

## CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA



## nornnorn

Bangkok, Thailand

Bedding &amp; Home Furnishing

www.nornnorn.com

Analysis period: 2018-2024

Loss main  
recy  
process  
subsid  
subscri  
profit

## Driving mattress recycling through a circular economy product subscription platform

### Business Spotlight

nornnorn, officially Circularity Co., Ltd. in Thailand and Circularity Pte. Ltd. in Singapore, is pioneering a pay-as-you-use, subscription service for premium quality recyclable mattresses.

Through its subscription service, the start-up makes high-value, long-life products more financially viable for hospitality and related businesses, as well as for individual consumers, while minimising waste generation and greenhouse gas (GHG) emissions by collecting and recycling the used products at the end of their subscription. nornnorn is thus able to collect waste products at the source and drive the development of innovative recycling technologies, such as those related to the polyurethane foam used in mattresses. nornnorn works in collaboration with a number of R&D partners, including the Asian Institute of Technology (AIT), Thailand, and the University of Cambridge, United Kingdom.

nornnorn is primarily debt-financed. Its product-as-a-service business model combines innovative financing tools (e.g. green bonds and digital investment tokens) with e-commerce and recycling technology. nornnorn enables resource circularity and contributes to resource efficiency. The start-up intends to expand its service to other complex, long-life consumer goods, such as electronic appliances, solar cells and batteries.

### Keywords

Bedding and Home furnishing, Mattress recycling, Product-as-service business model

### Innovation

Product/service design, End of life management, Resource circularity

## Context and baseline

Globally it is estimated that 150 million mattresses are disposed of annually.<sup>1</sup> In the absence of financially viable recycling processes the vast majority ends up in landfills or incinerators. At the same time, high-quality mattresses remain unaffordable to many.

The family of norrnorn's Founder has been in the mattress and bedding industry for more than 95 years, and the Founder himself spent ten years leading one of the family's mattress and bedding enterprises. Upon exposure to the Circular Economy concept in late 2015, he decided to create norrnorn to offer a circular solution to tackle the aforementioned negative aspects of the mattress industry.

nornorn sources its mattresses from leading manufacturers, such as Somphol Bedding and Mattress Industry Co., Ltd. in Thailand and PT Massindo Karya Prima in Indonesia. In December 2021, norrnorn became the first start-up in Thailand to issue green bonds worth THB 6.05M (~ USD 175,000) under the PP-10 bond issuance scheme of Thailand's Securities and Exchange Commission (SEC). In October 2023 norrnorn received credit facilities provided by one of Thailand's largest banks. In February 2024, the start-up commenced issuing digital investment tokens through an SEC-licensed digital asset platform, thereby becoming ASEAN's first-ever impact start-up to issue such tokens. All these debt financing tools have been used to finance the acquisition of the products used to serve its subscriptions.

## Innovation

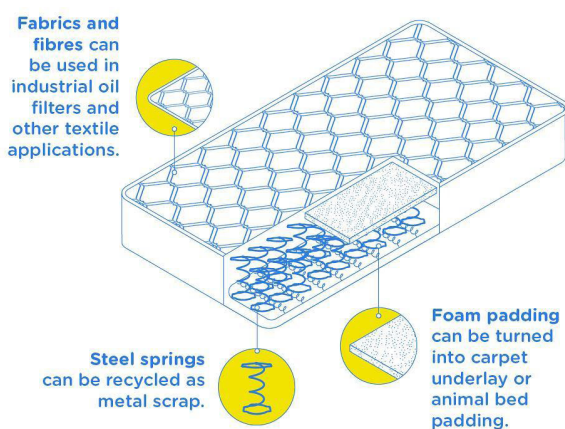
nornorn provides high quality, recyclable mattresses through a product-as-a-service business model to prevent used mattresses from becoming waste and close the affordability gap for high-quality mattresses. norrnorn voluntarily assumes Extended Producer Responsibility for its products by strategically positioning its business and has established this position as an important aspect of its marketing. norrnorn includes the future recycling costs in its monthly subscription fees to help finance the loss-making end-of-life mattress recycling processes. In this way, the start-up offers a financially and environmentally sound solution to an often-overlooked large waste item challenge. Mattresses in Thailand are often improperly disposed of, e.g. in canals or by the roadside. norrnorn's innovative business model not only diverts mattress waste from landfills or incineration, but also helps recover recycled materials from disposed products that can be used in industries instead of virgin resources, thus mitigating the energy use and greenhouse gas (GHG) emissions associated with virgin resource extractions.

The start-up's technical innovation addresses the end-of-life management of products, complementing its business model innovation in distribution and use.

The application of the product-as-a-service business model is new to the mattress and bedding sector globally and is spurring innovation to deliver world-class recycling technologies customised for mattresses.

nornorn's innovation affects its mattress suppliers (new mattress designs and new markets), its mattress users (access to brand-new, high-quality mattresses) and the waste management sector (new recycling technologies for used mattresses).

### How used mattresses can be recycled



<sup>1</sup> In the EU, approximately 42.5 million mattresses are disposed annually. See Community Resources Network Ireland, Improving Mattress Recycling Briefing Paper, Ireland: CRNI, 2022. <https://crni.ie/content/uploads/2022/07/CRNI-Mattress-Report.pdf>

## Circular Economy impact

nornnorn's business model unlocks the achievement of circular economy, particularly with respect to resource circularity. The product subscription model provides for the recovery of materials from the mattresses at the end of their lifespan/subscription period, in operational terms (nornnorn's customers' old mattresses are separately collected for recycling upon the delivery of new mattresses subscribed for through nornnorn), and through technology (development of customised recycling technologies for mattresses) and financing (recycling costs have been incorporated into the mattress subscription fees).

Benefits from the nornnorn business model will include large-scale materials recovery and reduction in virgin materials use along with the reduction in the carbon dioxide emissions associated with materials extraction and production. Based on the latest projection, by 2029 the start-up will have saved a total of at least 2.3 million mattresses, or around 73,000 tonnes of materials, from becoming waste. By putting all of these materials into recycling processes, the start-up will have helped save at least 70,000 tonnes of GHG emissions.

nornnorn commissioned in 2021 an independent Life-Cycle Assessment (LCA) to analyse its circular business model. The study has revealed that the start-up has the potential to help reduce GHG emission, air pollution, and human non-carcinogenic toxic compounds released over the lifecycle of mattresses by at least 31%, 28% and 24% respectively.<sup>2</sup>

## Business and market impact

As of March 25, 2024, nornnorn has deployed 538 mattresses (in standard single size) to 20 business customers and a growing number of home-use customers in Thailand and Indonesia. nornnorn aggressively aims to have served a cumulative total of 367,000 and 41,000 B2C and B2B subscriptions respectively by the end of 2029.

## Stakeholders

On the R&D front, nornnorn has been developing a polyurethane foam recycling technology since April 2021 with the Asian Institute of Technology (AIT) in collaboration with the University of Cambridge. The project has been supported by a GBP 160,000-grant from the UK Royal Academy of Engineering and Thailand's National Science and Technology Development Agency (NSTDA). The laboratory validation of the technology was completed in December 2023 and is now under evaluation.

nornnorn recognises that the improved recyclability of its products will raise the circularity of its product line and increase potential profits.

nornnorn's first LCA was completed in February 2023 by Thailand's Technology and Informatics Institute for Sustainability (TIIS), NSTDA, and supported by a USD 28,000-grant from Thailand's Office of National Higher Education, Science, Research and Innovation Policy Council.

Recycling processes are still in the early stages of planning, for no mattresses have reached the end of their subscription service, and thus the effects on stakeholders, including in the waste management system, are not yet available.

## Implementation

Finding and gaining access to the right debt instrument for its business model was a challenge that nornnorn spent five years tackling.

Given that the challenges experienced by Thailand's mattress industry are the same as those faced by most countries around the world, nornnorn intends to expand globally.

At present, nornnorn aims to convince its supplier partners to make mattresses more easily recyclable once its subscription service reaches a certain scale. To that end, nornnorn has already started working with a European product design company to develop and produce more recyclable mattresses.

## Takeaways

nornnorn has said that when embarking on anything truly novel, innovative, and groundbreaking, it is necessary to be patient, stay optimistic, and keep pushing ahead.

The start-up recognises that ASEAN's business culture is largely relationship-based, so there is a need to invest time and effort in cultivating goodwill among key stakeholders, especially the progressive, open-minded and influential ones who can become early supporters and help break through socio-economic and political barriers.

<sup>2</sup> <https://www.nornnorn.com/news/2024/1/11/nornnorns-and-thailands-mattress-industrys-inaugural-lca>

## Acknowledgements

This business case study was prepared within the framework of the Technical Advisory project: Mobilising Business Action for Circular Economy in the ASEAN countries under the EU SWITCH-Asia Policy Support Component for the sole purpose of documenting and analysing business experiences with the circular economy. The case study was produced by Chuthatip Maneepong (national expert, Thailand) and reviewed by Rene Van Berkel and Thomas Thomas (regional experts) on the basis of information provided and validated by norrnorn, Thailand.

## Disclaimer

The content of this publication is the joint responsibility of norrnorn, Thailand and the expert team. This publication does not constitute an endorsement of norrnorn, Thailand by the European Union nor any of the partners of the SWITCH-Asia Policy Support Component, nor necessarily reflects their views.

© 2024 SWITCH-Asia



[www.switch-asia.eu](http://www.switch-asia.eu)



**EU SWITCH-Asia Programme**  
@EUSWITCHAsia



**SWITCH-Asia**  
@SWITCHAsia



**SWITCH-Asia Official**  
@switch-asia-official