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Sustainable business model experimentation practices: evidence from three start-ups

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Keywords
Sustainable business model
Experimentation
Circular Economy
Start-up.

Abstract
With a growing world population, resource use, and the effects of climate change, it is apparent that our current 'take-make-dispose' economy cannot be sustained. Sustainable business model innovation integrates sustainability objectives into business models to achieve a positive impact on society and/or the environment in combination with pursuing profit. Experimentation capabilities are essential for implementation, but established companies struggle with execution. Start-ups are more acquainted with a trial and error approach in which assumptions are gradually validated or adapted to market needs. To contribute to the shift towards sustainable business models, this paper explores how start-ups develop sustainable business model experiments and which elements of the sustainable business model canvas are tested through experimentation. Three start-ups were followed in their experimentation journey to develop profitable sustainable business models. Results indicate that 1) experiments always concerned the value proposition and another building block of the business model with a high-risk profile 2) start-ups use easy accessible resources to execute experiments in a fast paced and iterative manner 3) decisions of continuation of business model ideas were based on the outcomes of experiments in relation to the purpose of the company. In addition, this paper provides examples of experimentation practices of these start-ups to give hands-on examples how sustainable business model experimentation can be developed.

Introduction

With a growing world population, increases in resource use, and the widespread effects of climate change (IPCC, 2014), it is evident that our current 'take-make-dispose' economy cannot be sustained. By changing the way in which companies operate, businesses can play a crucial role in the transition towards sustainable development (Loorbach & Wijsman, 2013).

Sustainable business model innovation is an emerging field of research attempting to integrate sustainability objectives into business models and achieve a positive impact on society and/or the environment in combination with the pursuit of profit (Schaltegger et al., 2015; Stubbs & Cocklin, 2008; Tyl et al., 2015).

Adopting new business models can create a competitive advantage. Experimentation is key for their discovery and development, as business models often cannot be fully anticipated in advance (McGrath, 2009). In these experiments, business ideas are treated as assumptions to be gradually validated or adapted to market needs with a trial and error approach (Blank, 2013; Ries, 2011).

Recent work of Weissbrod and Bocken (2017) show that an experimentation capability is essential to sustainable business modelling. Their study also shows that established companies struggle with execution of such experiments (Weissbrod & Bocken, 2017). As 'Lean-startup' practices spread, conventional wisdom about entrepreneurship is turned on its head as new ventures are following principles of failing fast and continually learning (Blank, 2013; Ries, 2011). To contribute to the shift towards sustainable business models, this paper explores how start-ups develop sustainable business model experiments and which elements of the sustainable business model canvas are tested through experimentation.

Methodology

Three start-ups with a sustainability-related business mission were followed in action research. In contrast to existing companies that execute a certain business model, these companies looked for a successful one, as the definition of 'start-up' by Blank (2013) describes. In action research practitioners and researchers act together in an iterative process, which includes problem diagnosis, action intervention and reflective learning in a systematic and documented way (Avison et al., 1991; Swann, 2002).

Data collection was performed by working with three

companies to define/validate specific elements of their sustainable business model in real situations. Project activities consisted of: framing the project scope, gathering insights of stakeholders, co-create sessions on how to enhance the sustainable business model, identifying riskiest assumptions of these business ideas, executing an experiment to validate these assumptions, adapting business ideas based on outcomes and reflecting on the experimentation process.

Common patterns in the experimentation process were discovered through framework analysis - a generative approach grounded in qualitative data that allows for systematic analysis and comparison of multiple cases (Srivastava & Thomson, 2009). Findings were analyzed by the authors in relation to the building blocks of the SBMC (Figure 2).

Results

Case 1: *THANKS*

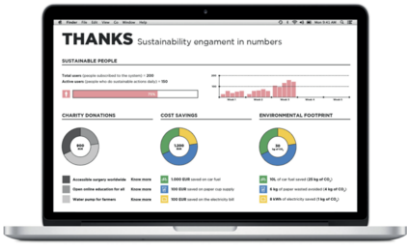

Figure 1. THANKS: a tool for a sustainable office culture © THANKS, 2016

Project framework: THANKS

THANKS is a new venture started in 2014 at Delft University of Technology within the framework of the Climate-KIC Netherlands (Figure 1). Background research revealed a market opportunity for energy saving solutions centred on sustainable behavioural change within large office buildings. The objective of THANKS was to develop a business model to encourage energy saving actions at the workplace.

Tested element of business model

THANKS' primary focus was to define a value proposition and frame the customer segment with more specificity. For THANKS the riskiest assumptions were as follows: first whether companies are interested in a solution based on behavioural change; and second whether employees could be nudged to save energy in the office. The customer segment building block was tested in relation to the value proposition.

Experiment and required resources

The experimentation process (Figure 4) took shape as a set of interrelated activities spread across three main iterations.

The first iteration entailed: interviewing the energy manager of a company; creating booklets to gather feedback from 20 office workers; a day of ethnographic observations into an office space; and a creative session with 10 office workers. Insights from these activities were combined into a new idea during a brainstorm session: to engage employees with the sustainability strategy of the company allowing them to make a small donation every time they made an energy saving action.

The second iteration entailed rapid service prototyping (Figure 3). Signs with energy saving reminders were placed in strategic locations (e.g. next to light switches). By scanning a QR code, office workers we redirected to a landing page where they could make a €1 donation on behalf of the company. The test was run with 10 office workers for 10 days. The amount of donations was used as an engagement metric: 87 out of the 100 possible Euros were donated. 10 follow up interviews provided feedback on energy saving potential. Parallel interviews with CSR managers of 2 international companies validated relevance for the customer. Insights from these activities were embedded into an updated prototype with adjusted features: broader focus on sustainable actions, a tangible donation experience for office workers, and impact feedback to the company.

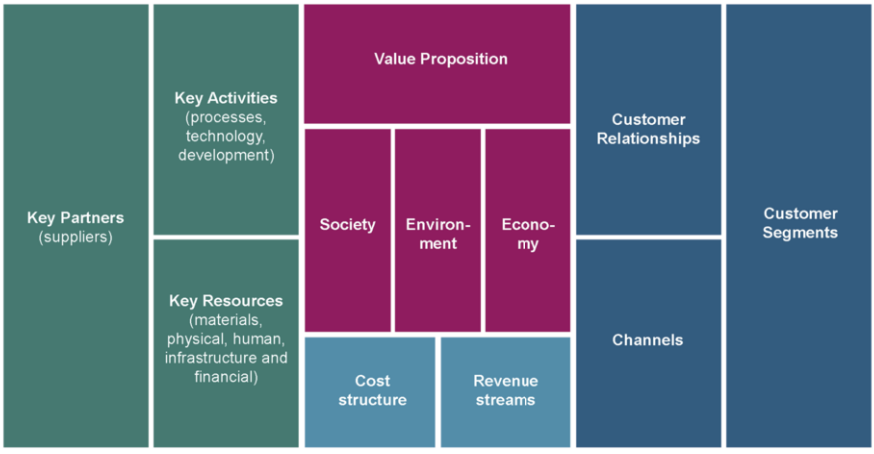

Figure 2. Sustainable Business Model Canvas (Bocken, 2015 building on Osterwalder & Pigneur, 2010)

The third iteration entailed rapid service prototyping (Figure 3). By putting tokens associated with different actions inside a piggy bank placed on their desk, office workers could donate money to a charity of their choice. Counting tokens at the end of the test provided immediate impact feedback to the company (e.g., kg of paper waste saved by reusing cups). The test was run with 4 office workers for 20 days. 68/100 Euros were donated. Parallel interviews with CSR managers of 5 international companies validated relevance for the customer.

Outcome of experiment

The positive outcome of the experimentation process enabled the definition of a preliminary business model around the value proposition and the defined customer segment. A first business plan was drafted. This was crucial to raise funds to build a digital prototype to be used by THANKS in the first pilots.

Figure 3. *THANKS Rapid prototyping, second iteration © THANKS, 2016*

Case 2: Mud Jeans

Figure 5. *Mud Jeans: The first circular jeans company © Mud Jeans, 2016*

Project framework: Mud Jeans

Mud Jeans is a Dutch denim company that introduced an innovative leasing business model for jeans in 2013 (Figure 5). Lease-a-jeans offers users the opportunity to lease a jeans for €7,50 a month and a one-time subscription fee of €20,00. After one year, lease-a-jeans members can return the jeans and switch to a new pair. The returned pair is upcycled to vintage jeans or recycled as a resource for new denim. The objective of this project was to create a stronger proposition for leasing jeans to appeal to more customers. Figure 6 shows the step-wise process taken for Mud Jeans.

Tested element of business model

Mud Jeans assumed that foremost, leasing jeans offers guilt-free consumption. During a workshop four other value propositions were developed (Figure 7).

For Mud Jeans the riskiest assumption was that customers would be willing to lease jeans instead of purchasing jeans to offer guilt-free consumption. The customer relation building block was tested in relation to the value proposition.

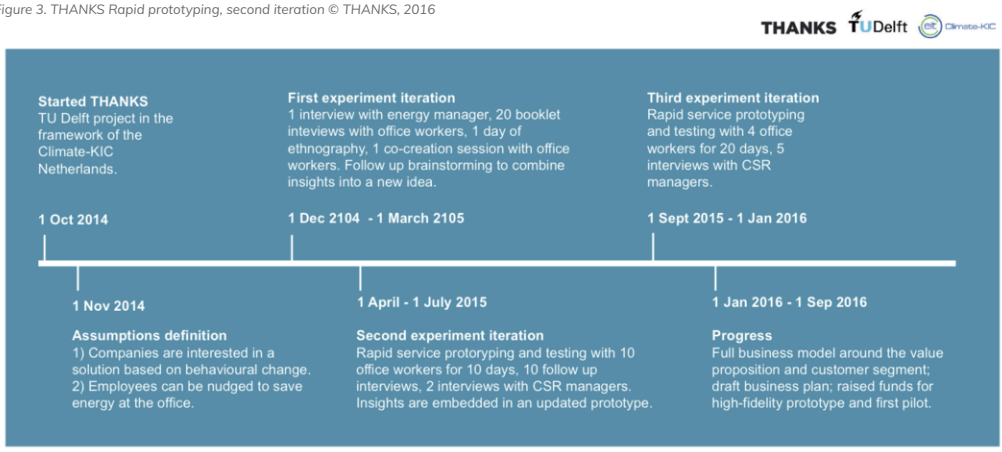

Figure 4. *Overview of experimentation activities of THANKS from 1 Oct 2014 to 1 Sep 2016*

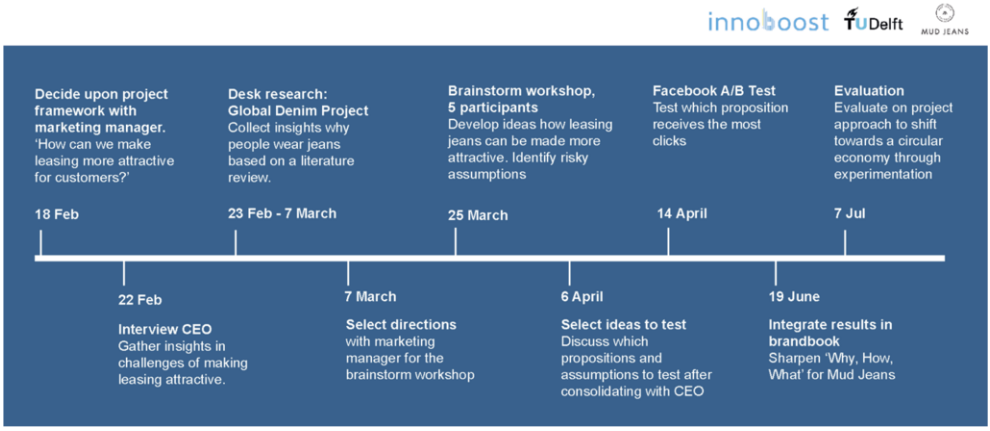

Figure 6. Overview of experimentation activities of Mud Jeans from 18 February 2016 to 7 July 2016.

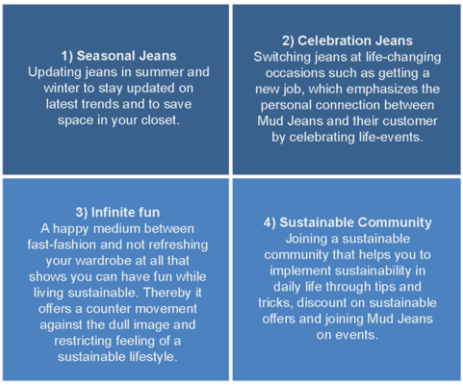

Figure 7. Four value propositions for leasing jeans.

Experiment and required resources

Mud Jeans set up a Facebook campaign and published this to potential customers to measure the click-through-rate on the advertisements which contained descriptions of the value proposition. In this way, costs were kept below €200.

Outcome of experiment

Mud Jeans decided to only test ideas that suited their purpose of becoming a circular company that reduces waste. Ideas that stimulate seasonal or special event purchases were not tested. Ideas that were related to expressing a sustainable lifestyle by wearing Mud Jeans were proposed to potential customers (Figures 8 and 9).

Both ads scored higher (sustainable community: 1.49%; Infinite fun: 1.17%) than the industry average CTR of textile ads (0.254% according to LINCHPINSEO) and previous ads of Mud Jeans about leasing jeans (1.02% and 1.11%). Mud Jeans decided to combine the proposition to make it suit their own believes. Results were incorporated in the brand book of Mud Jeans to further clarify what Mud Jeans stands for and what they should communicate to (potential) customers. Due to time constraints actual conversion was not tested.

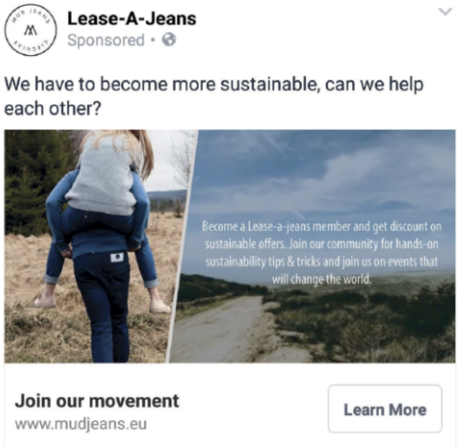

Figure 8. Facebook ad campaign 'Sustainable community' to test value propositions for leasing jeans © Innoboost, 2016

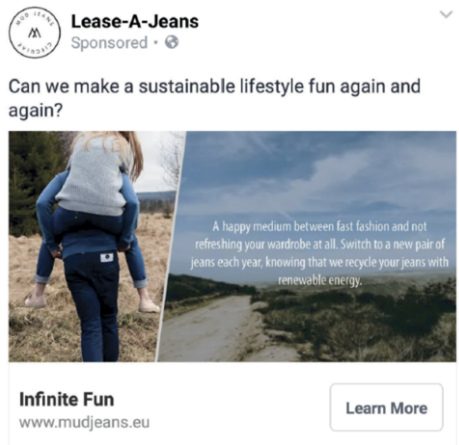

Figure 9. Facebook ad campaign 'Infinite fun' to test value propositions for leasing jeans © Innoboost, 2016

Case 3: Peerby

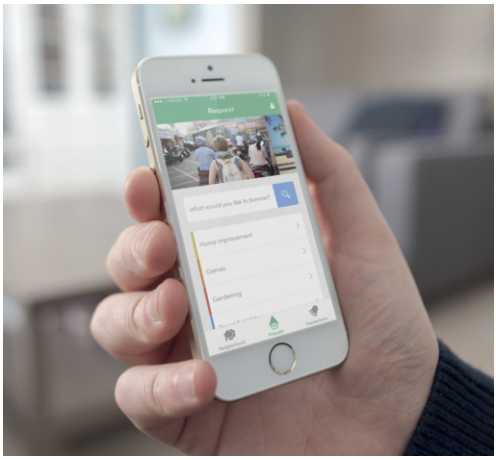

Figure 10. Peerby: Pioneer in the sharing economy © Peerby, 2017

Project framework: Peerby
Peerby offers a platform where neighbours can borrow or rent items from each other to stimulate the sharing economy (Figure 10). The objective was to find a business model to generate additional revenue streams (Figure 11 shows the experimentation activities).

Tested element of business model
First community members were asked questions about the existing platform and how more value could be added. Community members were satisfied with the current design. To generate additional revenue streams project members reflected on unique resources and capabilities of the company and questioned which new customers segments would be interested in these assets.

Business ideas and new customer sections were selected based on 1) coherence with Peerby's mission to shift away from the throw-away culture and excessive consumption 2) Business potential 3) scalability. This led to a focus on retailers. For Peerby the riskiest assumption was that retailers could be considered as an additional customer segment when adding new features to the platform. In this case, the customer segment was tested in relation the value proposition building block.

Experiment and required resources
Through a co-creation session with an ex-retailer from their own network, the value proposition was sharpened by brainstorming how key assets could become more valuable. The ex-retailer openly shared his considerations.

Outcome of experiment
After Peerby proposed value propositions to an ex-retailer business model, ideas changed to better meet the retailers' needs. After analyzing the impact of these ideas in more detail, Peerby decided not to continue with these as they counteract their purpose by stimulating sales of products, while Peerby is committed to enhance the sharing economy to offer an alternative for excessive consumption.

Overview of experimentation practices
Table 1 summarizes the experimentation practices for each of the cases.

It shows that for each type of practice, specific capabilities and resources are needed, which range widely from interview skills to physical prototyping.

Discussion and Conclusions
To contribute to the shift towards sustainable business models, this paper explored how start-ups develop sustainable business model experiments and which elements of the sustainable business model canvas are tested through experimentation.

First, it was found that fast-paced experiments gave meaningful and low-resource insights on how to adapt business models to better suit customer needs while strengthening the original sustainability purpose or strategy of the start-up.

Second, experiments for sustainable business model design and validation are always concerned with the

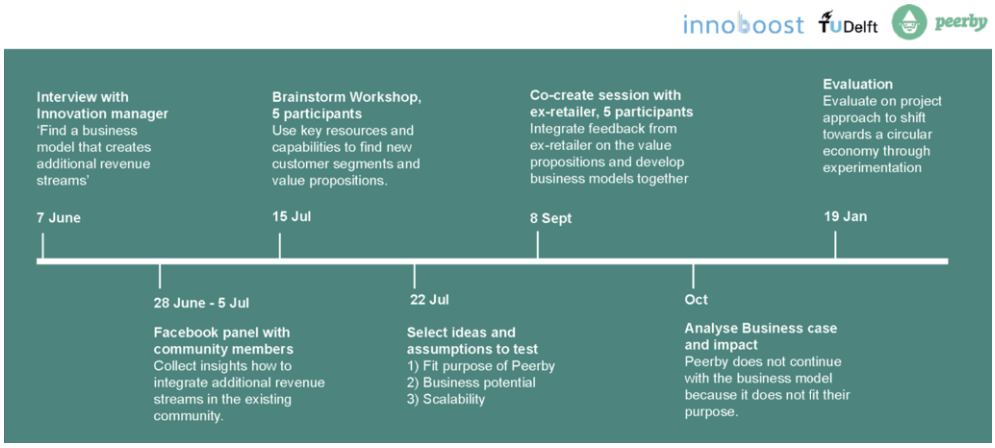

Figure 11. Overview of experimentation activities of Peerby from 7 June to 30 October.

Experimentation practices	Resources and capabilities	Outcomes	Case example
Conversational interview	Interviewer and interviewee	Insights in what is important to the stakeholder and their considerations	THANKS Mud Jeans Peerby
Booklet interview	Interviewer and interviewee; booklet design	In-depth insight in the stakeholders by discussing what is written down	THANKS
Ethnographic observation	Social researcher, notebook, photo / video camera	Real-life reactions and interactions of the customers to feed into experiment design	THANKS
Co-create session	Invite stakeholder who discusses considerations openly	1) Ideas that match the visions of involved stakeholders 2) Coherent vision	Peerby
Brainstorming	Multidisciplinary team and perspective outside the company	Ideas that fit the visions of people from different expertise's	THANKS Mud Jeans Peerby
Facebook A/B Test	Budget for ad campaign. Content-writer for ads	Indication of what resonates better with customers through number of clicks	Mud Jeans
Rapid Service Prototyping	Physical and/or digital prototype (e.g. paper signs, web landing page)	Customer feedback through interactions with the prototype	THANKS

Table 1. Overview of experimentation practices in the three case-studies and accompanied resources and capabilities

value proposition (which echoes existing literature, e.g. Osterwalder et al., 2014), but in relation to another building block of the business model, which is essential for implementing that value proposition. The selection of the building blocks appears to depend on two factors: the level of certainty about particular aspects of the business (e.g., clarity on future revenue streams or customer segments) and assumption the company perceives as riskiest (e.g. customer, channels). Experimentation can start with the most uncertain or riskiest assumptions.

Third, experiments allowed for minimization of cost and perceived risks for companies engaging in sustainable business model design and validation. In order to achieve this, experiments were conducted with a customer centric approach in line with Blank (2013) and Ries (2011) aiming to generate new business opportunities, fast paced and iteratively, and using easily accessible resources.

Fourth, deciding to continue with the business model idea is based on outcomes of experiments in relation to the purpose of the company. All three sustainability-driven start-ups have a clear purpose for their business and evaluated ideas based on the fit with their mission and vision.

Finally, we identified experimentation practices that can support sustainable business model experimentation. These include: conversational interview, booklet interview, ethnographic observation, co-creation session, brainstorming, A/B test, focus group, rapid service prototyping (physical and digital) and Facebook testing. These practices, which can be broadly categorized as design thinking type of activities and stakeholder interactions, have proven to be crucial in strengthening the business proposition allowing to progressively create an overlap between sustainability objectives and market needs (Keskin et al., 2013; Keskin 2015).

While tested in start-ups, we believe that experimentation can also help established companies 'stuck' in existing business models (Weissbrod and Bocken, 2017). For instance, co-creation (Table 1) is a key experimentation practice because it creates a sense of shared ownership, which is key to push innovation forward in a large and slow corporate context (Gardien et al., 2015). Further research is necessary to experience how the internal organization of established companies react to experimentation practices that are similar to the described cases.

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