

# Transforming Sustainability Challenges into Competitive Advantages for Enterprises: A Perspective of Sustainable Business Models

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**Abstract.** Traditional economic-oriented business models often have problems when faced with increasingly serious sustainability challenges. The advent of Industry 4.0 makes it necessary to transform sustainability challenges into competitive advantages for enterprises. Using a case study of a Chinese enterprise named GEM, this paper attempts to explore how sustainability challenges can be transformed to create competitive advantages. The research provides three conclusions: First, enterprises can transform sustainability challenges into competitive advantages by developing a sustainable business model, with environmental, social, and economic values. Second, a value proposition is the soul of the sustainable business model. Enterprises need not only focus on “how to do” but they must pay even more attention to “what to do”, so it is advisable to integrate a value proposition into the enterprise strategy and business process. Finally, a sustainable value proposition consists of sustainable economic, environmental, and social values, and their individual importance varies in sustainable business models for different industries where the demand for environmental and social value is increasingly important.

**Keywords:** Sustainable Business Model, Value Proposition, GEM

## 1 Introduction

Population expansion and technological progress are leading towards unsustainable levels of global production and consumption is unsustainable. Resource depletion, environmental pollution, ecological deterioration, questionable food safety, unfamiliar fatal diseases, and so on, have all become increasingly serious sustainability challenges. Industry 4.0 makes it necessary that enterprises transform sustainability challenges into competitive advantages. Traditional economic-oriented business models are often inadequate when faced with sustainability challenges [6, 26], a recent situation that has been forcing enterprises to rethink their role in society and reflect on the idea that profit may not be foremost among many important business performance criteria. This is reinforced by the fact that global sustainable development and the welfare of future generations will depend on current decisions and actions by enterprises [15]. At present, there is a growing need for enterprises to

address social, environmental, and economic issues through sustainable business practices [16], so sustainability has become one of the key factors for ensuring long-term business success [27], and traditional economic-oriented business models have started the transformation to sustainability-oriented business models. Therefore, research into the practice of sustainable business models is an emerging field that has attracted increased attention from academia, business, and political agents [12, 23].

Unlike traditional economic-oriented business models, sustainable business models involve a broader domain including all stakeholders and the natural ecosystem, with the goal of improving the economic, environmental, and social effects of enterprise activities [3]. Several studies have proved [8, 19, 22, 26] that sustainable business models can enable enterprises to better adapt to the complex business environment while gaining economic, social, and environmental value, and that sustainability challenges can be transformed into competitive advantages [2] and enhanced business opportunities [1]. However, academic research on sustainable business models has just started [6, 12], and comprehensive case studies are rare [6, 26], so only a few tools are currently available to assist enterprises in developing sustainable business models [8]. The accelerating need to identify new pathways for the innovation and design of sustainable business models has led to increased attention [11, 26]. To explore how sustainability challenges can be transformed into competitive advantages for enterprises, this paper attempts to exploit a sustainable business models canvas.

## **2 Methods and literature overview**

For traditional business models, Osterwalder and Pigneur [17] proposed a market-oriented business models canvas, and on this basis, the sustainability-oriented business models canvas has been developed. Product-service Systems (PSS) have been studied by researchers from a wide range of fields and are considered pioneering innovations in the development of sustainable business models [20, 25]. Zhu and Lin [13] proposed a conceptual framework for sustainable business models composed of a sustainable value proposition, sustainable value creation, sustainable value delivery, and sustainable value capture. Based on the business model canvas proposed by Osterwalder and Pigneur [17], Upward and Jones [26] and Kurucz et al. [11] developed the Strongly Sustainable Business Model Canvas, which is a thorough revision and extension of the original business model canvas. Geissdoerfer et al. [8] brought together design thinking and sustainable business model innovation to refine the creative process of developing sustainable value propositions and improve the overall business modelling process. In the sustainable business model framework proposed by Bocken and Short [2], analysis was conducted to promote the discussion regarding the role of new methods of value proposition, value creation and delivery, and value capture in contributing to sustainability. Joyce and Paquin [10] proposed the Triple Layered Business Model Canvas as a way to coherently integrate economic, environmental, and social concerns into a holistic view of an enterprise business model. Broman and Robert [4] studied a Framework for Strategic Sustainable Development [FSSD], and França et al. [6] integrated FSSD with the

business model canvas. To help enterprises in bridging the design-implementation gap in sustainable business models innovation, the Cambridge Business Model Innovation Process was developed by Geissdoerfer et al. [9]. Based on case studies of eleven organizations from diverse sectors, Morioka et al. [15] proposed a theory and practice-based framework of sustainable business models. These studies have important value for the theoretical and practical application of sustainable business models, but there are still shortcomings. First, the priorities for the sustainable value proposition elements are not sufficiently clear. Second, the enterprise positioning is weakened or even ignored. Third, the logical relationship between the sustainable business models elements is also not clear. Finally, the theoretical framework for sustainable business models is so abstract that it is difficult to put into practice.

Given the exploratory nature of the research objective, this analysis will be conducted using a case study. Using theoretical (rather than random sampling) selection criteria, an enterprise in China named Green Eco-Manufacture (GEM) was chosen. This paper uses evidence from a variety of sources. First, enterprise documents, including leader's speeches, announcements, research reports, academic papers, books, etc., were collected. Second, in August 2016, senior managers, core technical staff, and surrounding residents of Jingmen subsidiary of GEM, Jingmen Urban Mineral Resources Recycling Industry Park, and Huishouge Internet Co., Ltd., were interviewed to gather first-hand information. Third, on the basis of the interviews, the business premises, production equipment, and processes of the enterprise were directly observed, and Huishouge APP was experienced. At the same time, a case study database was established, forming a relatively complete chain of evidence.

### **3 Results**

Compared with traditional business models, sustainable business models have the following characteristics. Solving the problem of sustainable development and promoting sustainable economic, environmental, and social development are the primary factors driving the decision-making process and providing motivation for enterprise. The scope of enterprise stakeholders is broad and extends from the economic to the environmental and social fields. Enterprises make a profit to exist but they do not just exist to make a profit [24], they also pursue environmental and social values and design their sustainable business models based on a long-term perspective.

An increasing number of scholars have accepted that these business models integrate the value proposition, value creation and delivery, and value capture, so they provide the basic logic of business models research [2, 15]. Sustainable business models are based on traditional business models, so the basic logic of business models research also applies to sustainable business models [9].

Based on the characteristics and research logic of sustainable business models, this paper defines sustainable business models as a comprehensive program, designed to promote economic, environmental, and social sustainable development in order to create, deliver, and capture sustainable value for enterprises and their broad

stakeholders with a long-term perspective. Based on previous research, Fig.1 shows a sustainable business model canvas.

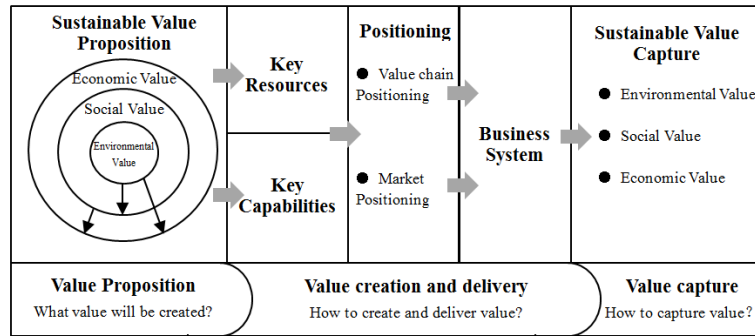


Fig. 1. Sustainable business model canvas.

### 3.1 Sustainable Value Proposition

The value proposition reflects the existence value of enterprises [21], which is the positive contribution of the enterprise to human development in their process of production and operation. The value proposition is at the core of the business model [17]; it is a key leverage point for enterprises to transform their business model [18], and it must be related to sustainability issues [24]. Sustainable business models are challenged to create and deliver not only financial value, but also, when it is achieved, a so called sustainable value that can be seen as the delimitation of an economic, environmental and/or social need for current and future generations, and they must provide satisfaction for the corresponding stakeholders [15]. Defining a sound value proposition is fundamental for the existence, survival, and prosperity of enterprises [5]. Therefore, the sustainable value proposition contains three parts, a sustainable economic value proposition, a social value proposition, and an environmental value proposition.

### 3.2 Sustainable Value Creation and Delivery

During the phase of sustainable value creation and delivery, the main issues to consider when implementing the value proposition are enterprise resources, their ability, and the inter-enterprises network, which means having strong connections to generate competitive advantages [21]. When making business decisions, enterprises should consider not only economic but also social and environmental drivers. To this end, enterprises should focus on their tangible and intangible resources and capabilities [14], and deal with relationships with partners [15]. Therefore, in order to achieve their sustainable value proposition, enterprises need to consider what key resources and capabilities they have, what key resources and capabilities they need to obtain, and how to obtain them. To deal with the relationship with partners,

enterprises also need, based on the sustainable value proposition, key resources and capabilities to establish their positioning, including their value chain positioning in the production system and market positioning in the consumer system. Value chain positioning refers to the role the enterprises should play and what business they should conduct in the value network. Market positioning refers to the identification of target customers and the determination of the products and/or services to be offered. The value proposition, key resources and capabilities, and positioning determine the enterprise business system, which in turn defines the role and value exchange relationship between enterprises and stakeholders in the value network.

### **3.3 Sustainable Value Capture**

If enterprises just rely on the value proposition and value creation and delivery but can't capture value, it would be difficult to ensure their continued successful operation [21]. However, enterprises make a profit to exist but they do not just exist to make a profit [24]. In the sustainable business model, enterprises should pursue economic values under the premise of environmental and social values.

## **4 Discussion**

In 2001, GEM was registered in Shenzhen City, and was the first enterprise in China to put forward the business concept of "limited resources, unlimited circulation" firstly in China in 2003. Since its inception, GEM has been actively advocating the exploitation of "urban mining", and has created a unique business model for doing so.

### **4.1 GEM's Sustainable Value Proposition**

GEM's sustainable value proposition can be summed up as the thought of "oneness of man and nature". GEM is an abbreviation for Green Eco-Manufacture, and each letter has a significant meaning: G represents green, E represents ecology, and M represents manufacturing. The overall objective of GEM is to develop an environmentally friendly industry by saving the limited resources and optimizing human living space through green manufacturing.

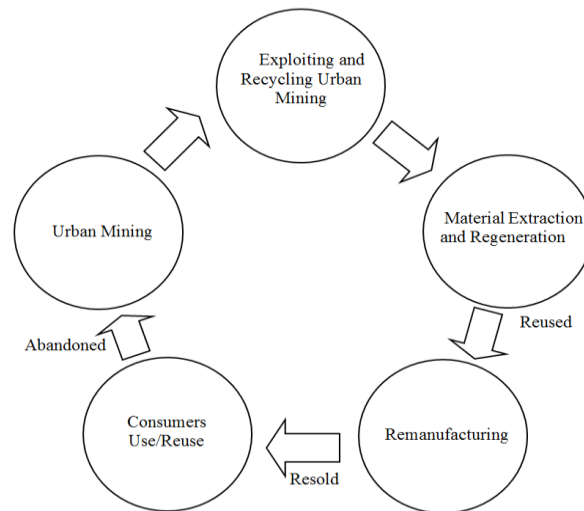
GEM's environmental value proposition is "to eliminate pollution and recycle resources", and to strive to resolve the dual pressures of environmental pollution and resource shortages. Their social value proposition is "to legitimize business, make a reasonable profit, be responsible for society and our staff", and to strive to take social responsibility and benefit the world. Their economic value proposition is "to innovate and upgrade, reduce costs, improve quality and efficiency", to strive to create an environmentally friendly enterprise that is efficient and competitive, and to strengthen the capacity for profitability and sustainable development.

## 4.2 GEM's Sustainable Value Creation and Delivery

**Key resources and capabilities.** GEM has broken through the key technical barriers for treating and recycling used batteries, electronic waste, end-of-life vehicles, etc., and has built sixteen circular industrial parks, six recycling systems for urban mining, and an intelligent environmental information platform based on Internet of Things technology.

**Positioning.** Based on the sustainable value proposition and the use of their key resources and capabilities, GEM's value chain positioning is as the leading enterprise in urban mining and recycling, and their market positioning is as a high-tech materials supplier for replacing raw materials.

**Business system.** GEM has established a closed-loop business system as shown in Fig. 2. While developing their process for urban mining, GEM proposed integrated waste disposal ideas that combine "internet + recycling + garbage removal + waste disposal", and have built six urban recycling systems which include systems for batteries and electronic waste, 3R chain stores in communities for recyclable good, cooperative recycling systems with public institutions and large enterprises, regional renewable resource recovery and distribution markets, and a system of "internet + recycling". In the phase of material extraction and regeneration, GEM has built five industrial chains related to recycling and regeneration of used batteries, recovery and utilization of nonferrous metals, recycling electronic waste, comprehensive utilization of end-of-life vehicles, and recycling of waste residue, gas, and water. With respect to remanufacturing, GEM has regenerated and reused scarce resources such as cobalt, nickel, tungsten, and so on, to produce new materials for batteries, wood-plastic composites, electrolytic copper, automotive components, battery power packs, and so on.



**Fig. 2.** GEM's closed-loop business system.

**Measures to help people lift themselves out of poverty.** Responding actively to the national call for poverty alleviation, GEM has been developing an environmentally friendly industry in a number of counties, through the provision of funds, the development of markets, the introduction of technology, the creation of employment and by offering other supports. They are forging a new path whereby green industries can assist in poverty alleviation.

**Promoting public welfare.** GEM has assumed a socially responsible role by organizing and participating in various forms of public welfare and charitable activities. Their social donations amounted to 3.5 million yuan in 2016, and they have achieved a level of harmony between enterprise interests and social benefits.

**Encouraging green development.** GEM has created National Circular Economy Education Demonstration Base opening to the public, and urban mining museums in each industrial park; in 2016, 28,507 people attended their exhibits. To improve environmental awareness among college students and the public, GEM has been conducting programs aimed at bringing “environmental protection into the campus” along with other social welfare activities.

#### **4.3 GEM’s Sustainable Value Capture**

**Environmental values capture.** In 2016, GEM disposed of a total of 3 million tons of waste, recycled 37 types of resources, and regenerated 58 different products. Their efforts saved 2.84 million tons of standard coal or 13.83 million barrels of oil, reduced solid waste emissions by 22.7 million tons, and prevented 1,850 hectares of deforestation, 116.6 million tons of water pollution, 7.5 million tons of CO2 emissions, and 63,111 square kilometers of soil pollution. At present, their annual recycling of small used batteries accounts for 10% of the Chinese total; recycling lithium-ion battery cathode materials accounted for more than 20% of the national market, and accounts for the recovery of nearly the same amount of cobalt resources. The recovery of waste household appliances accounted for more than 15% of the country’s total, the recovery of tungsten accounted for 8% of China’s total tungsten exploitation from nature, the disposal of waste circuit boards accounted for more than 20% of the domestic total, and the recovery of germanium resources accounted for 6% of the global total. Driven by enterprises like GEM, recyclables and renewables have become important resources to support the national economy.

**Social values capture.** Through the promotion of the concept of green development and the improvement of six recycling systems, GEM has constructed a recycling network for transferring waste resources from residents to communities and to society as a whole, which promotes a transformation in enterprise operations and individual lives, and improves the level of environmental awareness. Their targeted measures designed to help people lift themselves out of poverty encourage the poor to share in the achievements of enterprise development, a process which aids in the unification of the enterprise’s social responsibility and economic performance. By actively organizing and participating in various aspects of social public welfare and charity activities, GEM takes a level of responsibility for social benefit. As a result,

GEM has been awarded a number of honorary titles by the state, earned praise from the public, and created a good corporate social image.

**Economic values capture.** GEM has created a value-added model based on recycling waste and urban mining. Business income and profits increased continuously, climbing from RMB 570 million and RMB 97 million in 2010 to RMB 7,836 million and RMB 366 million respectively in 2016, with a respective average annual growth rate of 54.8% and 24.2%.

## 5 Conclusion

To some extent, the sustainable business model canvas discussed in this paper overcomes the shortcomings from existing research, and enriches the sustainable business model theory. The following three conclusions are reached: First, enterprises can transform the challenge of sustainability into a competitive advantage by developing a sustainable business model, with environmental, social, and economic values. Second, the value proposition is the soul of the sustainable business model, enterprises need not only focus on “how to do” but they must pay even more attention to “what to do”, therefore it is advisable to integrate the value proposition into the enterprise strategy and business process. Finally, the sustainable value proposition consists of sustainable economic value, environmental value, and social value, and their importance differs in sustainable business models for different industries where the demand for environmental and social values is increasingly important.

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