



Exploration of Design Strategies for International Public Logistics Product Services in the Context of Sustainable Development: A Case Study of the "The China Railway Express"

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Abstract. the objective of this article is to propose design strategies for advancing the high-quality development of the China Railway Express (CR) from a service design perspective within the context of global sustainable development. This proposal is based on an exploration of the green policies and practices of foreign logistics organizations and businesses. Methodology: Initially, a literature review method is employed to elucidate the concepts and research status of green logistics and service design. Furthermore, within the framework of sustainable development, an analysis of international logistics is conducted, including an examination of the practical strategies employed by the International Union of Railways and typical logistics enterprises in the context of sustainability. Subsequently, a desktop study, survey questionnaires, and similar techniques are utilized to comprehend the current state of development of the CR, as well as to gather perspectives and opinions from various stakeholders and customers regarding the existing processes. Taking the China Railway Express Hubei Platform agency as a specific case, service design tools are employed to analyze and refine the overall service processes of the CR. This analysis considers the shared values among different stakeholders. Ultimately, a set of strategies and approaches from a design discipline perspective is proposed to promote the high-quality development of the CR. Conclusion: Leveraging service design thinking to facilitate the high-quality development of the China Railway Express contributes to future service design practices and enhances the international competitiveness of the CR.

Keywords: Service Design, Green Logistics, Sustainability, China-Europe Railway Express.

1 Introduction

Currently, the impact of environmental pollution on human existence is expanding, and sustainable development has become a primary challenge and priority goal for the world. This applies to all economic sectors, including logistics, as they are closely

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linked to these goals and challenges. On one hand, the logistics and transportation industry plays a crucial role in people's daily lives and a nation's economic development. On the other hand, it is also a consumer of Earth's resources and a contributor to environmental pollution^[1]. It can be estimated that logistics activities will become increasingly frequent, further intensifying their impact on the environment, resulting in more carbon emissions and environmental pollution. This necessitates the adoption of sustainable practices within logistics service^[2].

Hence, logistics companies must take on greater responsibilities in addressing societal and environmental issues. Laws and regulations enacted by governments, as well as public management measures, guide companies in formulating sustainable development policies^[3]. Green and sustainable products are also increasingly favored by consumers. For consumers of freight services, companies offering greener services at similar costs can enhance user satisfaction^[4].

The China Railway Express, as a container "iron camel caravan" traversing countries along the Eurasian and "Belt and Road" regions, serves as an ambassador for deepening cultural exchange and economic cooperation between China and countries along its route. The high-quality development of the China Railway Express is a crucial lever for China to deepen its participation in global open cooperation, jointly build the "Belt and Road," and promote the construction of a community with a shared future for humanity. How to enhance its service efficiency and promote its sustainable development is the focus of this paper.

2 Literature Review

2.1 Green Logistics in the Context of Sustainable Development

Currently, environmental and resource issues have become a threshold that must be crossed for economic sustainable development. How to reconcile the contradiction between economic growth and environmental pollution, as well as resource consumption, is a challenge that the entire world will face^[5]. For modern logistics, green logistics represents a trend, serving as a concept that connects resources, products, and consumers. Green logistics is conducive to the completion of a circular economy and serves as a vital tool within this framework^[6]. Given the context of the China-Europe Railway Express, it is worth discussing how it can transition to green logistics and achieve sustainable development.

2.2 Service System Design

In 1984, the Harvard Business Review published an article titled "Designing Services That Deliver," which introduced the concepts of "service design" and "service blueprints" to the fields of marketing and management. The author, G. Lynn Shostack, is considered the founder of service design for this reason. In 1991, Dr. Erlhoff Michael and Professor Birgit Mager from the International School of Design in Cologne began to introduce the concept of "service design" into the field of design and devoted them-

selves to teaching and research, thus initiating the development of service design within the design community.

In the field of design, the concept of "service design" became clearer in 2008 when the International Design Research Association provided an authoritative definition in the "Design Dictionary": "Service design is the activity of planning and organizing people, infrastructure, communication and material components of a service in order to improve its quality and the interaction between the service provider and its customers. The purpose of service design methodologies is to design according to the needs of customers or participants, so that the service is user-friendly, competitive, and relevant."

Looking back on the recent development of service design, much research has focused on consumer experience, product experience, and value in commercial design concepts. However, there is room for further exploration in the realm of service design for reducing resource consumption, promoting sustainable development, and constructing higher-level theoretical frameworks. Therefore, this study, using the China Railway Express as an example of international public logistics product research, has analyzed and synthesized strategies and recommendations through the analysis of service systems to drive the achievement of its sustainable development goals. This research contributes to expanding the application of service design principles in the context of sustainability and logistics.

2.3 Stakeholders

The China Railway Express, as a large international organization that operates across regions and cultures, requires collaboration among various entities such as railways and customs, and it involves a vast array of stakeholders. In this complex system environment, coordinating the efforts of these organizational entities to achieve co-value creation and enhance the overall service system's experience quality necessitates holistic thinking and planning that encompasses every stakeholder involved. Only by considering and addressing the needs and interests of all stakeholders can the goal of comprehensive and inclusive service be achieved.

The stakeholder theory was initially applied in the field of corporate management, where managers consider their relationships with different stakeholders, analyze their respective independent or interdependent structures, and identify the key stakeholders worth management's attention to enhance organizational efficiency.

Kindstrom, Kowalkowski, and Sandberg (2013) emphasize that the most significant challenges to address during the transition of businesses towards a service-centered logic are changes in behavior, values, and mental models. Therefore, when shifting towards a service orientation, enterprises need to adopt appropriate tools, methods, and reach consensus with all stakeholders. Sjodin et al. proposed corresponding tools and organizational activities for digital serviceization: (1) object-related data collection (design research), (2) communication and workshops with the company, and (3) the use of visualization tools^[7].

Through design research, companies can gain a better understanding of customer needs. By combining discussions with internal and external stakeholders and the use

of visualization tools, businesses can facilitate their transition to a service-oriented approach. Additionally, visualizing their processes through these tools also aids in finding more sustainable work methods and approaches.

3 China-Europe Railway Express Development History and Current Strategies

3.1 Development History

According to data released by the China Railway Corporation on July 6, in the first half of 2023, the China-Europe Railway Express operated a total of 8,641 trains and transported 936,000 standard containers, marking a year-on-year increase of 16% and 30%, respectively. As of the last update, the China-Europe Railway Express has operated over 73,000 trains and transported 6.9 million standard containers, connecting to 25 European countries and 216 cities^[8].

3.2 Current Strategies

In modern logistics activities, the implementation of specific green logistics methods and tools is crucial for achieving sustainable development goals. From the perspective of China's current situation, the principles of sustainable development, green regulations, and innovative practices have garnered widespread attention. It is important to continue promoting and adopting green logistics practices to align with global sustainability objectives and reduce the environmental impact of logistics operations. The "China-Europe Railway Express Development Report (2021)" provides a systematic summary of the China Railway Express from the perspectives of development achievements, insights, and prospects. It emphasizes that "China will work hand in hand with countries along the route, adhere to an open, green, and clean philosophy, consolidate and enhance the favorable development trend of the China Railway Express, jointly build prosperous, digital, green, shared, and cultural railway services, benefiting more countries and people along the route, and contributing to the building of a community with a shared future for humanity" ^[9].

In the context of sustainable development, the report emphasizes that "green" is the underlying foundation for building the "Belt and Road" initiative. Green development is the global direction for progress, and it is the responsibility and mission of countries worldwide. Advocating for green, low-carbon, circular, and sustainable production and lifestyles, and deepening ecological and environmental cooperation throughout the entire chain and lifecycle of railway transport, makes green the primary theme for the high-quality development of the China Railway Express.

Regarding the service system, it is highlighted that the service system is the fundamental guarantee for the smooth and efficient operation of the China Railway Express and is crucial for enhancing its competitiveness. In practice, it is proposed to summarize and promote the operational service experience already formed in the early stages, strengthen service standard leadership and brand quality management,

and comprehensively improve the service level of the China Railway Express. At the same time, there is an emphasis on extending the logistics service capabilities at both ends of the China-Europe Railway Express.

4 Exploring the Design of the China-Europe Railway Express through Service Design Thinking

4.1 User Research

To begin with, we established contact with the operator of the China-Europe Railway Express (Changjiang No.): Wuhan Han-Alliance International Logistics Co., Ltd. This served as the specific case for our in-depth research. Wuhan Han-Alliance International Logistics Co., Ltd. (WEA) is a wholly-owned subsidiary of Hubei Port Group and is one of the seven initiating units of the China Railway Express Transport Coordination Committee. With the assistance of Han-Alliance, we conducted research from the perspective of service design practice, focusing on the various groups of people involved in the China-Europe Railway Express.

Based on our previous desktop research and practical research on the company, we initially developed a systems diagram (Figure 1).

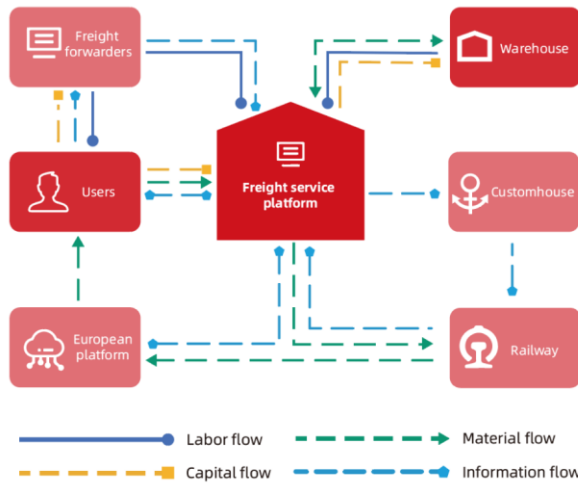


Fig. 1. Systems diagram

Through an analysis of the exchange of information, materials, labor, and funds among different stakeholders, we found that the freight platform plays a crucial role in this ecosystem. Whether it's information exchange between customers, railways, customs, or the actual transportation of goods, the freight platform serves as the central coordination point, much like a "crossroads" for the exchange of different resources and values.

4.2 Stakeholder Needs Analysis

In contrast to traditional design, service design not only considers the needs of users but also takes into account the needs of all stakeholders throughout the entire service process. It also considers intangible factors and new value co-creation in the context of sustainable development. Therefore, service design thinking emphasizes a holistic perspective that centers on overall development and interests.

Within the complex system of the China Railway Express, we have categorized the importance of stakeholders to the organization into primary and secondary stakeholders. Using this categorization, we have created a stakeholder map (Figure 2). In the diagram, we have placed the platform operation, which serves as the "crossroads" in the system flow, at the center. Moving outward, we first identify the primary stakeholders: customers, central stations, customs, European cooperation platforms, service providers, service recipients, and business partners. Beyond that, in the outermost layer, we have the secondary stakeholders: transfer companies, container return points, government entities, media, communities, and partners.

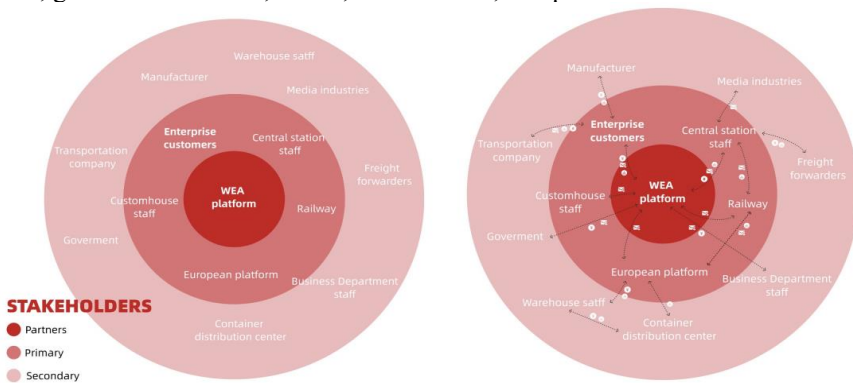


Fig. 2. Stakeholder map

In the complex value network of the China Railway Express, achieving sustainable development and high-quality development goes beyond optimizing infrastructure and achieving material construction. It is an inevitable challenge in future sustainable and high-quality development to lead stakeholders to achieve higher value creation and empowerment while ensuring the system's operation.

5 Design Strategies and Recommendations for Achieving High-Quality Development of the China-Europe Railway Express

For a vast and complex system like the China Railway Express, which involves intricate content and multiple stakeholders, the principles of "stakeholder-centered" and "co-creation" from service design thinking can help integrate relevant resources and solve complex problems from the perspective of the overall system. However, achiev-

ing value co-creation between enterprises and multi-role stakeholders in the China Railway Express is a challenging issue. In management studies, value co-creation is primarily achieved through two approaches: consumer experience-based value co-creation and service-dominant logic-based value co-creation systems. In both of these value co-creation systems, the way service providers and recipients interact and experience each other is the foundation for both parties to realize value.

However, for the China Railway Express, its vast and complex value chain makes enterprises both service providers and service recipients throughout the entire process. The interest groups involved in its value co-creation are also extensive, and the cycle for realizing value transformation is longer.

In the context of the China Railway Express, user value in value co-creation should be the realization of multi-role stakeholder needs, and the manifestation of value co-creation involves a longer cycle of circulation, ultimately conveyed to enterprises and stakeholders through continuous iterations of products and services. Therefore, based on the coexistence of service recipient and provider roles within the complex value chain, a value co-creation model can be built for the China Railway Express (Figure 3).

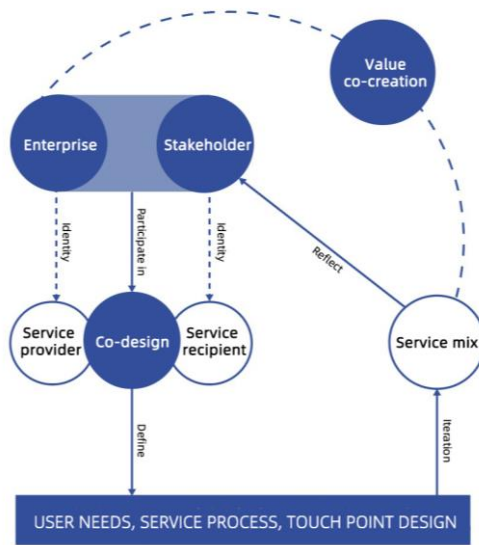


Fig. 3. Value co-creation model

Enterprises and various stakeholders collaborate using service design and other co-design tools under the guidance of designers to iteratively design products and services that cater to needs, service processes, touchpoints, and more. In this process, the products that result from iterations are then served to both the enterprise and the diverse stakeholders involved. Through such a virtuous cycle, the aim is to meet the needs of stakeholders in different phases and periods, ultimately achieving value co-creation.

6 Conclusion

Faced with the challenge of enhancing the international competitiveness of the China-Europe Railway Express and promoting its high-quality development within the global context of sustainability, this paper has visualized its relevant value network from a service design perspective. Additionally, the complex transportation processes of the China-Europe Railway Express were visualized. As service design thinking deepens, we have proposed strategic recommendations for the sustainable and high-quality development of the China Railway Express from the perspective of design discipline.

This study contributes to a specific practical attempt of service design in reducing resource consumption and promoting sustainable development. The strategic recommendations derived from this research are based on observations and reflections in the context of service design practice for the China Railway Express. While they may not constitute a comprehensive theoretical framework or methodology, we hope that this project can provide scholars and designers involved in service design practice and sustainable logistics development with valuable insights and materials for further exploration.

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