

# INSIDE THIS ISSUE



---

Group Report –  
Caitlyn Khoo, Jessica  
Huo, Adrian Tieu

---

**Issue No. 2022-12**

Edward Yiu – Associate Professor  
[edward.yiu@auckland.ac.nz](mailto:edward.yiu@auckland.ac.nz)

University of Auckland Business  
School, New Zealand

## A CIRCULAR ECONOMY PROPOSAL ON CONSTRUCTION WASTE -

REDUCE, REUSE, REPURPOSE, RECYCLE

The construction industry is not only one of the largest consumers of energy and raw materials, but also one of the largest producers of waste. Construction creates an estimated one third of the world's overall waste and at least 40% of the world's carbon dioxide emissions (Miller, 2021). This all gives rise to an obvious question – why don't we reduce, reuse, repurpose and recycle what we build. This thought has spurred the group of students to look into how to reduce, reuse and recycle the large quantity of construction materials and waste. If the construction industry can be shifted from a linear to a circular economy, it does not only bring huge ecological improvements, but it can also create an additional global market opportunity. Here is an excerpt of their proposal report.

# CONSTRUCTSAVE V. DEMOSAVE



## SEED FUNDING PROPOSAL

Construction and demolition waste comprise 50% of all waste going to New Zealand's landfill. Construction and demolition derive a high level of waste and negative environmental impacts. We propose two solutions: ConstructSave and DemoSave to mitigate construction and demolition waste respectively.

## REDUCE WASTE BY CONSTRUCTSAVE

ConstructSave utilises Building Information Modelling (BIM) to produce 3D models to capture insights to determine structure feasibility and create resource-efficient structures.

## REUSE AND RECYCLE WASTE BY DEMOSAVE

DemoSave is a tablet and iPad-friendly software utilising artificial intelligence and machine learning to recognise demolition waste to solve how and where the materials can be recycled, repurposed or reused.

## TIME TO CHANGE

The construction industry is the largest source of waste in New Zealand, generating about 50% of all waste products, which accounts for about 20% of landfill waste and 80% cleanfill waste (BRANZ, 2022a). The current social and political environment of New Zealand does not incentivise contractors to change their practices from the traditional linear economy to a new model of circular economy, the PESTLE analysis shows some signs of changes, including the \$1.1 million injection from the Waste Minimisation Fund in funding to Auckland-based Waste Revolution to build a commercial resource and recovery centre for the storage and redistribution of construction, demolition and commercial waste (insite, 2021). Furthermore, the waste disposal levy on construction and demolition fill has been increased since 2021 based on the Waste Management Act 2008 (BRANZ, 2022b).

## BUSINESS MODEL

Over 95% of demolition waste are found to be recyclable (Hughes & Salvidge, 2022), which reflects that this is not an issue of not being able to recycle, rather it is a lack of wanting to. Therefore, there is space for organisations to connect demolition experts and demolition material recyclers to help protect the environment.

DemoSave is a tablet-friendly software utilising artificial intelligence and machine learning to recognise demolition waste to identify how and where the materials can be recycled, repurposed or reused. Machine learning data from categories, such as concrete, wood, brick, board and mixed, are compared with the scan to determine material type and quality (Na et al., 2022).

It is estimated that around 4,000 out of two million New Zealand dwellings are demolished annually in the residential market alone (Page & Fung, 2008). Hence, with high demolition rate in New Zealand, it derives high demand. There are about 17 Auckland-based demolition experts, which presents excellent partnering opportunities. Furthermore, with the increased corporate sustainability practices through Green Star and Homestar, every commercial building and home can be enticed to utilise DemoSave to improve their ratings. Details can be found in the Business Model Canvas below.

**P**

### POLITICAL

- Lack of government levies to disincentivize waste going to landfill (Hancock, 2020)
- Future government action likely will be taken due to increase in waste from construction and demolition. (Environment, 2020).

**E**

### ECONOMIC

- Rising construction material prices to help reduce waste (Bell, 2022).
- Rising house prices have caused a demand in building more homes (Martin, 2022).
- High level of investors seeking new business ventures and wanting to invest in sustainable practices/companies could benefit both parties.

**S**

### SOCIAL

- Corporates have increased focus on sustainability and reducing waste going to landfill (Palmer, 2022).
- Younger demographic placing greater focus on sustainability
- Corporates would like brand image to show that it is sustainable (Newman, 2020).

**T**

### TECHNOLOGICAL

- Increased technological advancements allowing the conversation of construction and demolition waste into repurposed materials/products (Mdpi, 2018).
- Increased sustainability research of what to do with wastage.

**E**

### ENVIRONMENT

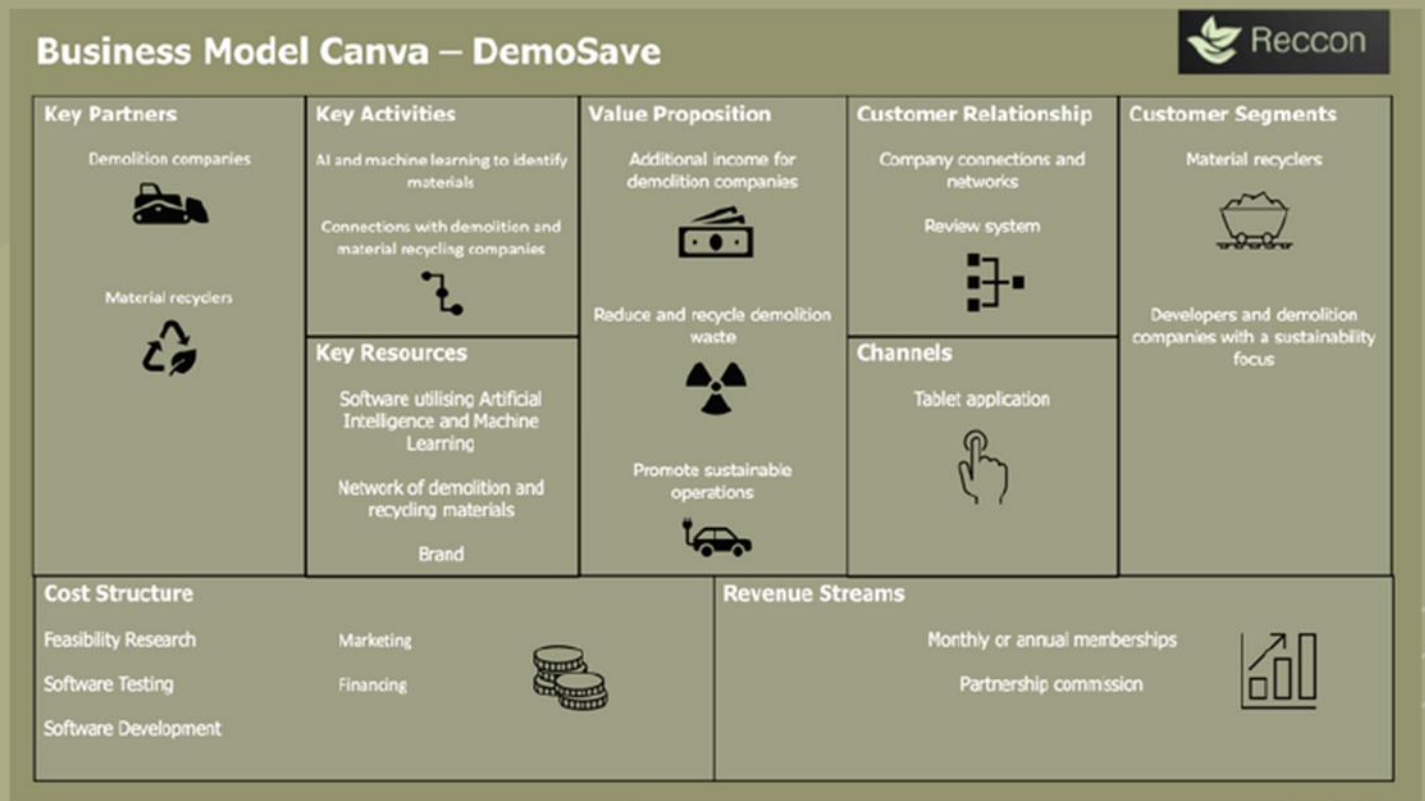
- Limited landfill for all the construction materials being wasted. Mainly from toxins, leachate and greenhouse gases (Unisan, 2021).
- UN sustainable development goals with a focus to make materials more eco friendly

**L**

### LEGAL

- GreenStar and Homestar requirements - demolition and construction sustainability impacts the rating (NIH, 2022).
- Lower carbon emissions to improve quality of life, especially cleaner air and slowing climate change.
- Lack of incentive for waste management. It is anticipated that the government would implement future schemes to protect the environment.

## APPENDIX 6: Business Model - DemoSave



### References:

BRANZ (2022a) [Reducing building material waste](#), Sustainable building, BRANZ.

BRANZ (2022b) [Waste Minimisation Act and the Waste Disposal Levy](#), BRANZ.

Hughes & Salvidge (2022) Recycling, [Demolition & the environment](#), Hughes & Salvidge.

Insite (2021) [New Zealand to fund projects diverting construction waste from landfill](#), 25 August.

Miller, Norman (2021) [The industry creating a third of the world's waste](#), BBC News, 16 December.

Na, S., Heo, S., Han, S. Shin, Y. & Lee, M. (2022) Development of an Artificial Intelligence Model to Recognise Construction Waste by Applying Image Data Augmentation and Transfer Learning, Buildings, 12(2), 175. <https://doi.org/10.3390/buildings12020175>

Page, I.C. & Fung, J. (2008) [Study Report \(No. 214 \[2009\]\) Housing life cycle and sustainability](#), Part One, BRANZ.