Creating and capturing value from innovative tech

Ph.D. Class ENG-642

Dr. Sharon Tal
sharon@wheretoplay.co

Session 1
Fall Term 2024

Hi, I am Sharon

Trainer, educator and facilitator	
Author of Where to Play: www.wheretoplay.co	
Co-founder and former executive director of the Technion Entrepreneurship Center	

Commercializing our own academic know-how


FT PUBLISHING
FINANCIAL TIMES
WHERE TO PLAY
3 STEPS FOR DISCOVERING YOUR MOST VALUABLE MARKET OPPORTUNITIES
Marc Gruber and Sharon Tal
'Enjoy discovering highly practical worksheets, maps and dartboards of tremendous interest to better identify, evaluate and strategise market opportunities.'
Alex Osterwalder and Yves Pigneur, authors of the bestseller Business Model Generation
2
1
1
High
Mid
Low
OPPORTUNITY SET

The commercial possibilities of your tech expertise

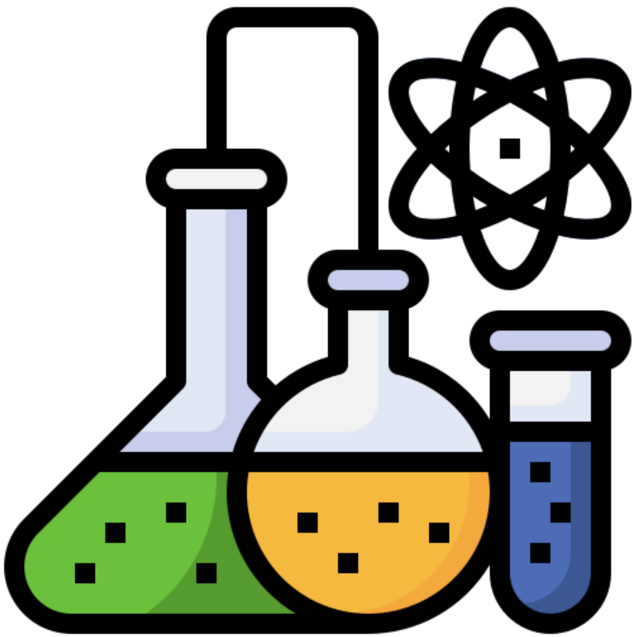
Realizing the commercial possibilities of your unique technology/know-how allows you to:

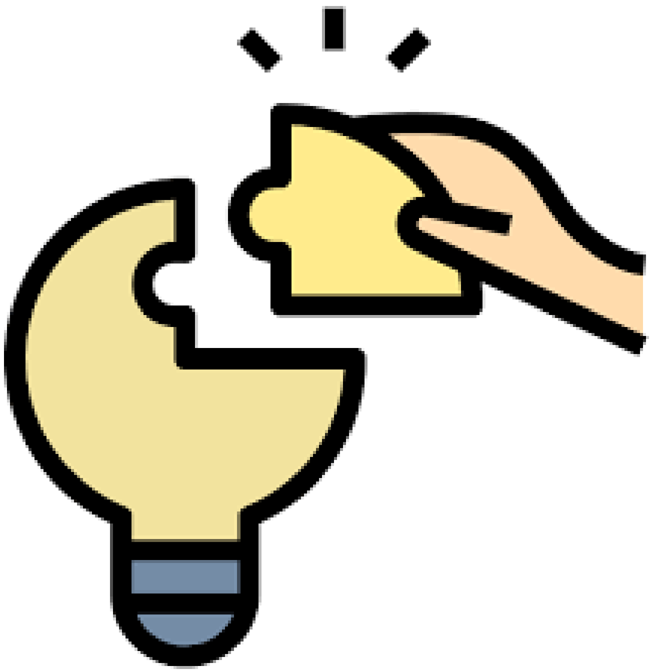
- Engage in more meaningful research projects
- Consider entrepreneurship as an alternative career path

Do you consider entrepreneurship as a career path? 

Goal: From an academic mindset to an entrepreneurial outlook

From tech and science → customers and solutions





There are many commonalities

Personality traits:

- Resilience
- Curiosity
- Creativity
- Critical thinking etc

Working context:

- Coping with uncertainty
- Starting with hypothesis

But one MAJOR difference

So how can we realize the value of an innovative tech

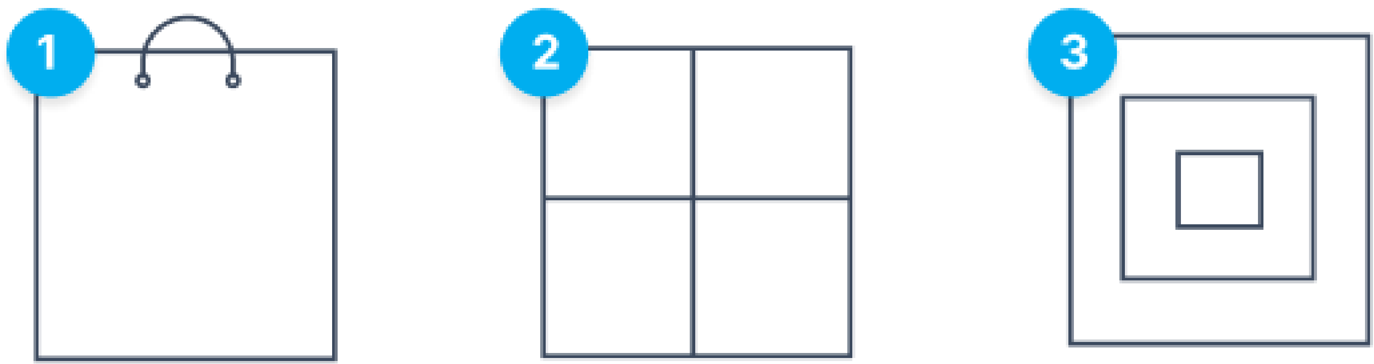
- ✓ Discover different applications stemming from your know-how and the customers who may need it
- ✓ Evaluate different commercial opportunities to compare and prioritize
- ✓ Develop a strategy to realize the full potential of your core abilities

Sounds complicated?

The good news: there is a toolset!

The Market Opportunity Navigator

Understand your opportunity space and find the best market for your innovation



IDENTIFY
Market opportunities for your business

EVALUATE
and compare options systematically

PRIORITIZE
opportunities for a clear strategic focus

About this course

Course objectives

The goal of this course is threefold:

1) to understand the process of opportunity identification and evaluation in the context of new technologies;
2) to acquire **practical business tools and key transversal skills** for the adoption of an entrepreneurial mindset and the consideration of entrepreneurship as an alternative career path
3) to apply this know-how on a real invention, and gain hands-on experience in this all-important process

Practical business tools and key transversal skills

Business tools

By the end of the course, you will be able to:

1. Identify different applications and customers for innovative technologies

2. Evaluate the value creation potential of a market opportunity

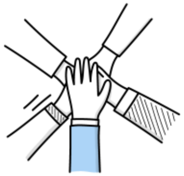
3. Evaluate the challenges in capturing value for each opportunity

4. Set a business strategy to capture both financial and social gains

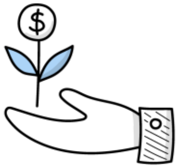
Practical business tools and key transversal skills

Transversal skills

Communication and presentation



Team work and interdisciplinary collaboration



Responsible leadership

Learning from others

Course Program- Session 1

Monday, Nov 18

- Introduction & Overview
- Markets for technologies
- Innovation presentation & team formation
- Identifying market opportunities for an innovation (Worksheet 1 of the Market Opportunity Navigator)
- Team work on Worksheet 1

Deliverables: The filled Worksheet 1

Course Program- Session 2

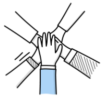
Tuesday, Nov 19

- Share & learn: 1-2 presentations of Worksheet 1, Q&A
- The Value Proposition: assumptions and phrasing
- Team work: what is your value proposition
- Validating value propositions through customer interviews
- Team work on interview preparation

Deliverables: Interview with one external person (per market)

Course Program- Session 3

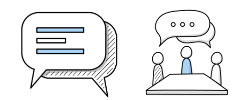
Wednesday, Nov 20

- Share & learn: 1-2 presentations of interview takeaways, Q&A  
- Evaluating the attractiveness of your opportunity: Potential and Challenge (Worksheet 2 of the Market Opportunity Navigator)
- Assessing the social/ environmental impact of your opportunity 
- Team work on Worksheet 2 

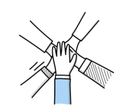
Deliverables: The filled Worksheet 2 for 1-3 options

Course Program- Session 4

Thursday, Nov 21



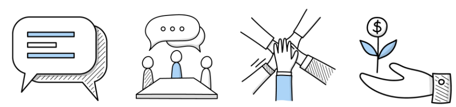
- Share & learn: 1-2 presentations of Worksheet 2, Q&A
- How to focus smartly (Worksheet 3 of the Market Opportunity Navigator)
- Mr. Andre Catana- head of Unit, Venture Builder: how EPFL supports budding entrepreneurs
- Group work on Worksheet 3 and business presentations



Deliverables: The filled Worksheet 3, the business presentation

Course Program- Session 5

Friday, Nov 24

- Learning from the successes and mistakes of a budding entrepreneur:
  Luis Mendoza- Co-founder & CTO Beyond Scroll
- Business presentations by teams 
- Overview on the Lean Startup toolset and how it complements the Market Opportunity Navigator
- Main takeaways and course wrap-up

Assignments

This is a 2 ECTS course:

Assignment	Due date
Preface report (individual assignment)	Nov 13
Business presentation (team assignment)	Nov 22
Reflection report (individual assignment)	Dec 2

Please note:

- ✓ Class attendance and active participation are crucial to obtain the value this class is offering
- ✓ Group work outside the class is an essential element of this course

Supporting materials

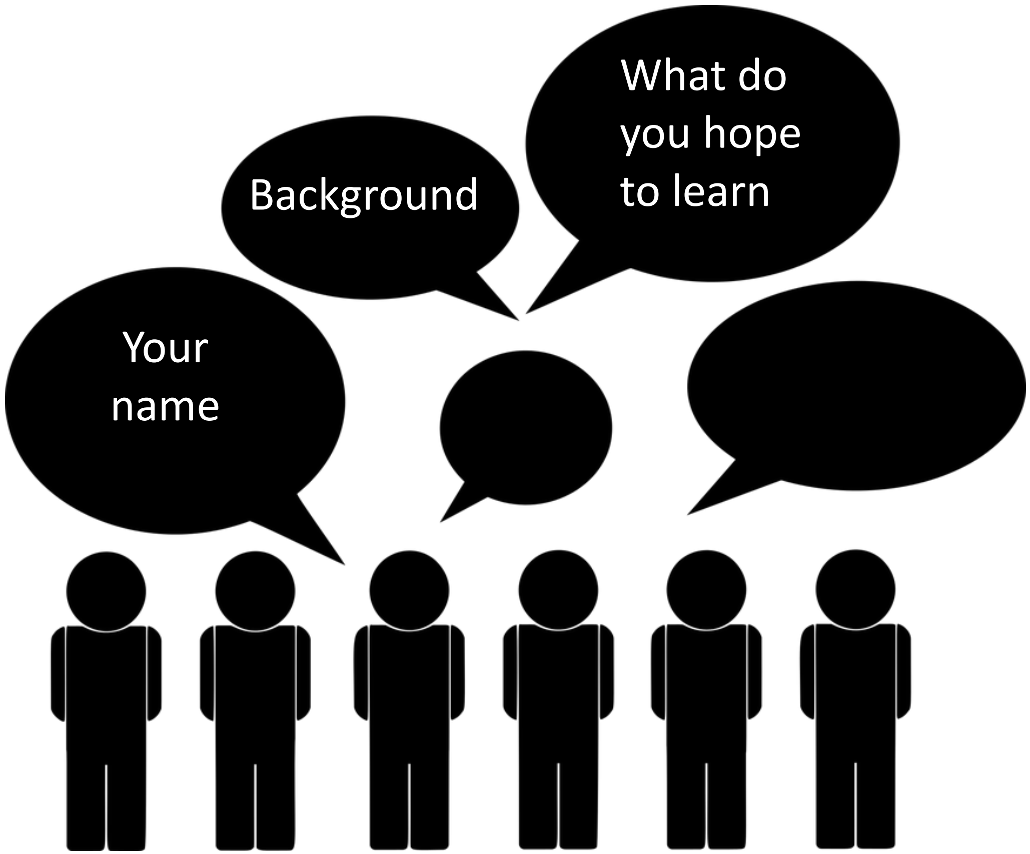
The recommended reading for each session is available on the course syllabus. Please come to class prepared.

Other supporting materials:

The book: ‘Where to Play’
(Also available in French / German)

The on-line course on edX:
Find the right market for your innovation

One sentence:
“One thing I hope to get out of this course is…”



From your preface report: Transversal objectives

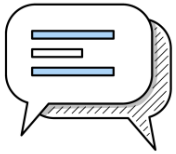
- ✓ I mostly communicate/present to people from the field => communicating with non-experts, improve my ability to simplify concepts
- ✓ Presenting my work to audiences in an academic context => present my work in a more business-focused context / sell an idea
- ✓ In my research project, I mainly work alone => experience in developing ideas and plans in a team
- ✓ Collaborating with people with similar professional background => work in a team with people who are from different backgrounds

Transversal skills: day-by-day follow up

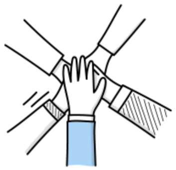
Do you feel that you worked today on the following skills?

Place a sticker on the bar if your answer is YES

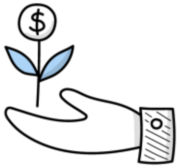
Communication and presentation



Team work and interdisciplinary collaboration



Responsible leadership



Learning from others

Markets for Technologies

Innovations can address different needs & serve different types of customers

AUGURY
Machines talk, we listen

Heating, ventilation and air conditioning systems

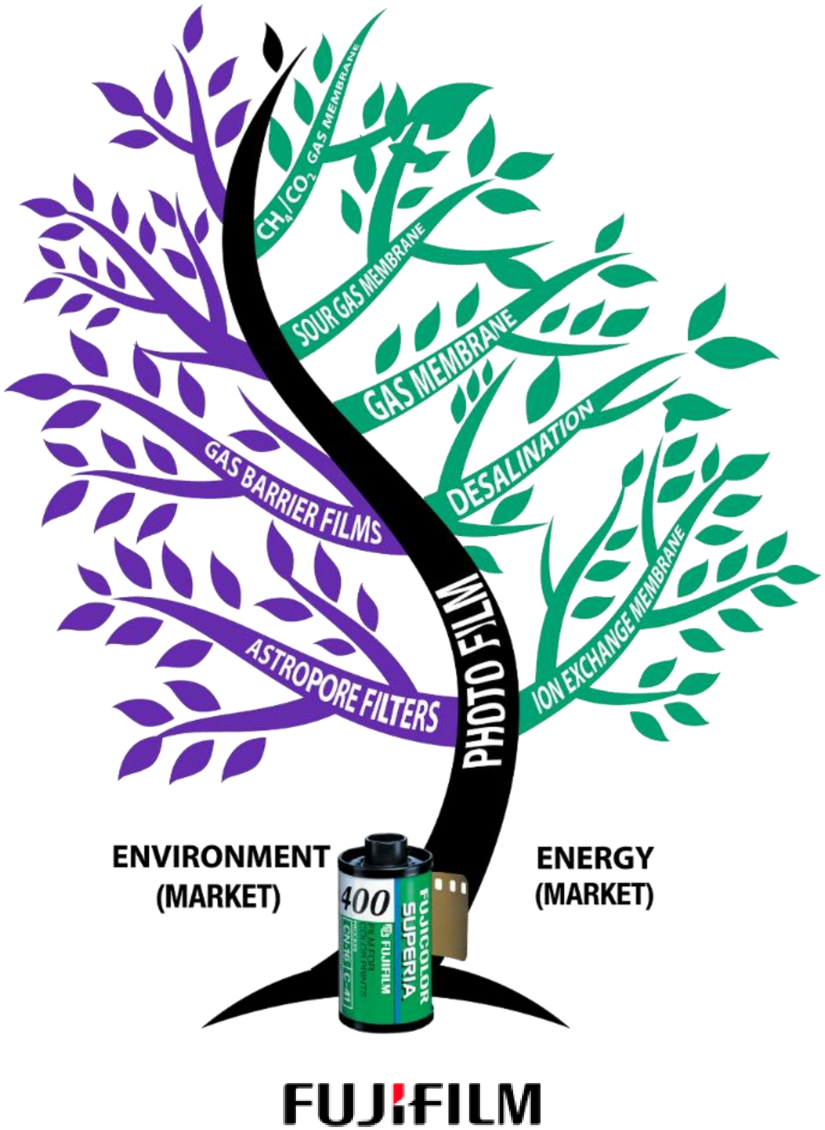
Manufacturing machines in factories

‘Augury inside’ for car manufacturers

…Or form the baseline for different types of products

CONSISMEDICAL From tunnel scanner to medical colonoscopy

True for startups and large corporations

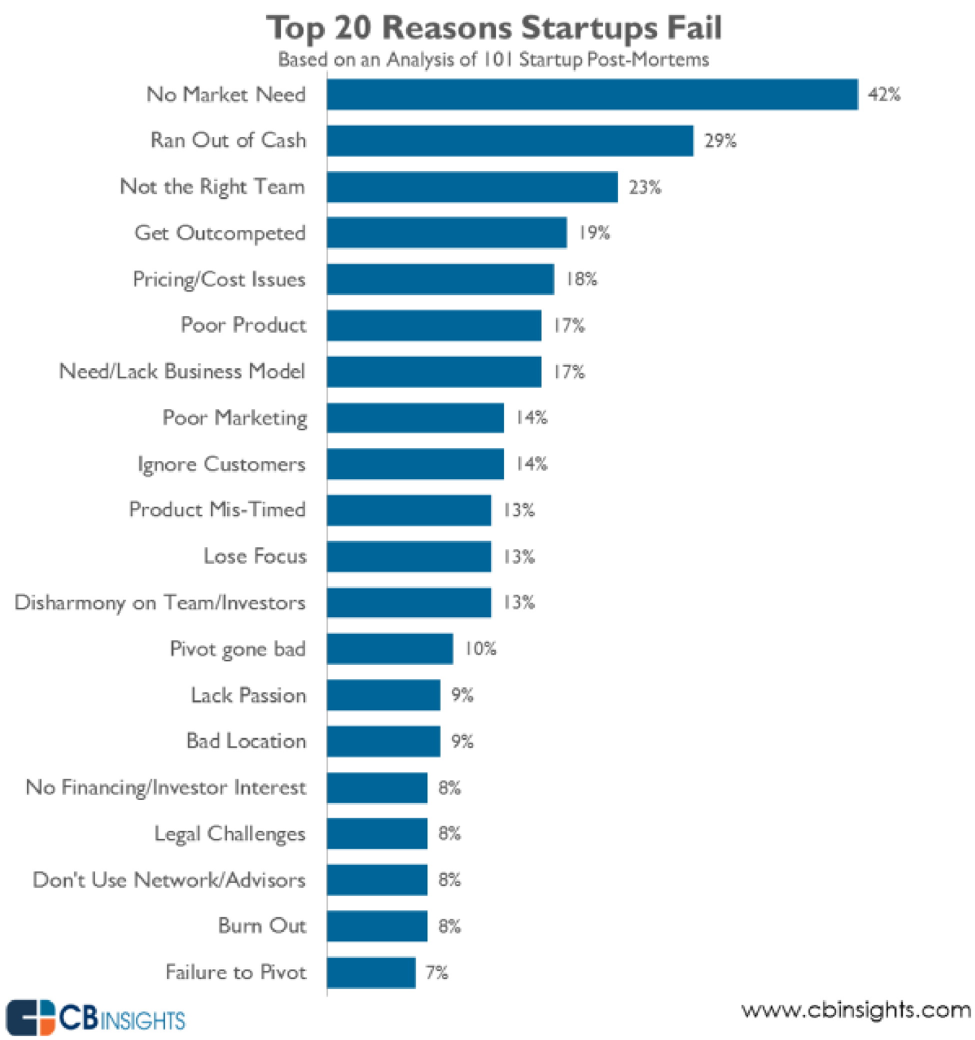


Market choice-
a profound decision

1) Shapes the chances of success

2) Shapes the DNA of the venture

‘No market need’: The #1 reason for startup failure



What did we learn from hundreds of start-ups?

#1 **Look before you leap: a set of market opportunities is a real asset for the firm**
(Gruber, MacMillan & Thompson, 2008)

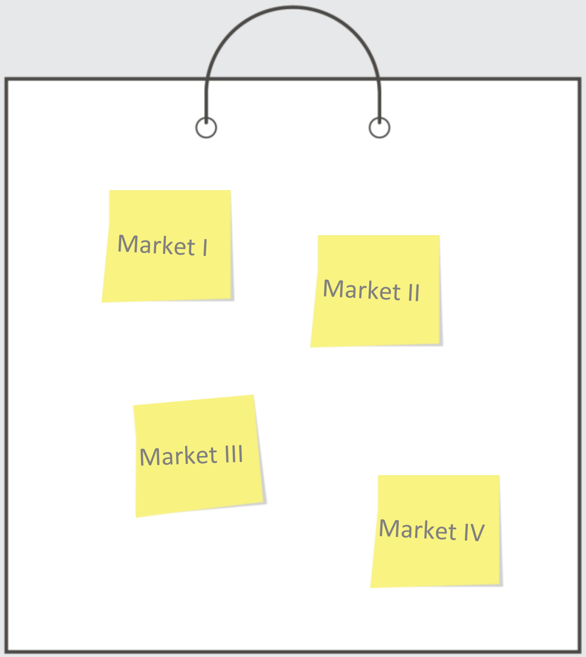
#2 **Number and variety of options matter**
(Gruber, MacMillan & Thompson, 2008)

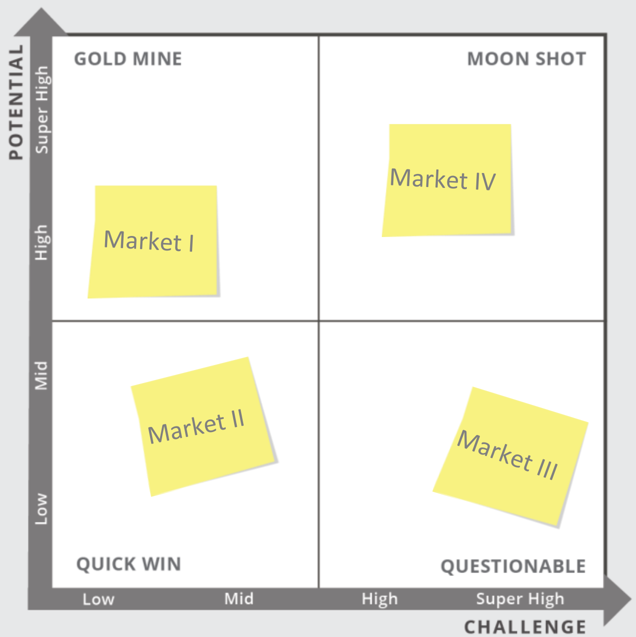
#3 **Focusing smartly is more than choosing a promising market**
(Tal, Gruber & de-Haan, 2013)

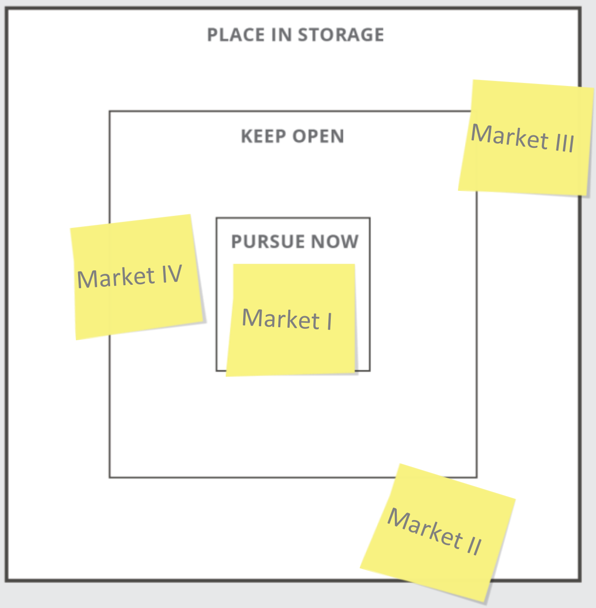
THE MARKET OPPORTUNITY NAVIGATOR

NAME

DATE







MARKET OPPORTUNITY SET

1 Use Worksheet 1 to identify potential market opportunities, and place them in the set

ATTRACTIVENESS MAP

2 Use Worksheet 2 to evaluate the atractiveness of each market opportunity, and place each one on the map

AGILE FOCUS DARTBOARD

3 Use Worksheet 3 to design your Agile Focus strategy, and mark it on the dartboard

market opportunity = any combination of application + customer

Use sticky-notes™ to represent each market opportunity

Develop a strategy to realize the full potential of your innovation

Found a startup?

- ✓ Focus on a promising opportunity
- ✓ Develop the foundations for a flexible company

Continue with research?

- ✓ Focus on meaningful projects
- ✓ Choose what and when to publish

Example: A Technion Spin-off

FeelIT

The co-founders

FeelIT

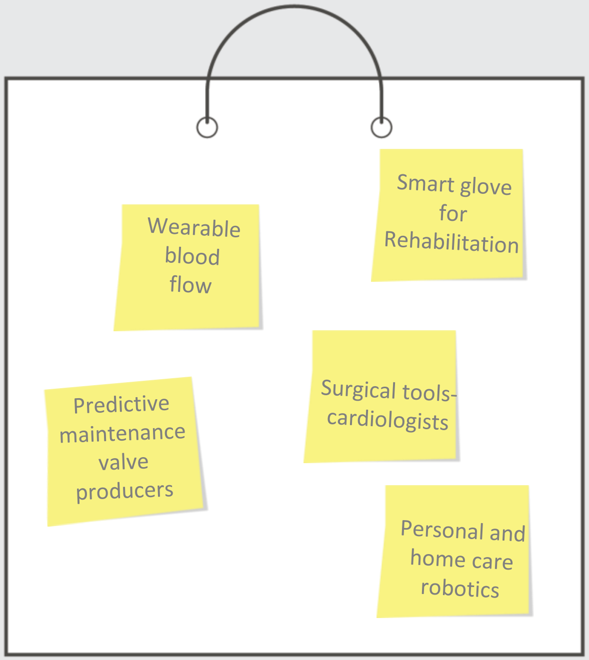
Dr. Gady Konvalina
CEO and Co-founder

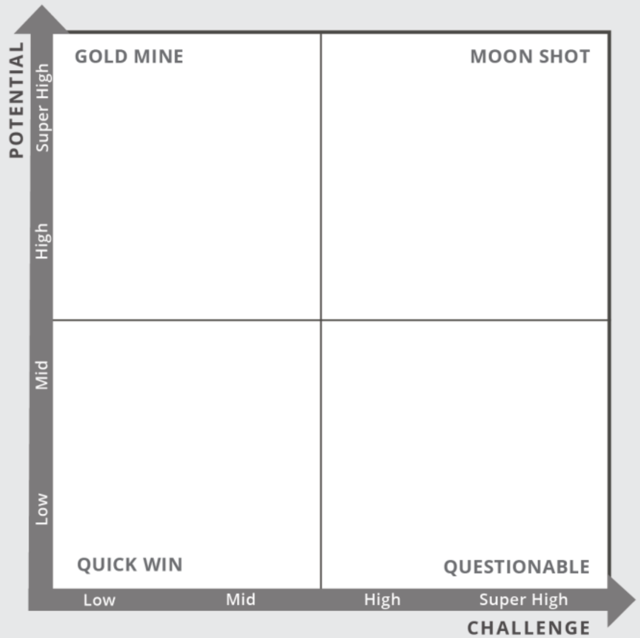
Dr. Meital Segev-Bar
CTO and Co-founder

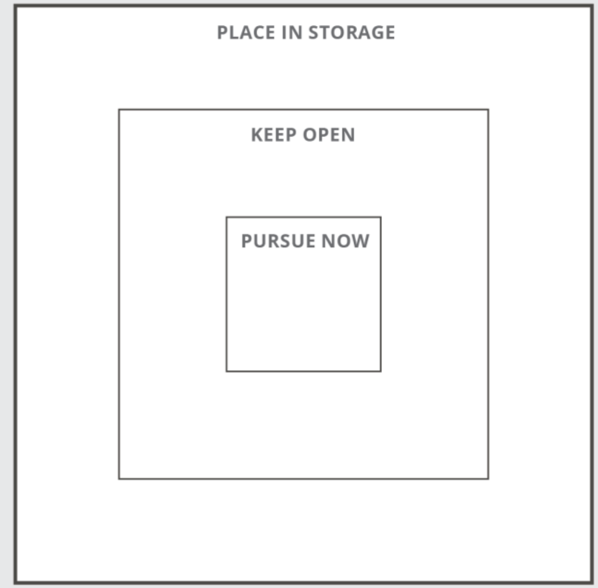
THE MARKET OPPORTUNITY NAVIGATOR

NAME: FeelIT

DATE:







MARKET OPPORTUNITY SET

1 Use Worksheet 1 to identify potential market opportunities, and place them in the set

ATTRACTIVENESS MAP

2 Use Worksheet 2 to evaluate the atractiveness of each market opportunity, and place each one on the map

AGILE FOCUS DARTBOARD

3 Use Worksheet 3 to design your Agile Focus strategy, and mark it on the dartboard

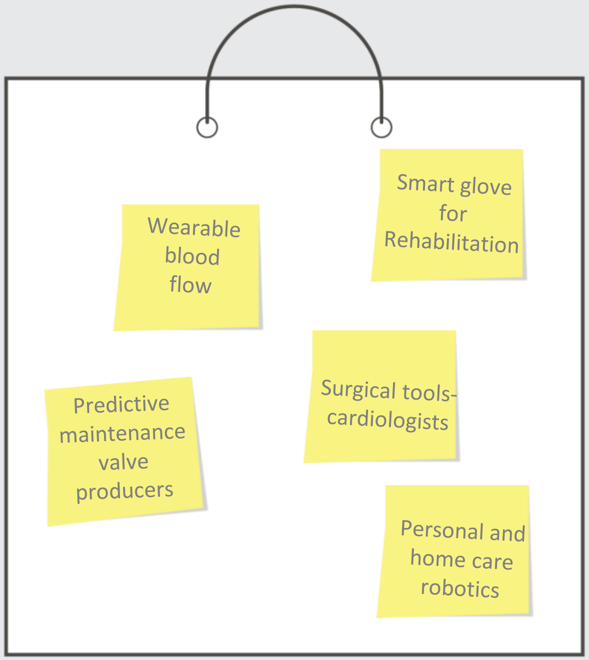
market opportunity = any combination of application + customer

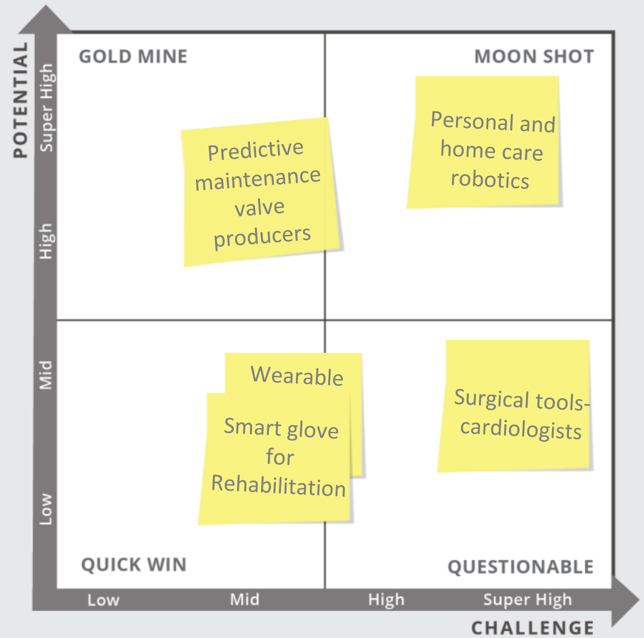
Use sticky-notes™ to represent each market opportunity

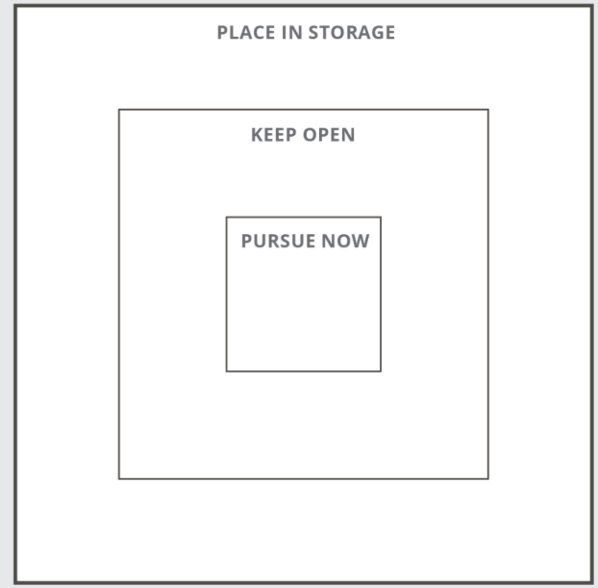
THE MARKET OPPORTUNITY NAVIGATOR

NAME: FeelIT

DATE:







MARKET OPPORTUNITY SET

1 Use Worksheet 1 to identify potential market opportunities, and place them in the set

ATTRACTIVENESS MAP

2 Use Worksheet 2 to evaluate the atractiveness of each market opportunity, and place each one on the map

AGILE FOCUS DARTBOARD

3 Use Worksheet 3 to design your Agile Focus strategy, and mark it on the dartboard

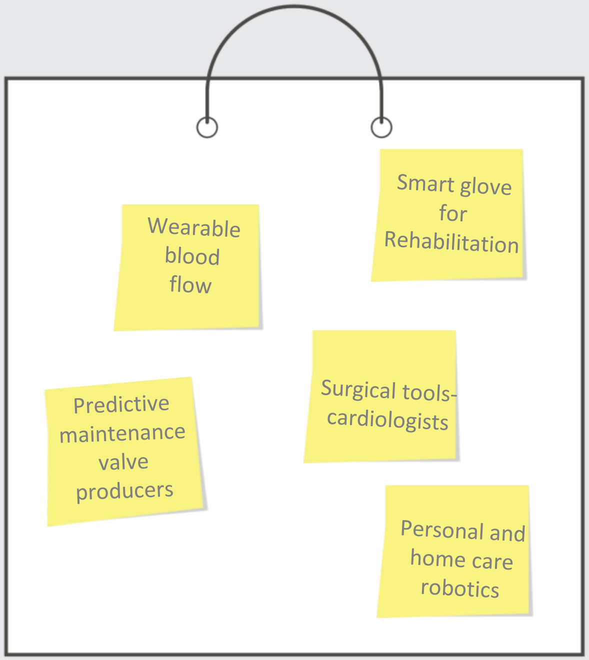
market opportunity = any combination of application + customer

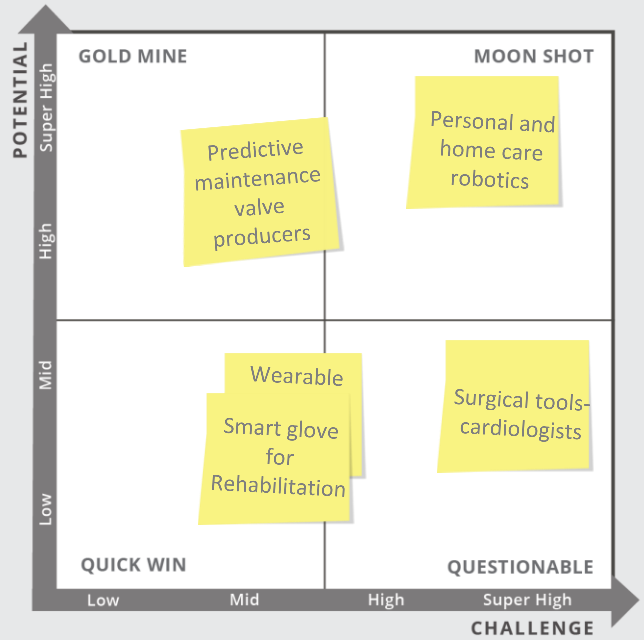
Use sticky-notes™ to represent each market opportunity

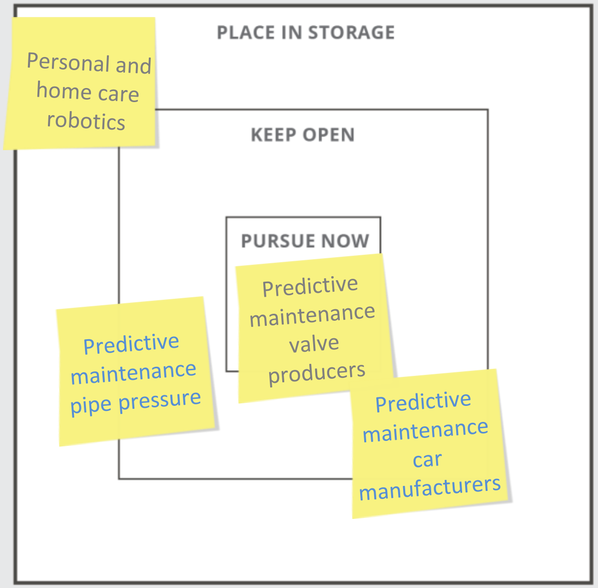
THE MARKET OPPORTUNITY NAVIGATOR

NAME: FeelIT

DATE:







MARKET OPPORTUNITY SET

1 Use Worksheet 1 to identify potential market opportunities, and place them in the set

ATTRACTIVENESS MAP

2 Use Worksheet 2 to evaluate the atractiveness of each market opportunity, and place each one on the map

AGILE FOCUS DARTBOARD

3 Use Worksheet 3 to design your Agile Focus strategy, and mark it on the dartboard

market opportunity = any combination of application + customer

Use sticky-notes™ to represent each market opportunity

Where are they today?

Finalized an investment round of $1.5M

Won the first place at Calcalist's Industry 4.0 Startup Competition

Where are they today?

Feelit


LUCKY

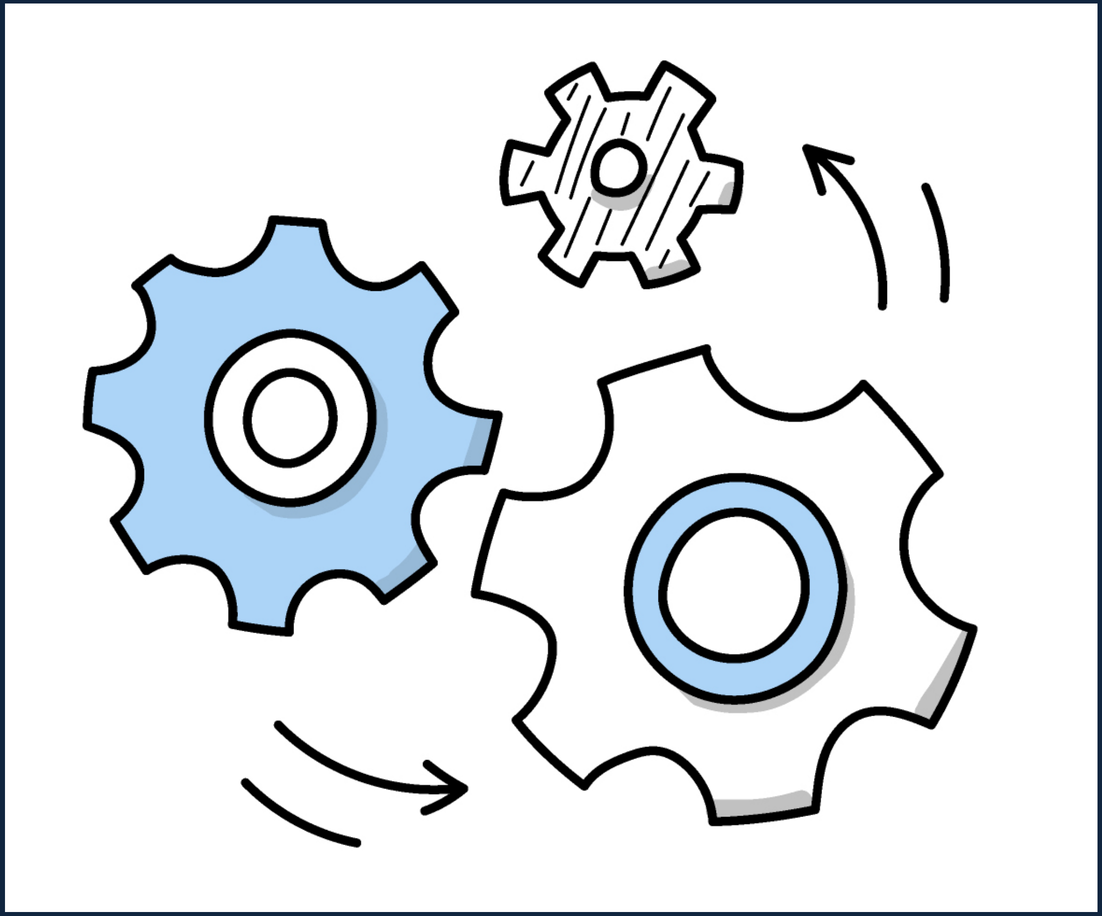
The power of structured processes

SUPPORTS YOUR DECISION-MAKING

PROVIDES A SHARED LANGUAGE

OFFERS GUIDANCE OVER TIME

Innovation presentation and team formation



Tell us about your research project

Content

1. What is it and what can it do? What is unique about it? What are its main functions/properties?
2. What is the specific application for this technology? Was it studied before?
3. What other applications can this technology be used for? Can it address the needs of different customer segments?

Guidelines

1. Try to avoid technical terms
2. No slides required
3. 5 mins !

Team formation

1) Which statement suits you best:

- I would like to work on my own technology/ invention / unique know-how during the course, and analyse its applications with a team of students
- I would like to work on someone else's technology/ invention / unique know-how during the course

2)If you wish to work on someone else's technology, please write here 2 options that spark your interest:

- Option 1:
- Option 2:

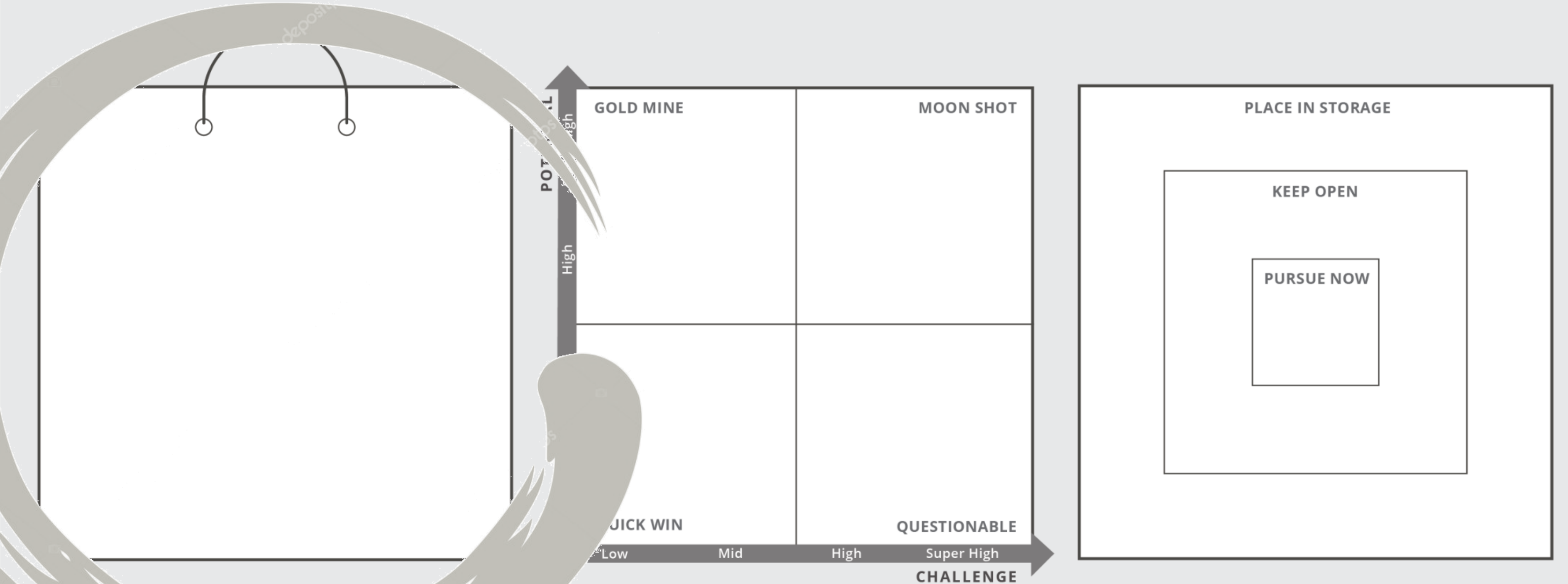
Link to Google form: https://forms.gle/vmHXshMR3MW2ZKTE9

Step 1:
Identifying market opportunities for your business

THE MARKET OPPORTUNITY NAVIGATOR

NAME

DATE



[illegible]PPORTUNITY SET

1 Us[illegible] opportuni[illegible], and [illegible]

ATTRACTIVENESS MAP

2 Use Worksheet 2 to evaluate the atractiveness of each market opportunity, and place each one on the map

AGILE FOCUS DARTBOARD

3 Use Worksheet 3 to design your Agile Focus strategy, and mark it on the dartboard

market opportunity = any combination of application + customer

Use sticky-notes™ to represent each market opportunity

What are we looking for?

application + customer

=

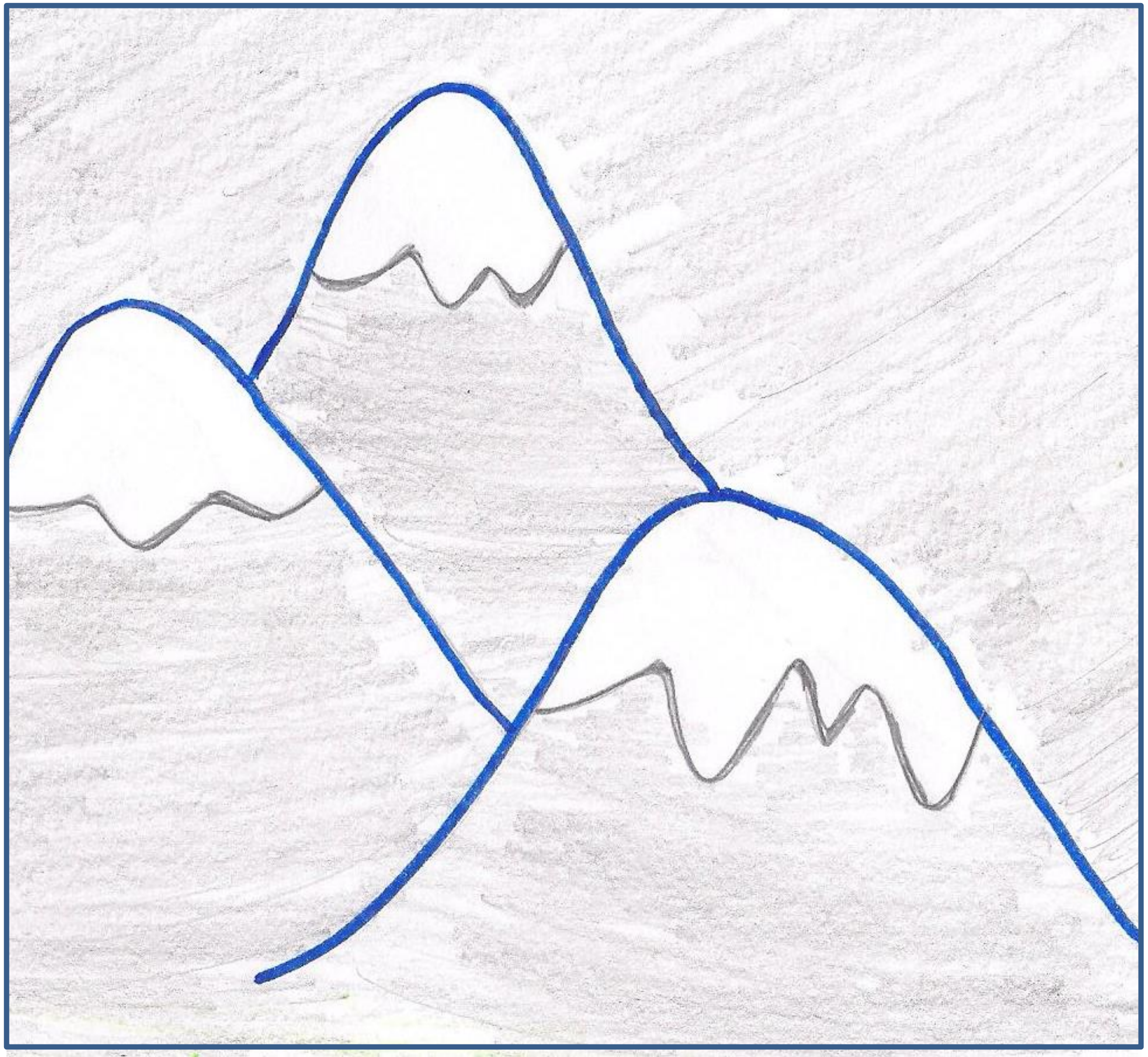
market opportunity

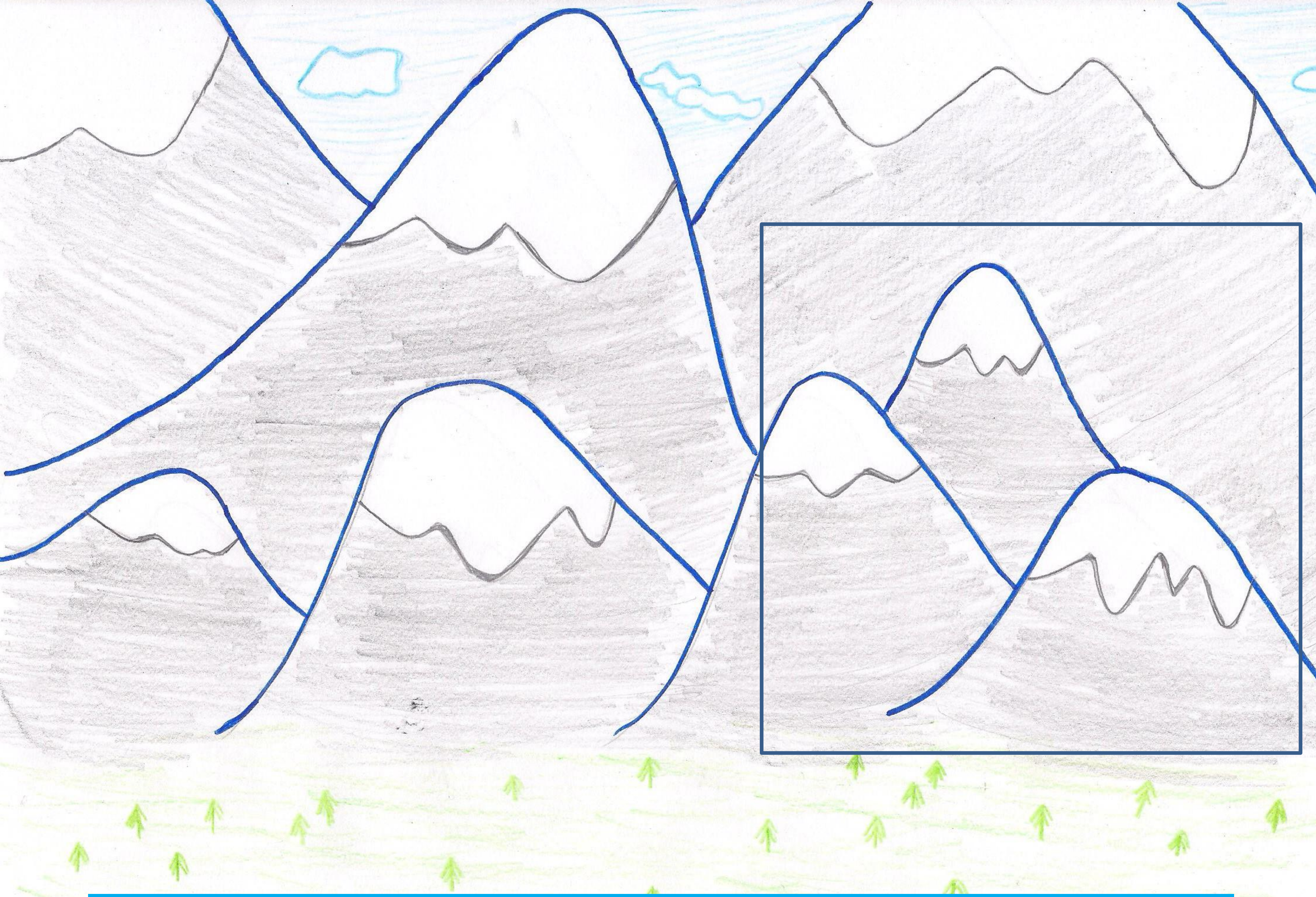
A set of opportunities: Why should we bother?

Options are a real asset!

Image from: https://www.frost.com/brand-and-demand-solutions/strategy-planning/how-to-identify-the-best-market-opportunities-for-business-growth/

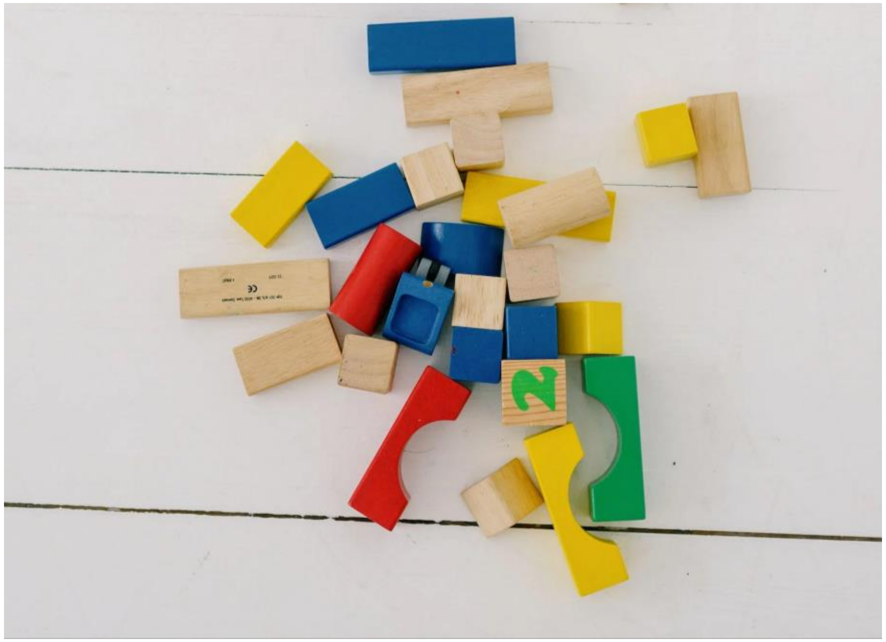
If market opportunities were mountains…





The benefit of seeing the BIG PICTURE

Required: cognitive flexibility



WORKSHEET 1

GENERATE YOUR MARKET OPPORTUNITY SET

NAME

DATE

List the venture's core abilities or technological elements

Characterize them based on their functions and properties. Describe them in a general manner, independent from your (envisioned) product.

ABILITIES

De-linking

Identify your market opportunities

Which applications can you offer with your core abilities? Which customers may need them? Zoom in to further segment each customer group.

APPLICATIONS

CUSTOMERS

application + customer = market opportunity

Place the market opportunities that you would like to evaluate in the Market Opportunity Set.

WORKSHEET 1

GENERATE YOUR MARKET OPPORTUNITY SET

NAME

DATE

List the venture's core abilities or technological elements

Characterize them based on their functions and properties. Describe them in a general manner, independent from your (envisioned) product.

ABILITIES

Identify your market opportunities

Which applications can you offer with your core abilities? Which customers may need them? Zoom in to further segment each customer group.

APPLICATIONS

CUSTOMERS

Re-linking

application + customer = market opportunity

Place the market opportunities that you would like to evaluate in the Market Opportunity Set.

De-linking: Characterizing your unique abilities

What are your main building blocks:

- Core technological elements
- Important know-how about a specific process
- A rare resource that you own etc

These can be based on what you already possess, or on what you are planning to develop.

Describe their main properties or the functions they can perform

This exercise is also important for developing your **cognitive flexibility**

Example: Where to start building our business?

FLYABILITY

WORKSHEET 1

GENERATE YOUR MARKET OPPORTUNITY SET

NAME: FlyAbility

DATE: 2015

List the venture's core abilities or technological elements

Characterize them based on their functions and properties. Describe them in a general manner, independent from your (envisioned) product.

ABILITIES

Unique Accessibility	Aviation Abilities	Imagery System	
Collision tolerance (humans/ walls)	On-site video piloting	HD recording	
Decoupled & light protection cage	Dark/ smoked/ dusty environments	Thermal recording	
Rolls on any surface	Limited flight duration	Real time video streaming	
Operates in a range of temperatures & pressures		Remotely adjustable	
		Post mission analysis	

Identify your market opportunities

Which applications can you offer with your core abilities? Which customers may need them? Zoom in to further segment each customer group.

APPLICATIONS

CUSTOMERS

application + customer = market opportunity

Place the market opportunities that you would like to evaluate in the Market Opportunity Set.

Example: De-linking tech capabilities

FeelIT

WORKSHEET 1

GENERATE YOUR MARKET OPPORTUNITY SET

NAME: FeelIT

DATE:

List the venture's core abilities or technological elements

Characterize them based on their functions and properties. Describe them in a general manner, independent from your (envisioned) product.

ABILITIES

Sensors	Patches	Readouts	
Sense touch and pressure	Flexible & Adherable	Small data volume	
Small and thin	Wearable	Long time measurement	
High resolution	Fully printed	Low power consumption	
	Small or large areas	Extremely accurate & fast	
	Low cost	Adjustable sensing range	
		Wireless solution	

Identify your market opportunities

Which applications can you offer with your core abilities? Which customers may need them? Zoom in to further segment each customer group.

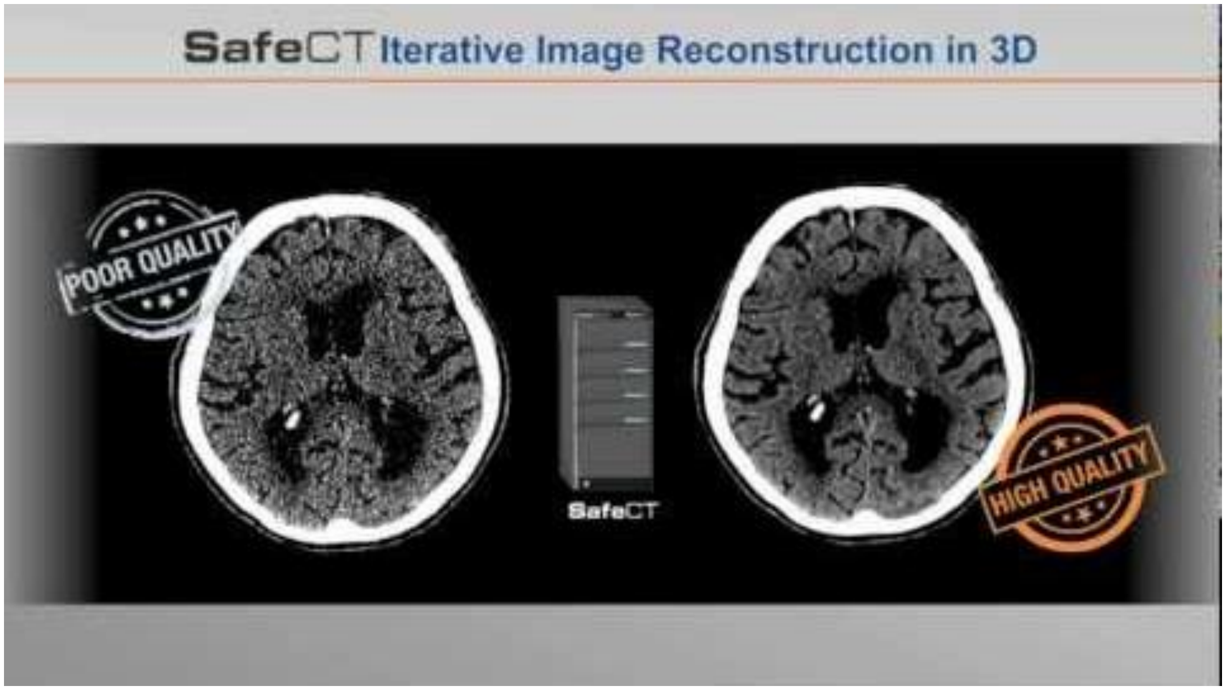
APPLICATIONS

CUSTOMERS

application + customer = market opportunity

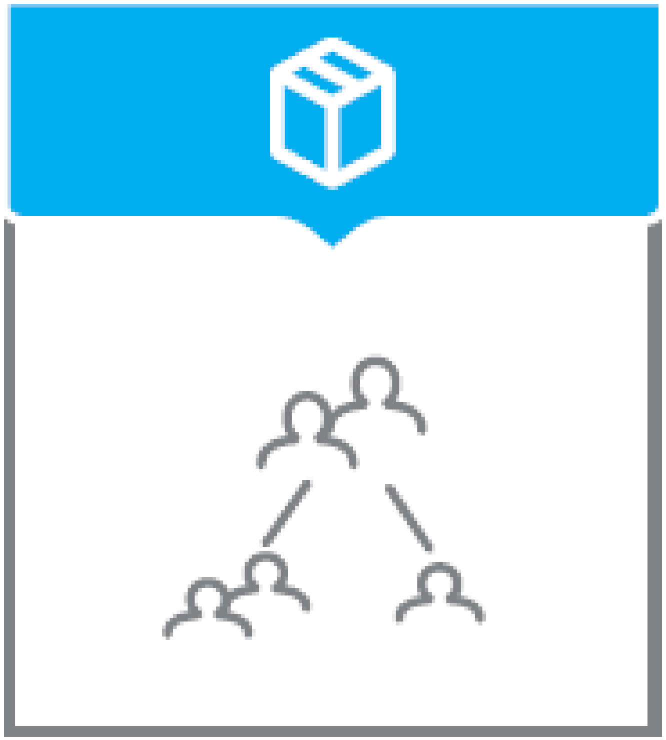
Place the market opportunities that you would like to evaluate in the Market Opportunity Set.

Sometimes one feature can be valuable in itself



MEDICVISION
IMAGING SOLUTIONS

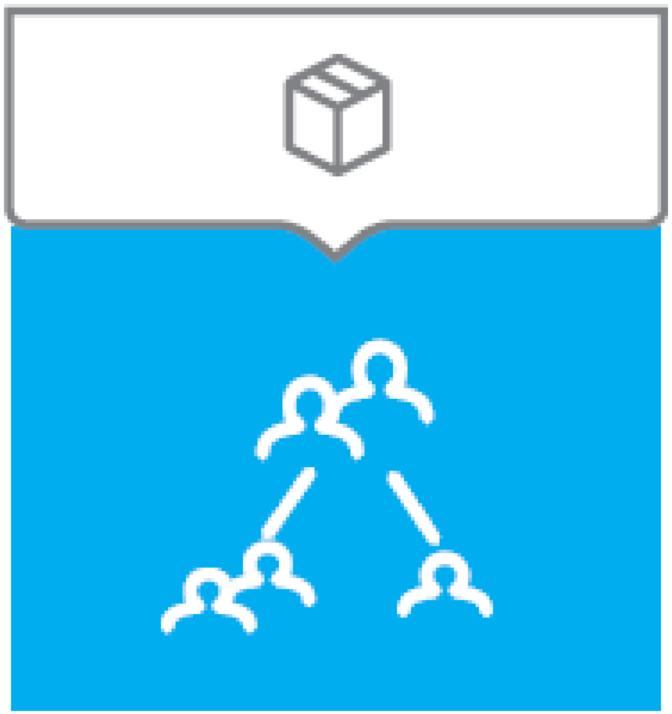
Re-linking: Applications and customers



An application means a specific usage or function, which you can create with your core technologies and abilities.

It can be based on some or on all of the key elements you noted in the upper part of Worksheet 1.
You can also combine your abilities with other complementary technologies…

Re-linking: Applications and customers



As you uncover potential applications, you should also consider who may have the need for them.
These will create your possible segments.

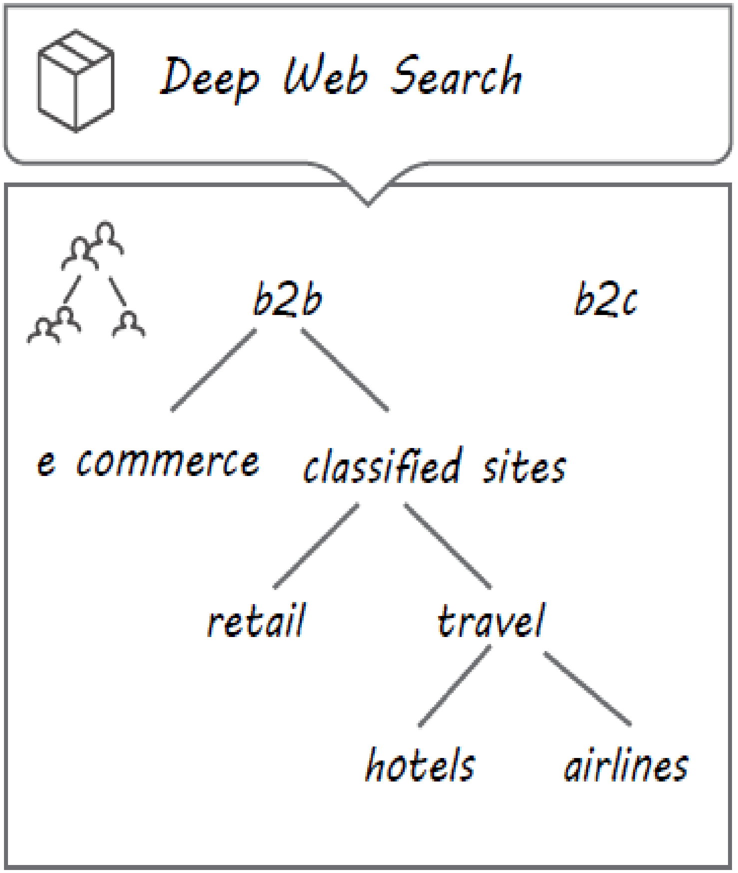
A **market segment** is a group of potential customers who share a common need and are expected to respond in a similar manner to your marketing efforts

Zoom in and out on possible customers

Zoom-in on potential customer segments to identify sub-segments

Zoom-out to identify a broader set of users that may open your mind to other segments

Define your market opportunities so they are not too narrow and not too broad



WORKSHEET 1
GENERATE YOUR MARKET OPPORTUNITY SET

NAME: FlyAbility
DATE: 2015

List the venture's core abilities or technological elements

Characterize them based on their functions and properties. Describe them in a general manner, independent from your (envisioned) product.

ABILITIES

Unique Accessibility
- Collision tolerance (humans/ walls)
- Decoupled & light protection cage
- Roles on any surface
- Operates in a range of temperatures & pressures

Aviation Abilities
- On-site video piloting
- Dark/ smoked/ dusty environments
- Limited flight duration

Imagery System
- HD recording
- Thermal recording
- Real time video streaming
- Remotely adjustable
- Post mission analysis

Identify your market opportunities

Which applications can you offer with your core abilities? Which customers may need them? Zoom in to further segment each customer group.

APPLICATIONS / CUSTOMERS

Industrial Inspection
- Oil & Gas
  - Pressure vessels
  - Storage tanks
- Power plants
  - Thermal boilers
  - Nuclear rooms
  - Wind
- Maritime
  - Vessels
  - Fuel tanks

Infrastructure Inspection
- Open air facilities
  - Bridges
  - Dams
- Indoors facilities
  - Sewers
  - Mines

Security / Search and Rescue
- Intelligence surveillance
  - Police
  - Military
- Rescue forces
  - Fire fighters

application + customer = market opportunity

Place the market opportunities that you would like to evaluate in the Market Opportunity Set.

Initial screening of your market opportunities

Key questions you can ask for an initial screening:

Does the customer need exist?

Can we really satisfy the customer's need, using our unique abilities, and better than existing solutions?

Are there severe restrictions that would hinder us from executing on this market opportunity?

Will this opportunity be in conflict with any of our core values?

WORKSHEET 1

GENERATE YOUR MARKET OPPORTUNITY SET

NAME: FlyAbility

DATE: 2015

List the venture's core abilities or technological elements

Characterize them based on their functions and properties. Describe them in a general manner, independent from your (envisioned) product.

ABILITIES

Unique Accessibility	Aviation Abilities	Imagery System	
Collision tolerance (humans/ walls)	On-site video piloting	HD recording	
Decoupled & light protection cage	Dark/ smoked/ dusty environments	Thermal recording	
Roles on any surface	Limited fly duration	Real time video streaming	
Operates in a range of temperatures & pressures		Remotely adjustable	
		Post mission analysis	

Identify your market opportunities

Which applications can you offer with your core abilities? Which customers may need them? Zoom in to further segment each customer group.

APPLICATIONS

CUSTOMERS

Industrial Inspection

- Oil & Gas
  - Pressure vessels
  - Storage tanks
- Power plants
  - Thermal boilers
  - Nuclear rooms
  - Wind
- Maritime
  - Vessels
  - Fuel tanks

Infrastructure Inspection

- Open air facilities
  - Bridges
  - Dams
- Indoors facilities
  - Sewers
  - Mines

Security / Search and Rescue

- Intelligence surveillance
  - Police
  - Military
- Rescue forces
  - Fire fighters

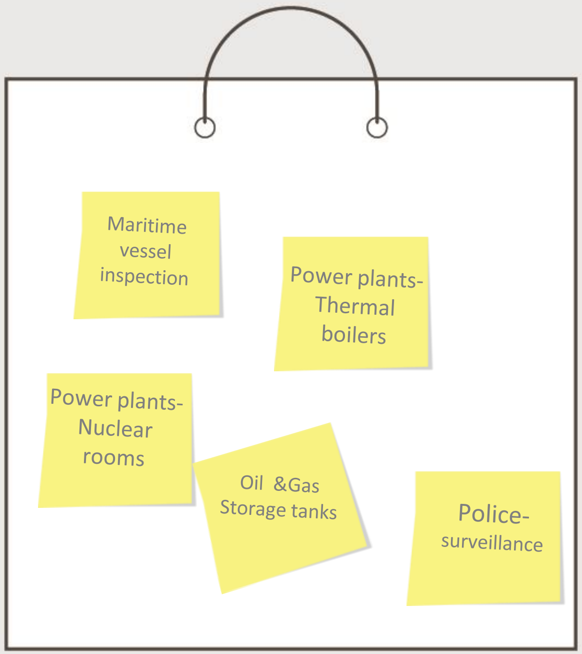
application + customer = market opportunity

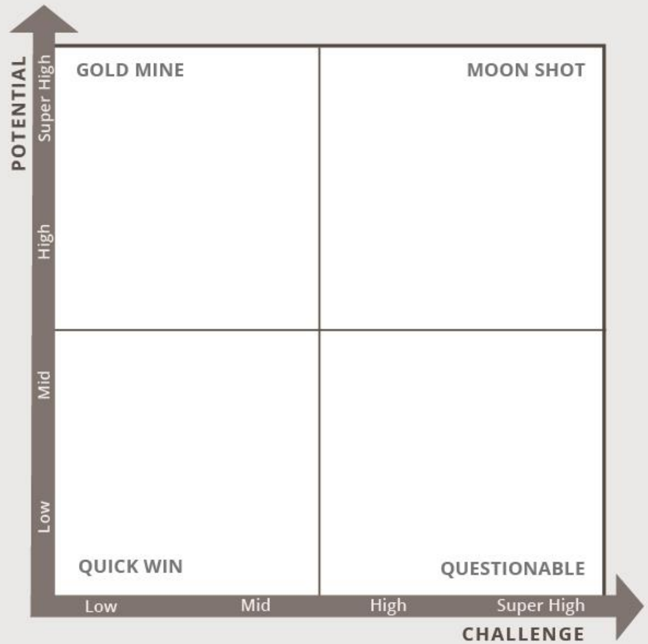
Place the market opportunities that you would like to evaluate in the Market Opportunity Set.

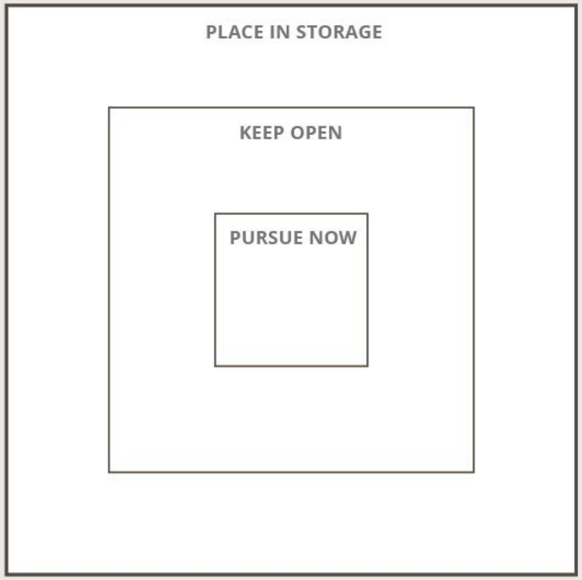
THE MARKET OPPORTUNITY NAVIGATOR

NAME: FlyAbility

DATE: 2015







MARKET OPPORTUNITY SET

1 Use Worksheet 1 to identify potential market opportunities, and place them in the set

ATTRACTIVENESS MAP

2 Use Worksheet 2 to evaluate the atractiveness of each market opportunity, and place each one on the map

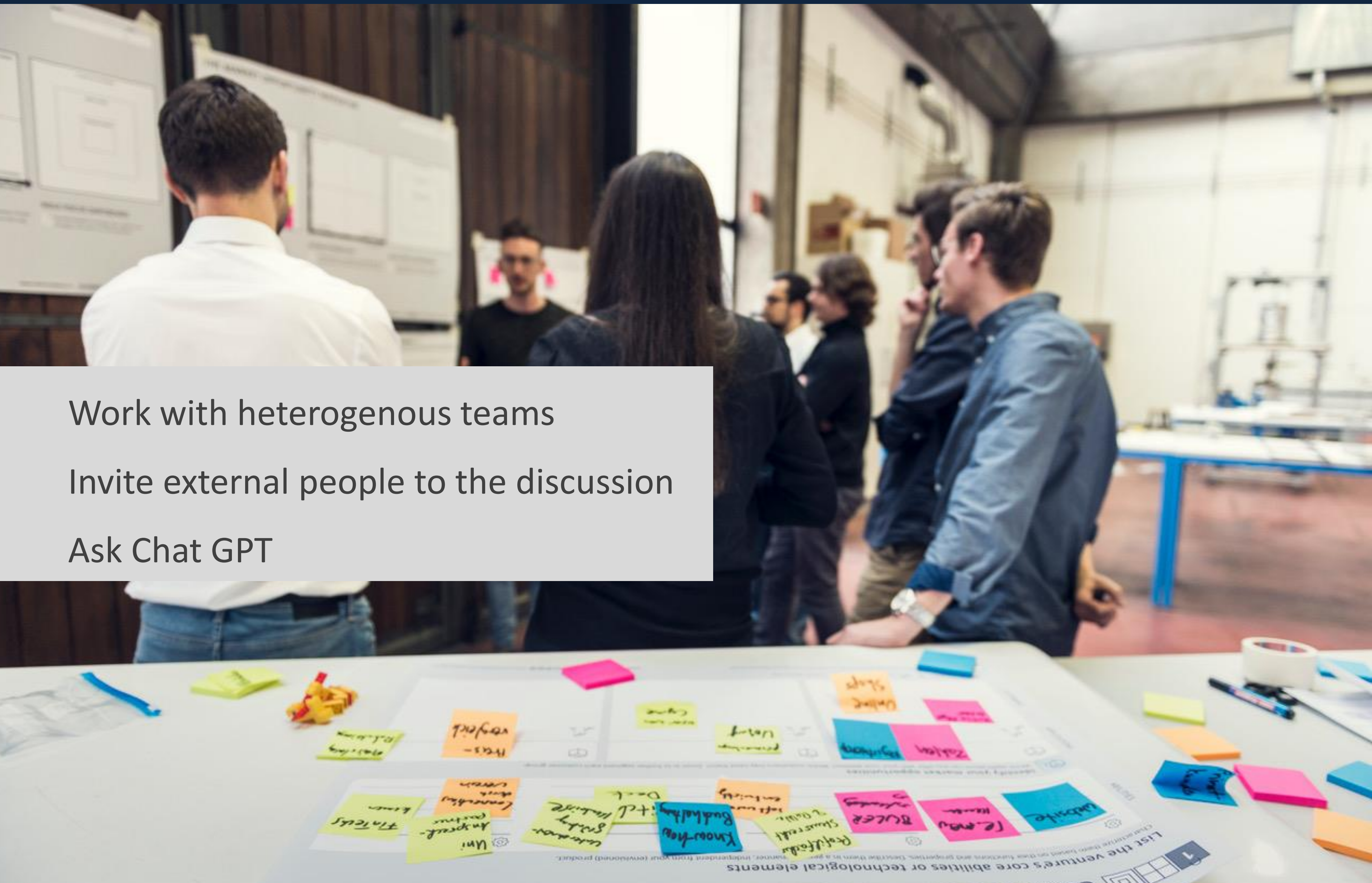
AGILE FOCUS DARTBOARD

3 Use Worksheet 3 to design your Agile Focus strategy, and mark it on the dartboard

market opportunity = any combination of application + customer

Use sticky-notes™ to represent each market opportunity

Tips to improve opportunity discovery

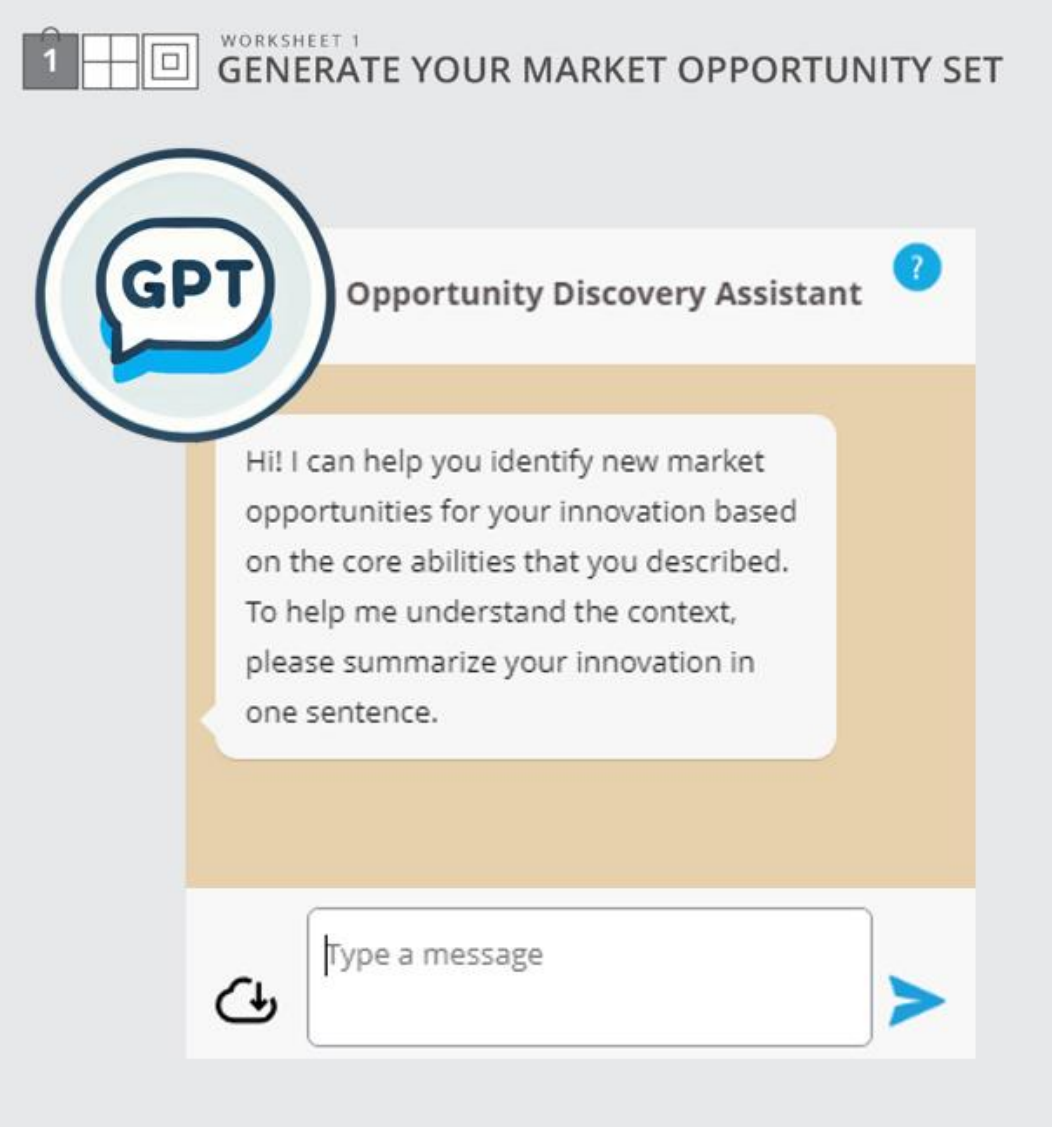


Work with heterogenous teams

Invite external people to the discussion

Ask Chat GPT

Try the Opportunity Discovery Assistant on the web-app



Not only tech…consider competences more widely!

Low tech

Services

People

Questions?

Now its your turn

Apply Worksheet 1:

- ✓ List and characterize your core technological elements/ unique know-how
- ✓ Brainstorm on different applications stemming from these abilities, and different customer segments who may need it

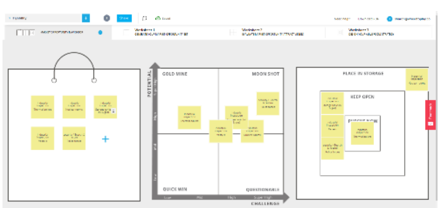
Deliverables:

- ✓ Upload the filled Worksheet 1 on Moodle (under Session 1)
- ✓ Be ready to present it in tomorrow's Share & Learn session

Work in any format you prefer

Download the worksheets
(available on Moodle)

Use the PPT template
(available on Moodle)



Sign up to the free web-app
https://app.wheretoplay.co