New Venture Creation Project

Deliverable 3: Validation of the Business Model (using a Minimum Viable Product)

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| **Project Name:** |  |
| **Code (EMINE23\_XY):** |  |
| **Tutor:** |  |

Project Team

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(\*) Please, write your name in the same order that in the official course list

To review if necessary:

Project Description (What made you change it? Try to be as specific as possible)

Radiant Power focuses on developing and commercializing strontium beta voltaic batteries from spent nuclear fuel inventory, which converts the energy from decaying beta particles into electricity. These batteries offer a reliable and predictable power source, independent of temperature differences. The demand for long-lasting, low-power batteries is growing, especially in applications where temperature differentials cannot be relied upon. Our strontium beta voltaic batteries provide a steady power output throughout their lifespan, allowing for accurate device replacements or servicing planning. They are a sustainable and safe energy solution, utilizing strontium's radioactive decay properties.

Our business model focuses on powering small devices that serve various functions like sensors for various equipment, powering medical devices, etc. By addressing the limitations of temperature-dependent power, we have a promising opportunity to provide innovative and sustainable solutions to industries seeking efficient and long-lasting power solutions.

Value Creation Ecosystem

Paste here your VCE as an image

Initial Business Model Canvas

Paste your initial BMC as an image, you can use the file: Editable\_Business\_Model\_Canvas.docx.

**Validation of the Value Proposition and the Business Model**

The validation is an iterative process that takes many rounds to validate the hypotheses behind your Business Model. Take as starting point your current Business Model Canvas (BMC). In each round, you identify the main hypotheses behind your business model (on any block of the BMC, including the one of the Value Proposition).

In this deliverable, you should carry out **at least 2 rounds** of validation (with **5 to 10 in person or Zoom/Teams interactions/interviews)**, with a minimum of **1 of them including an MVP.**

**Validation round #1**

Challenge your own solution and identify the 2-3 Unknowns/Hypotheses you consider the most relevant for the success of your Business. Describe the hypotheses and the implications.

1. Unknowns/Hypotheses (Try to be as specific as possible)
2. Radiant batteries are estimated to have an activity of 1012 Bq, they might get caught in regulations.
3. We might have to get special licences to conduct our business.
4. Radiant battery might be underpowered to be useful in SMR’s sensors.
5. **Interviews and/or Observations to validate the hypotheses**

Gather data, be creative and carry out a set of interviews/observations to validate the hypotheses. Describe what you did to validate each hypothesis: What, where and who did you observe? Whom did you interview and what were the topics of the interview?

We conducted three interviews with experts in the nuclear field, including a business owner (LeadCold) and researcher currently developing a new Swedish SMR design (Sunrise).

To validate the hypothesis, we asked the three questions below.

1. Radiant batteries are estimated to have an activity of 1010 Bq, what kind of regulations do we need to consider?
2. What kind of licence do we need to adhere to the regulations and how do we obtain it?
3. How useful will Radiant battery be in SMR monitoring systems?

and these were the responses:

1. Based on the estimated activity for each Radiant battery, they will fall under the controlled substance category, more specifically they fall under the class III nuclear materials. Therefore, the battery is under regulatory control.
2. To produce the battery in our company we must obtain the licence for handling class III nuclear material, which will involve an application to the nuclear regulatory body.
3. In different monitoring systems for the SMR, including normal operation and post-accident scenarios.
4. **Analysis of results (validation/refutation of unknowns/hypotheses)**

Because of the validation process, some of the unknowns/hypotheses may be unveiled/validated/refuted. In either case, explain why you validated/refuted the hypotheses.

Hypothesis 1 – validated.

Hypothesis 2 – validated.

Hypothesis 3 – Refuted, there are valid use cases in SMRs

a. Hypothesis: Radiant batteries may be subject to regulations due to their estimated activity of 10^12 Bq. Validation: The interviews confirmed that Radiant batteries fall under regulatory control as class III nuclear materials.

b. Hypothesis: Special licenses may be needed to conduct the business. Validation: The interviews revealed the need for a license to handle class III nuclear material.

c. Hypothesis: Radiant batteries may have limited usefulness in SMR's sensors. Validation: The interviews indicated potential applications of Radiant batteries in various SMR monitoring systems.

1. Re-design of the Business Model Canvas

After validating/refuting the hypotheses, you should update your Business Model Canvas to provide a better fit. Your business model will likely pivot. What changes have you introduced?

Paste BMC as image, you can use the file: Editable\_Business\_Model\_Canvas.docx.

Use colors to highlight the changes from the previous BMC.

We include the type of fuel (Tritium) in the value proposition segment in the first model

We include civilian use in the first model.

We should reprocess the spent fuel ourselves in the first model. We should process Tritium ourselves in the first model.

We should only sell to military, space exploration companies and nuclear facilities in the second model.

**Validation round #2**

Minimum Viable Product

A Minimum Viable Product (MVP) is a product with just enough features to satisfy early customers, and to provide feedback for future product development. Build/program/design an MVP to test your Value Proposition and Business Model.

Use the Business Model Canvas from the previous validation round, as starting point. Follow the same procedure as before

1. Hypotheses (Try to be as specific as possible)
2. By incorporating strontium from spent fuel in beta voltaic batteries, it is possible to enhance the power output and extend the lifespan of the batteries, surpassing the capabilities of the tritium beta voltaic existing technology.
3. Spent fuel and obtaining Strontium from that spent fuel might be too difficult.
4. **Experiments & MVP to validate the hypotheses**
5. Tritium batteries are estimated have an activity of 1010 Bq, and Strontium batteries of the same amount produce a higher activity of 1012 Bq, hence generating more power.
6. There are companies that already produce separated fission products such as Nordion.
7. **Analysis of results (validation/refutation of hypotheses)**

Hypothesis 1 – Validated.

Hypothesis 2 – Refuted, because we can buy Strontium as separated fission product from companies like Nordion.

1. Re-design of the Business Model Canvas

Paste BMC as image, you can use the file: Editable\_Business\_Model\_Canvas.docx.

Use colors to highlight the changes from the previous BMC.

We include the type of fuel (Tritium) in the value proposition segment in the third model.

We should purchase Strontium as separated fission product from suppliers and only assemble the batteries inhouse in the third model.

Add more validation rounds if convenient to improve your Value Proposition and Business Model.