

THE CLASSIFICATION OF SUSTAINABLE BUSINESS MODEL PATTERNS USING MACHINE LEARNING

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Sustainable business model patterns as a means to create impactful businesses - NBM 2020



OVERVIEW

Key concepts

- Business model patterns as problem-solution combinations
- Business model innovation for sustainability is to strive for sustainable business models
- Descriptive (practical) vs prescriptive (design) approach
- Explained by taxonomy vs typology
- Machine learning and natural language processing tool
- Analysis of sustainability reports and audited public corporate literature

Aim

- Accurately describe an organizations business model
- Associate with organizational sustainability performance
- Across industries, regions and scales
- Process that can automatically replicate and scale
- Determine success or failure

HOW TO DRIVE THE TRANSITION TO SUSTAINABLE BUSINESS MODELS

Measuring what matters most

Sustainability Performance Measurement (Maltz et al. 2018; Evans et al. 2017; Boons et al. 2013; Morioka et al. 2016).

MEASURING

Define (into existence) vs Discern (identification):

Business Model categorization (Remane et al. 2017; Lüdeke-Freund et al. 2018; Gassmann et al. 2014).

DESCRIBING

Business Model Innovation for Sustainability (Schaltegger et al. 2012; França et al. 2017):

Determine which business models are more sustainable than others.

EVALUATING

We live in an economy where we privatize gains, socialize losses and underprice risk —
Thomas L Friedman

DEFINE & DISCERN (SUSTAINABLE) BUSINESS MODELS

Leverage:

Pattern theory (Alexander 1977; Leitner 2015): Problem-Solution combination

Machine Learning (Kotsiantis et al. 2007; Binkhonain & Zhao 2019)

Design Science Research approach (Aken 2004; Hevner et al. 2004)

Control for Bias & Variance (Mehrabi et al. 2019; Lambert 2015)

Taxonomy/Typology:

Archetypes (Bocken et al. 2014)

Ideal-Types (Stubbs & Cocklin 2008)

Frameworks (Fielt 2013)

Necessary & sufficient: (Upward & Jones 2016; Robèrt 2003; Broman & Robèrt 2017)

Able to categorize source PDFs/HTML documents up to 83% accuracy using Lüdeke-Freund et al. (2018) taxonomy (45 BMPs within 11 Groups).

Allowing us to answer questions:

What is an enterprise's business model?

Which business models are associated with enterprises that perform more sustainably?

Don't sit waiting to join the Dodo! - Mike Barry

RESULTS THUS FAR...

The SodaStream System

The SodaStream system was designed to provide an **environmentally friendly** alternative beverage. The business model is centered on the premise of a circular **plastic-free** reuse system. **Reducing the number of** carbonated and plastic bottles needed to enjoy sparkling water.

Our circular network is designed to be **closed-loop**, where the local flow follows the Circular flow principles below:

At the end of each product's lifecycle, SodaStream's **customers** can use our **sparkling facilities** at home, otherwise **return** our cylinders, our customers can use our **user-friendly** procedure to identify the most appropriate **return** or **refill** option for a **fully charged** cylinder with CO₂. The used cylinders are **returned** to retailers to SodaStream or **through us**. Much like the cylinders provided to SodaStream, quality control is **ensured** and **checked** with CO₂. The refilled cylinders then begin the journey again from retailer to customer.

The cylinders that do not pass **quality control** are determined to be older than five years, they are sent to our manufacturing plant for **recycling**. From this point our cylinders are either **refilled** and **refilled** and returned to the user or **recycled**. If the cylinder is damaged, the metal components are **recycled** and **recycled**. The framework of the SodaStream business essentially **based on the 3R's** to reduce the number of plastic and carbon beverages necessary to enjoy sparkling water and made at home. Our cylinders are **virtually** infinitely reusable to continue to **provide** the **quality**, and when the cylinders **cannot** be **refilled**, they are **100%** recycled back into the material.

REDUCE REUSE RECYCLE

SodaStream CO₂ cylinders are **virtually** reusable and represent a **renewable** resource. **Reducing the number of** carbonated and plastic bottles needed to enjoy sparkling water.

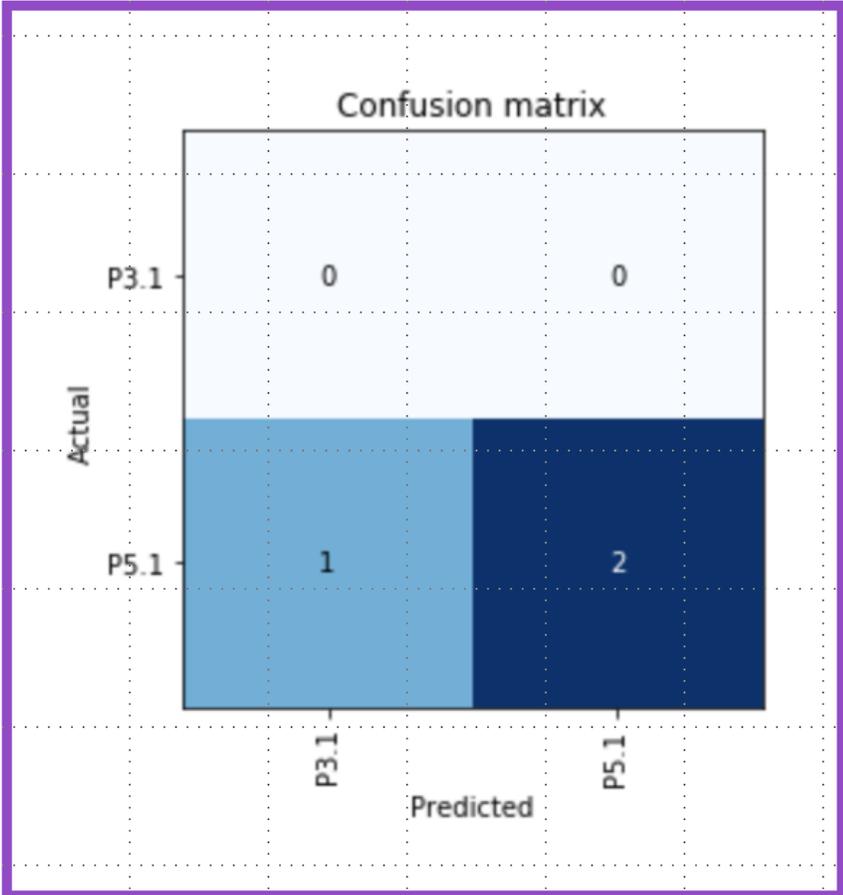
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| | text | target | pred_target | pred_score |
|----|--|--------|-------------|------------|
| 5 | the cover design incorporates scenes showing L... | P3.1 | True | 0.120768 |
| 12 | thasunon.com searchengine/sustainability.org cont... | P5.1 | True | 0.120768 |
| 1 | annual report content board of directors report... | P5.1 | True | 0.120768 |
| 9 | annualreportroyalgreeni... | P5.1 | True | 0.120768 |
| 6 | annualreportinomad foods ltd nomad... | P5.1 | True | 0.120768 |

| | precision | recall | f1-score | support |
|--------------|-----------|--------|----------|---------|
| P3.1 | 0.00 | 0.00 | 0.00 | 2 |
| P5.1 | 0.83 | 1.00 | 0.91 | 10 |
| accuracy | | | 0.83 | 12 |
| macro avg | 0.42 | 0.50 | 0.45 | 12 |
| weighted avg | 0.69 | 0.83 | 0.76 | 12 |

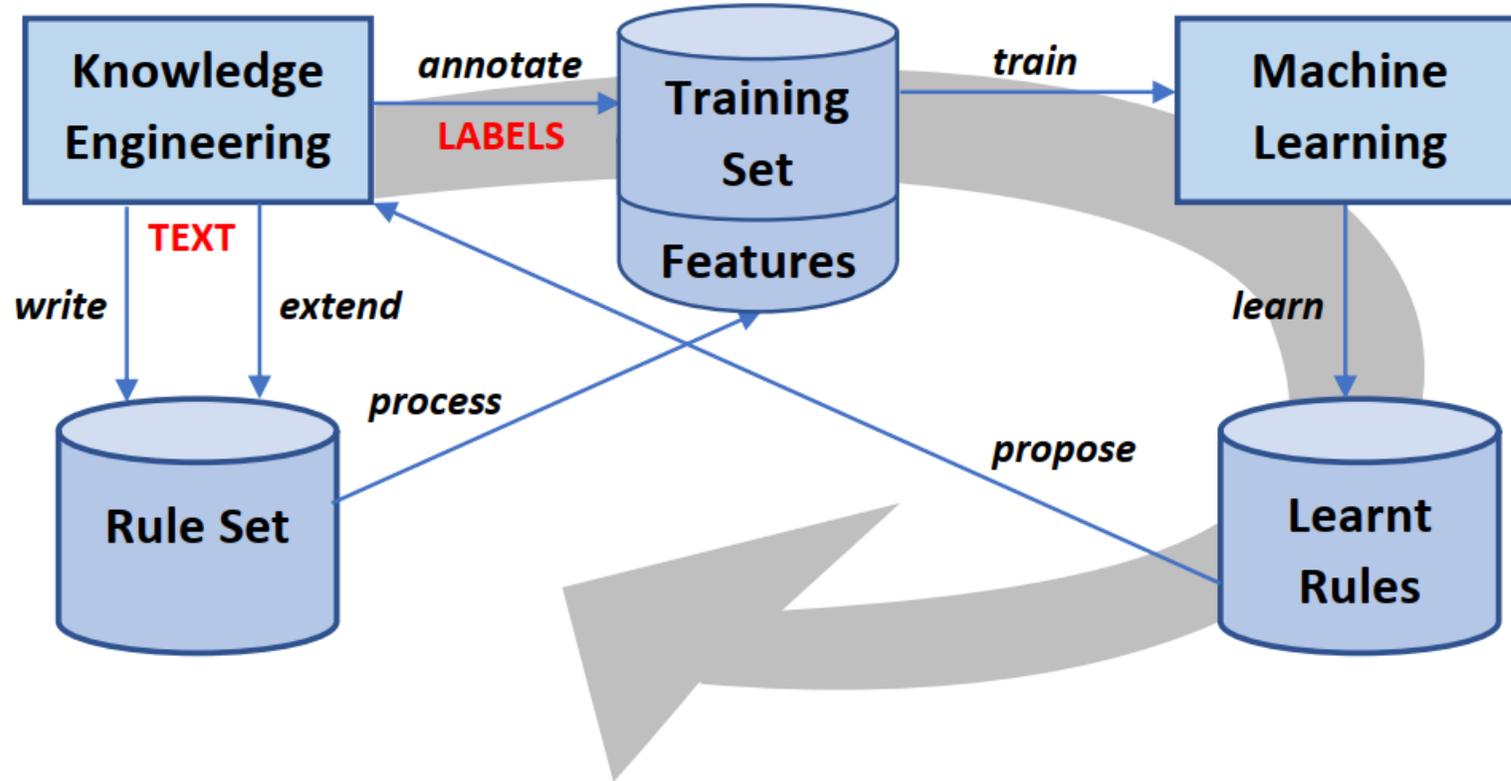


Participate and receive copy of results. Which BMs are more sustainable than others?

Which BMPs are most common among certain industries or sectors?

Which combinations of BMPs empirically correlate with higher levels of sustainability performance?

THE FUTURE OF SBM CATEGORIZATION USING MACHINE LEARNING



Which business models outperform others?

Examine business model pattern as proven problem-solution combinations;

Apply the process to other entities (sector model, country model).

Benefits of this approach:

Automated, scalable, unbiased, repeatable and transparent.

Providing the basis of a pattern language.

Source: The Classification of Sustainable Business Model Patterns using Machine Learning by Morris D Fedeli and Florian Lüdeke-Freund 2020.

The Classification of Sustainable Business Model Patterns using Machine Learning

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International New Business Model Conference
2020

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Which BMs are more sustainable than others?**

