technical breakthroughs that has enabled companies to overcome the many obstacles facing customers, companies as well as the government, in terms of becoming more sustainable. Digital solutions enable cost efficient ways to reach clients or end-consumers as well as payment solutions for new revenue streams, where these technologies can allow companies to leapfrog in terms of circular economy development. This is one of the factors, alongside the high value-chain concentration in China for many companies, the market size and the varying conditions between China's regions, that indicate that the country can serve as a testing ground for technology and business models related to circular economy.

Set ambitious targets

- Leading companies are proactive and have stricter demands than what is stipulated in laws. These companies view the long term business case of circular solutions and expect a ROI in the mid- to long term
- Companies with a sustainable profile will increasingly be awarded as Chinese customers are gradually becoming more aware of the negative effects of current consumption patterns

Seek new partnerships

- Close and long-term partnerships with suppliers and distributors enable companies to integrate a large portion of their value-chains in China and extend current partnerships to cover new areas
- Seek complementary and cross-sectorial partnerships that enable co-invention, an increase of circular flows or new business models
- Consortia or other forms of collaboration could enable companies to provide offerings that solve societal problems in China and increases the chance of winning contracts in public tender processes

Test novel technology and business models

- China offers great opportunities to test new technologies or business models related to circular economy, due to its recent technological breakthroughs, supply-chain concentration, market size as well as the large disparities between regions

Leverage digital solutions

- China's rapid digitalization will enable technical leapfrogging
- Digital solutions enable cost efficient ways to reach clients or end-consumers as well as payment solutions for new revenue streams

Recommendations for Future Promotional Efforts

Swedish companies are often at the forefront of sustainable development making use of new environmentally friendly technologies as well as sustainable business models. By these means, companies are well positioned to not only find business opportunities in the Chinese market but also contribute to a more sustainable economic growth in the country. While several companies have been able to increase the sustainability of their value-chains by making use of circular economic business models, the impact of Swedish solutions have been limited outside of the value-chains of these companies as the sales and application of Swedish sustainable technology and solutions in China has been relatively low. Team Sweden has previously promoted Swedish sustainable solutions as well as provided policy support to overcome the barriers of implementing circular economy solutions in China. Although the efforts have been appreciated from Chinese governmental officials, the seminars, delegations, pilots as well as lobbying efforts have generated limited results where participation of Swedish companies in public projects have been limited. The strategy of general promotion on policy level have not yielded the intended effects. The explanation is partly that the Swedish model for circular economy is a system that only functions in the Swedish context, as the system is not only based on ambitious goals but also on transparency and well-defined roles when allocating responsibilities. The possibilities of replicating this system in China are limited. Another factor that indicates that Team Sweden will have a limited success in influencing China on a policy level is that decisions often are based on other rationales beyond simply the environmental impact. Nevertheless promotion that is focused and that shows the win-win for the government, consumers as well as the involved companies can increase the likelihood of success. Without thoroughly proving these benefits to the Chinese stakeholders the willingness to make changes will most likely be low.

This idea is among others shared by H&M that believes that Team Sweden should promote the business case that circular solutions provide e.g. the business case for reusing or recycling clothes in China is already strong with a high potential in for example, recycling old army uniforms and other high quality products. They also noted, that when the business case is clearly understood in China the country's companies are often quick in changing their patterns.

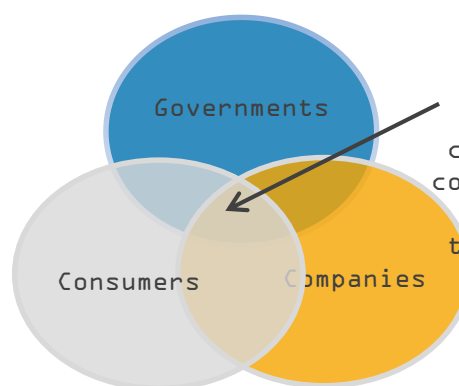


Figure 1.5.

Promotional efforts that focus on the overlapping interest of the government, companies and consumers will likely have the greatest impact

Previous experience has shown that focusing on concrete and well-defined pilot projects is the most efficient and impactful strategy. Focus maximizes the potential impact of Team Sweden's efforts and it should provide solutions to specific problems, rather than promoting a system or an industry.

Team Sweden's promotional work to change the material in bags from plastic to paper in the cement industry in Vietnam, thereby reducing the pollution problem caused by plastic litter in the country, is an example where the promotional effort has been directed towards a particular challenge. This example also demonstrated the benefits of a close collaboration and an alignment of the wanted outcome between Team Sweden and participating Swedish companies, as well as the benefits that official governmental support can have as a door-opener for companies to reach important stakeholders.

It should further be noted that solving real societal problems may require the combined efforts of several types of companies active in several different sectors or industries. In these efforts it can be key to help create consortia, whether between Swedish companies or with a mix of Swedish and foreign companies, that have the combined resources to provide solutions to societal challenges. This support can come in the form of creating forums where companies can exchange ideas and find form for collaboration.

Problematic has also been the shifting focus of promotional efforts where the subject of Team Sweden's promotional efforts can change despite an interest in follow-up from both the Swedish and Chinese side. More stamina is needed to be able to leverage this interest and to establish relationships between stakeholders from both sides. In order to leverage resources, they should be distributed according to a long-term strategy including a geographical or project focus. One example is to focus on the geographically limited area that is the new city of Xiongan. Constructing the city will call for a multitude of sustainable solutions and a prolonged effort from Swedish companies or consortia with the help of Team Sweden is needed to have a chance of taking part in the business opportunities associated with the city's construction.

The following recommendations to Team Sweden on how future promotional activities should be performed are general and therefore not restricted to the Chinese context.

Focus on clearly defined projects

- Focus on concrete and well-defined pilot projects and devote resources to particular projects and geographical areas
- Promotional effort should focus on where there exists an overlapping interest of the government, companies and consumers

Have a long-term focus

- Create long-term strategies for promotional efforts
- Maintain the same focus for an extended period of time in order to leverage interest and establish the required relationships

Adjust to the needs of Swedish companies

- Early alignment of outcome between Team Sweden and Swedish companies is essential to be able to accomplish the intended results
- Maintain a close collaboration and continuous communication with companies

Enable partnerships between companies

- Create forums where companies can exchange ideas and create partnerships
- Aid companies in their efforts to create alliances

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