Study on Environmental Benefits through Life Cycle Value Co-creation in B2C Sharing Economy

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Abstract. In B2C sharing economy, businesses and individual customers temporally trade product-based services through sharing platform. Life cycle management provides a good insight to assess the environmental benefits in such sharing environment. This paper discusses how information is generated during consumption and how information sharing facilitates life cycle value co-creation to enrich environmental benefits eventually. An in-depth case study is conducted to examine Mobike’s practices as a bike sharing case in China. It is concluded that customers join with businesses in value co-creation for service sharing in B2C sharing economy. Through well-established platforms, various types of information are co-created during consumption can be shared and serve as valuable input for life cycle management to co-create more values. Ultimately, environmental benefits can be expanded and enriched.

1. Introduction
Sharing economy has originally emerged as an economic model in which the owner of the item shares his own resources to the item demander on a commercial base [1-2]. The ethical concerns about excessive consumption are the main reasons for promoting sharing economy [2]. Sharing economy addresses long-standing sustainability issues, by effectively reducing resource waste and carbon emissions by encouraging reuse behavior [1]. Business-to-customer (abbreviated as B2C) sharing economy links different parties, especially businesses and customers in a value co-creation relationship. Value co-creation of common expectations between consumers and enterprises is a process of mutual learning, and value comes from products, services and the interaction between them [3-4].

The paper aims to answer the question how to enrich environmental benefits through the life cycle value co-creation process. In B2C sharing economy, customers join with businesses in value co-creation, and among different values, various types of information are co-created during consumption. Through well-established platforms, information can be shared and made use of for life cycle management to create more value. Especially, environmental benefits can be enriched.

2. Literature Review

2.1. Sharing Economy
Sharing economy involves a series of activities by network participants to access idle network resources for non-profit or profit goals. The purpose is for people to use underutilized assets, resources, time and skills in the network environment activated by technological advancement [2]. Sharing economy is a phenomenon of the Internet era. Traditional product manufacturers transform to
product-related service providers when more and more consumers choose to use product-related services without purchasing products [1]. With B2C sharing economy, rather than underutilized, products are manufactured for the purpose of sharing among disperse individual customers. Technological factors are the first drivers of sharing economy [5].

2.2. Value Co-creation
Value co-creation focuses on consumer experiences by leveraging collaborative production processes between consumers and enterprises [3]. Both sides work together for the same mission in the process of relational value creation [6]. Consumers are endogenous in the process of value creation. Value comes not only from the product or service offered by enterprises, but also from the reciprocal interaction between the enterprises and consumers [4]. Therefore, service providers should establish genuine relationships with Internet customers and create true customer value.

2.3. Environmental Benefits
Environmental benefit is a measure of the environmental consequences of human social activities. Studies show that consumers with strong environmental consciousness are particularly willing to bear the emotional costs and choose product service system [7]. From the perspective of the assessment method of environmental benefits, the existing researches can be divided into three categories: (1) focusing on the improvement of individual environmental impact indicators (energy consumption, water consumption, GHG emissions, etc.), (2) using shadow price to monetize environmental benefits, (3) evaluate environmental performance by using life cycle assessment.

2.4. Life Cycle Management
Life cycle management (abbreviated as LCM) is a framework for continuous improvement of the organization and its products and services, which can be integrated into research and development, product design, strategic planning, procurement, sales and management [8]. SETAC (Society of Environmental Toxicology and Chemistry) Europe defines LCM as: “A flexible and comprehensive framework based on a life cycle perspective, including concepts, technologies and procedures, which promotes continuous product and organization from environmental, economic, technical and social aspects”. It offers a system-based, comprehensive perspective for analyzing the environmental performance of a product system.

2.5. Summary
In B2C sharing economy, businesses and customers are transaction parties, and products for temporal use are transaction objects. Sharing platform serves as a medium to link supply and demand. Value co-creation is a must in product share and service fulfilment, but it is also about co-creating a favorable sharing environment, especially through information sharing. Life cycle management provides a good insight to assess the environmental benefits in such sharing environment.

3. Research Method

3.1. Case Study
Case study approach is used in this research. As a qualitative research method, case study is thought provoking and suitable for in-depth investigation of newly emergent phenomena [9]. As an emerging representative industry of B2C sharing economy, bike sharing industry has only been in development for five years since it appeared. Secondly, case study method is applicable to explore less studied fields. Moreover, compared with other research methods, case study is suitable for the exploration of mechanism problems.

The focal case in this paper is Mobike. Rapid development of mobile network and high prevalence rate of smart phones catalyze a blowout type growth of bike sharing industry in China. Mobike has become another target of research after Airbnb [10-12]. Furthermore, Mobike achieves value
co-creation with customers through information sharing and service exchange, and environmental benefits derives from the whole of the life cycle of Mobike’s products [10], which fits well with our research theme.

3.2. Mobike’s Development
Beijing Mobike Technology Co., Ltd was founded in January, 2015. Since 2015, bike sharing has become an important complement to urban transport. The promising industry has attracted many businesses to join in, leading to more than ever fierce competition. 1) The first stage of its development till January 2017, Mobike targeted at urban citizens from the very beginning and devoted to innovative product design. Through its unique product design, rigorous manufacturing technique, and high quality service provision, Mobike successfully gained customer recognition. 2) The second stage spanned from January 2017 to July 2018, when Mobike introduced traditional bike pattern to reduce manufacturing costs and fight for market share. With the dramatic expansion of bike sharing industry, Mobike had no choice but to take part in the competition for market share. In January, 2017, Mobike cooperated with Foxconn in the product design and manufacturing and furthered its productivity advantage. In March, 2017, Mobike started its overseas exploration, and by December 2017, Mobike had established its presence in over 200 cities in 14 countries. Late 2017 to early 2018 witnesses a lot of bankruptcies in bike sharing industry, and Mobike won out with its strong market share and anticipated market growth. 3) Mobike entered the third stage by returning to its original mission since July 2018. Mobike gave publicity to its life cycle management strategy, and released its upgraded products. Maintenance record for each single component helps Mobike to optimize its production plan, and prolong its product use. Another type of information, collected from its big data AI platform, enables the smart operation and intelligent dispatch of its bikes [10].

4. Information-Based Value Co-creation for Life Cycle Management

4.1. Information Co-generated
There are different types of information generated automatically, including real-time consumption information, breakdown and maintenance information, among others customer’s riding time and frequency, departure point and destination of riding, location of parking is generated by customers during Mobike consumption. Moreover, breakdown and maintenance record for each single component is kept to trace their history and anticipate their life span by Mobike.

4.2. Information Co-processed for Value Co-creation
Through two of Mobike’s platforms, life cycle green management platform and big data artificial intelligence platform, co-generated information can be further processed before being shared and translated to valuable input across life cycle product and service management. They are the hub of value co-creation system and the interface where information is gathered, processed and distributed to the parties who are in need of certain information at different part of life cycle.

(1) Big data artificial intelligence platform. During consumption of Mobike products, real-time information is collected by the platform, including individual customer’s riding time and frequency, departure point and destination of riding, location of parking and any other questions. Original real-time information can be used for demand-supply analysis and parking space need analysis in different part of a city through big data artificial intelligence platform. Grid management and smart operation thus become possible. Mobike is able to distribute its bikes scientifically in terms of time and space and design seamless connection between Mobike and public transports.

(2) Life cycle green management platform. Through life cycle green management platform that breakdown and maintenance information can be recorded, further processed and shared with Mobike producer and resource recovery companies. Based on each component’s historical performance, the producers can figure out the causes of different breakdowns, and redesign the Mobike products to make sure they are more secure and more durable. When bikes come to the end of their life, they go to
the resource recovery companies, who can trace the history of each component and develop most environmentally-friendly recovery plan for each bike. Each bike will be dissembled first. Components in good conditions are subject to remanufacturing before they are recycled as resources. In this way, some components, such as smart locks, solar panels, wheel sets, are processed and built again into Mobike products, while some useless components are recycled.

5. Enriched Environmental Benefits through Value Co-creation

Figure 1 shows the mechanism of Mobike’s life cycle value co-creation. As a tool for green travel, Mobike can not only save resources and energy, but also effectively reduce carbon emissions, which has a significant effect on protecting the ecological environment. Besides, environmental benefits can be enriched from Mobike based on information-based life cycle value co-creation.

![Figure 1. Mechanism of Mobike’s life cycle value co-creation.](image)

Mobike has developed a sophisticated business model that enables information generation, sharing and utilization by and among different parties, which enriches environmental benefits by reducing negative environmental impacts arising from overproduction [1].

5.1. Environmental Benefits Generated by Big Data Artificial Intelligence Platform

At individual level, customers can have much easier access to sharing bike when in need, so as to reduce carbon emissions by green travel. At urban level, government can decide on reasonable scale of bikes put on market, redesign parking space and riding lanes according to actual need, provide real-time transport guidance, these collectively help to optimize green urban transportation system and expand environmental benefits.

5.2. Environmental Benefits Generated from Life Cycle Green Management Platform

Mobike producer, together with recovery companies, joins in value co-creation by redesigning the product and recycling materials, and remanufacturing and recycling in the end-of-life management to expand environmental value. Information-based value co-creation helps with product redesign by using recyclable and more durable materials, thus extends products life cycle and saves energy consumption. In end-of-life stage, recovery companies recover wasted products in the most environmentally friendly way which reduces raw material consumption.

6. Discussion and Conclusion

Through Mobike’s case, this study found the mechanism of information-driven life cycle value co-creation to enrich environmental benefits in B2C sharing economy.
Sharing economy unites businesses, customers, government and other participants. Customers, especially, join with businesses to co-create various forms of values during consumption, among which information is co-created. Information co-creation consists of three interrelated stages. In the first stage, information is generated through customer consumption and gathered by the sharing platform. In the second stage, gathered information is further processed by the sharing platform. Lastly, processed information is distributed through the sharing platform among those in need. Just like Mobike’s big data artificial intelligent platform and life cycle green management platform that enable co-created information to help with product design, function fulfillment, end-of-life management, and even urban transport, it is through sharing platform that all transaction parties collaborate and integrate resources to create values for themselves and for others.

Environmental benefits are one of the most desirable values pursued through B2C sharing economy. The enrichment of environmental benefits is affected by the informationalization degree of sharing platform, and also information co-creation about the dynamic interaction of transaction parties in the B2C system. Business should develop a highly integrative sharing platform to fully collect, process, and share the information among different parties over the life cycle product and service management, so as to facilitate and optimize environmental benefits in a collaborative way.

Overall, information is an important input as well as output in value co-creation in B2C sharing economy. Information-driven value co-creation can enrich environmental benefits through life cycle management. Research can be conducted in various industries to see if proper categorization can be developed concerning the mechanism of information generation and utilization at a deeper level.

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