



EPR Policy and Corporate Servitisation Transformation: Motivations, Barriers and Pathways

Ziying Wang

University of Leeds, Leeds, LS2 9JT, United Kingdom
Annawzy7@163.com

Abstract. Extended Producer Responsibility (EPR) is increasingly seen as a policy tool to encourage businesses to adopt servitisation and support the circular economy. However, how EPR affects business model transformation remains under-researched. This paper addresses the question of whether and under what conditions EPR promotes servitisation. This study draws on institutional theory to develop an analytical framework in which EPR generates cost internalisation pressures and is influenced by product characteristics, firm capabilities, market conditions and policy design. The framework is tested through a comparative case study of Philips Lighting in the Netherlands and shared laundry services by Chinese appliance firms. The findings suggest that EPR incentivises servitisation when policies are well designed and aligned with favourable conditions, while weak EPR makes servitisation an additional cost burden. Linking institutional theory to research on circular business models, this study offers recommendations for improved policy design.

Keywords: Extended Producer Responsibility (EPR); Servitisation; Circular Economy; Institutional Theory; Comparative Case Study; Policy Design

1 Introduction

Servitisation is widely recognised as a key element of the circular economy. The shift from selling products to providing services incentivises firms to design for sustainability, retain ownership and recycle products at end-of-life [1]. Despite this theoretical potential, adoption remains limited. Research points to the lack of strong environmental regulation as a key barrier [2]. Meanwhile, Extended Producer Responsibility (EPR) has gained policy acceptance as a mechanism to hold producers accountable for the management of end-of-life products, but its interaction with servitisation remains under-explored.

This leads to a central question: can policy effectively promote the move towards service-based business? More specifically, this study explores whether environmental public policy encourages service-based business models, through what kind of mechanisms, and under what contextual conditions this relationship is strengthened or weakened. It also explores how different environmental public policy designs (e.g., fee structure, coverage, and enforcement) affect firms' responses.

Based on institutional theory [3], this study links the EPR and servitisation literature with the aim of providing recommendations for better policy design. This study combines a literature review with a comparative case study of shared laundry services provided by Philips Lighting in the Netherlands and a Chinese home appliance company. By examining these two cases in different EPR contexts, it examines how policy settings can influence the outcomes of servitisation. The paper draws three main conclusions. First, EPR internalises recovery costs and generates economic pressure in favour of servitisation, but this effect is not automatic. Second, the strength of this relationship depends on product characteristics, firm capabilities, market conditions, and policy design details. Third, when EPR is weakly or poorly implemented, servitisation becomes an additional cost burden rather than a strategic opportunity.

2 Literature Review

2.1 Theoretical Foundations and Intersections

EPR requires producers to take responsibility for products after use by consumers, forcing firms to consider the collection and recycling of end-of-life products [4]. The economic mechanism is straightforward: when firms bear the cost of recycling, they have an incentive to disassemble, recycle and design for durability. That is eco-design [5]. Implementation varies from region to region. The EU's WEEE Directive mandates producer-funded recycling, while China's EPR pilots conducted since 2016 remain limited. A major challenge for developing countries is the undermining of the formal system by the informal recycling sector [6].

Servitisation is linked to the circular economy through retention of ownership. When firms retain ownership of their products under a servitisation model, profits depend on how long the product lasts rather than how much it is sold, creating an intrinsic incentive for durability and repairability [7]. This is consistent with circular business model strategies that slow down the resource cycle and close the material cycle [8].

The intersection of extended producer responsibility (EPR) and servitisation is important. Both mechanisms shift responsibility to producers - EPR through regulation and servitisation through business model design. Combined, they create complementary pressures: EPR imposes end-of-life liability, while servitisation makes this operationally manageable through retention of ownership.

2.2 Synergies, Barriers and Research Gaps

EPR and servitisation share a common logic: both aim to extend product life and enable material recovery. EPR brings regulatory pressure to bear on end-of-life management, while servitisation makes such management operational by retaining ownership.

However, the combination of the two also poses challenges. Unclear responsibilities in product-as-a-service contracts create uncertainty [9], while weak environmental regulation remains a major barrier to the adoption of servitisation [2]. Well-designed EPRs can address this by forcing firms to internalise recovery costs, which

is easier for those already adopting a servicing model. But policy design matters: weak rules cannot generate meaningful pressure.

Existing research has explored how EPR affects product design [5], but little is known about whether EPR encourages servitising adoption. This study fills this gap by considering EPR as an institutional pressure that influences business model choice [10].

3 Analytical Framework

The framework that guides this study is shown in Figure 1. The framework centres on a direct relationship: EPR policies drive the transformation of firms into service-oriented businesses through the internalisation of costs. However, this relationship is moderated by four sets of contextual factors.

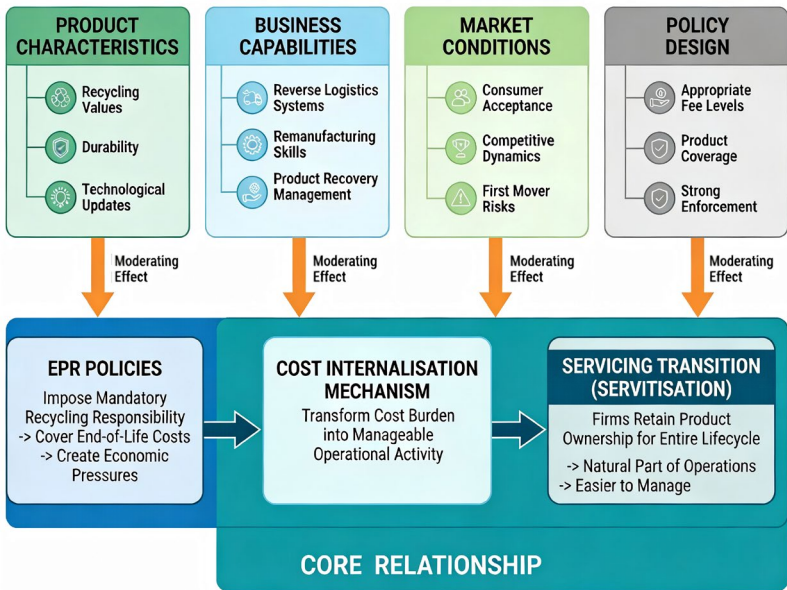


Fig. 1. Analytical framework of EPR policy influencing corporate servitisation transition

At the centre of the framework is the direct impact of EPR policies on the servicing transition, which imposes a mandatory recycling responsibility on producers to cover end-of-life costs. This cost internalisation mechanism creates economic pressures: in the traditional sales model, recycling is an additional expense with no direct return. Under the servitised model, firms retain ownership of their products for their entire lifecycle, making recycling a natural part of operations and easier to manage [5]. When firms must pay for recycling regardless of their business model, servitisation becomes a rational response that transforms the cost burden into a manageable operational activity.

However, this direct impact does not exist in isolation. Four types of moderating factors determine whether and to what extent EPR pressures translate into servitisation outcomes.

Primarily, there are product characteristics. Products with higher recycling values provide a stronger economic rationale for recycling. Products with greater durability are more likely to retain ownership under a servicing model. Products with faster technological updates may face different dynamics.

The capabilities of the business determine whether the organisation can respond effectively. Reverse logistics systems, remanufacturing skills and product recovery management require investment and expertise. Firms with these capabilities are better able to turn regulatory pressures into service opportunities [11][12].

Market conditions determine demand and feasibility. Consumers of different cultures and product types have different levels of acceptance of service models. Competitive dynamics also matter - first movers face higher risks if competitors maintain traditional sales models.

Policy design details determine whether regulation will generate meaningful pressure. Appropriate fee levels ensure that costs are sufficient to influence decision-making. Appropriate product coverage prevents loopholes that allow firms to shift liability. Strong enforcement demonstrates that compliance with regulations is expected. By contrast, poorly designed policies can easily be ignored or circumvented.

Collectively, these elements form a comprehensive framework. EPRs generate initial pressure through cost internalisation, but whether firms move towards servitisation depends on what they sell, what capabilities they have, what markets they operate in, and the soundness of their policy design. The following case study tests this framework by examining two firms operating in different EPR environments.

4 Case Study

This section reviews two cases to validate the analytical framework presented in Figure 1. Both cases involve usage-oriented servitisation models for durable electronic goods, but operate under different EPR systems. The comparison examines how the moderating effects of product characteristics, firm capabilities, market conditions and policy design on EPR pressures affect the outcome of servitisation.

Both cases were chosen for their comparability. Philips offers “lighting as a service” for commercial buildings in the Netherlands, where the EU WEEE Directive provides for manufacturer-funded recycling of electronics. Haier and Midea offer shared laundry services in China, where EPR pilots are still limited and largely voluntary. Both companies involve manufacturers retaining ownership of durable goods (lighting fixtures and washing machines) and offering usage-based services. Although the products are different, the logic of the business models is similar: companies must consider longevity, maintenance costs and end-of-life disposal. This similarity allows us to examine how the EPR environment affects outcomes when all else is roughly equal.

4.1 Philips Lighting (Netherlands): Strong EPR Enabling Servitisation

In the Netherlands, a strong EPR creates a mechanism for internalising core costs and is essential to the framework. Philips has to pay for recycling regardless of the business model, so retaining ownership helps manage existing costs rather than adding new ones. The company gained direct financial benefits from designing products with a longer service life and easier disassembly, as each improvement in durability or recyclability reduced the company's own expenses [5].

Each of the four moderators in the framework plays a reinforcing role.

Product Characteristics: Lighting equipment has a high recycling value and durability. These characteristics make retention of ownership economically sensible, as the long service life allows Philips to spread maintenance and recycling costs over many years. High-value materials, such as metals in LED components, also create strong economic incentives for recycling.

Solid capabilities: Philips has established reverse logistics and material recovery partnerships [11]. The existing infrastructure enables the company to efficiently collect used lamps, refurbish them, or extract valuable materials. Without such a capability, even strong EPR pressure may not translate into servitisation.

Market conditions: Commercial customers in the Netherlands and across Europe are increasingly accepting results-based contracts. They are willing to pay for light output rather than owning the luminaire, thus reducing demand-side resistance. This market acceptance reduces the risk of Philips moving to a service model.

Policy design: The EU WEEE Directive has a clear tariff structure, broad product coverage and strong enforcement. These design elements ensure that EPR pressure is not easily avoided. Philips cannot pass on recycling costs to its customers or ignore its obligations, which reinforces the cost internalisation mechanism.

These favourable moderating factors together mean that a strong EPR makes servitising a strategically rational response for Philips. The positive correlation predicted by the framework holds.

4.2 Chinese Appliance Firms (Haier/Midea): Weak EPR Hindering Servitisation

In China, without strong EPRs, the situation is very different. Under the servicing model, firms retain ownership of their washing machines and must deal with end-of-life costs alone, with no regulatory push or policy support [2]. The informal recycling sector dominates and undermines the formal system [6].

An examination of these four moderators reveals why servitising can be a cost burden rather than an opportunity.

Product characteristics: Washing machines have an average recycling value, with mechanical wear and tear limiting their useful life to a few years. Recycled materials offer lower economic returns than lighting equipment, and the shorter service life means that costs must be recouped in a shorter period of time. This reduces the economic incentive to retain ownership.

Business Capabilities: At the time of these pilots, neither Haier nor Midea had developed large-scale reverse logistics specifically for washing machine recycling. Without a dedicated collection network, refurbishment facility, or material recovery process, the operational costs of end-of-life management would have been prohibitively high.

Market conditions: The cultural preference for owning over sharing remains strong in China [13]. Many consumers are reluctant to pay for the use of household appliances and prefer to own their own washing machines. This limits the demand for shared laundry services, reduces revenue, and makes cost recovery more difficult.

Policy design: China's EPR pilot is voluntary, lacks a clear fee structure, and is poorly enforced. Firms are not penalised for neglecting end-of-life responsibilities, nor are they rewarded for designing recyclable products. As a result, there is a lack of cost internalisation mechanisms. Haier and Midea did not receive any policy push for servitisation, but they still had to bear the cost of product recycling when they tried the service model.

Thus, the combination of weak extended producer responsibility and unfavourable regulatory factors means that servitising becomes an additional cost burden. The framework's prediction is again confirmed: when the pressure for extended producer responsibility is weak and the regulating factors are challenging, the positive correlation breaks down.

4.3 Comparative Analysis

This comparison validates the core logic of the framework. EPR generates initial pressure through cost internalisation, but whether firms move towards servitisation depends on product characteristics, firm capabilities, market conditions and policy design. The summaries of the two cases are shown in Table 1.

In the Netherlands, a strong EPR was combined with favourable product characteristics (high recycling value, durability), firm capabilities (reverse logistics), market conditions (customer acceptance) and policy design (clear tariffs and enforcement). The combination of these factors makes servitisation economically rational.

In China, weak EPR is combined with less favourable product characteristics (medium recycling value, limited wear life), underdeveloped firm capabilities, cultural resistance to sharing and poor policy design. The result is that companies attempting servitisation bear the end-of-life costs alone, without any compensating policy support or market advantage.

The products are different, but the mechanisms are the same: servitisation becomes justified when EPRs force costs to be internalised, and the regulators are favourable; when EPRs are weak, and the regulators are challenging, servitisation becomes just another cost to be borne. This consistency between the case evidence and the framework's predictions supports the validity of the analytical model.

Table 1. Comparative summary of case studies

Dimension	Philips Lighting (Netherlands)	Chinese Appliance Firms (Haier/Midea)
EPR Policy	Strong: EU WEEE Directive mandates producer-funded recycling; clear fees, broad coverage, strong enforcement	Weak: Limited pilots since 2016, largely voluntary; informal sector dominates [6]
Service Model	"Lighting as a Service" – customers pay for light output (lux hours); Philips retains ownership of fixtures	Shared laundry / rental models – users pay per wash; firms retain ownership of machines
Product Characteristics	High recycling value; durable; long lifespan	Moderate recycling value; wear limits lifespan
Firm Capabilities	Established reverse logistics and material recovery partnerships [11]	Underdeveloped large-scale reverse logistics capacity
Market Conditions	Business customers accept outcomes-based contracts	Cultural preference for ownership over sharing remains strong [13]
Policy Design	Clear fees, broad coverage, strong enforcement	Voluntary pilots, weak enforcement, no fee incentives
Servitisation Outcome	Strategically rational response; cost internalisation enables durable design	Additional cost burden; firms bear end-of-life costs alone [2]

5 Discussion and Conclusion

This study aims to explore whether and how EPR policies influence the adoption of business servitisation. Drawing on institutional theory, the study develops an analytical framework (Figure 1) in which EPRs generate cost internalisation pressures and are moderated by four contextual factors: product characteristics, firm capabilities, market conditions and policy design. The framework is tested through a comparative case study of a shared laundry service between the Dutch company Philips Lighting and a Chinese home appliance company.

The findings confirm that EPR can drive servitisation, but that its effectiveness depends on the coordination of the four moderating factors. The analysis leads to three main conclusions.

Conclusion 1: Conditions for successful servitisation. When an EPR policy has clear tariffs, broad coverage and strong enforcement, it internalises recovery costs and generates economic pressure in favour of servitisation. However, such pressures alone are not enough. To be successful, there must be a combination of favourable product characteristics (high recycling value, long durability), corporate capabilities (reverse logistics, remanufacturing skills) and market conditions (customer acceptance of the service model). The Philips case exemplifies this: a strong EPR combined with dura-

ble lighting equipment, existing recycling infrastructure and receptive business customers made servitising a strategically sound response.

Conclusion 2: Conditions for failure. In situations where extended producer responsibility is weak - voluntary pilots, incomplete coverage, no enforcement - cost internalisation mechanisms do not exist. In the absence of a regulatory push or policy support, companies attempting servitisation bear the end-of-life costs alone. Failure is further amplified when product characteristics are less favourable (moderate recycling value, limited wear-and-tear life), firm capabilities are underdeveloped (no reverse logistics), and market conditions are challenging (cultural preference for ownership). The case of China Home Appliances shows that this combination leads to servitisation becoming an additional cost burden rather than a strategic opportunity.

Conclusion 3: Theoretical and practical implications. This study contributes to theory by defining EPR as institutional pressures affecting business model choice, linking institutional theory [3] to circular business model research [14]. The four moderators provide a diagnostic perspective for predicting when policy translates into business model change. In practice, effective EPR requires nuanced design: differentiated tariffs that reward durable and recyclable designs, clear responsibilities under the service model, synergies between EPR and servitisation, and investment in reverse logistics. Without these, even well-intentioned policies will fail.

This study has limitations. It draws on two cases and theoretical reasoning rather than large-scale empirical data. Future research could test these findings through surveys or statistical analyses of different firms and regions [15]. Nonetheless, its core message remains valid: if EPR is well designed and combined with favourable moderating factors, it can be a powerful tool for advancing servitization and the circular economy.

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