STRATEGY CARDS

ARE ABOUT:

Value proposition
Market strategy
Marketing & Branding
Pricing & funding

ARE A SUPPORT FOR:

Differentiation
Market positioning
Branding aspects
Business models

S

BRANDING

Which message does the product/brand want to convey?

Example:
Young and sporty
Technical and medical
...

01 S STRATEGY

PARTNERS

Who could/should become partner of the product system?

Example:
An insurance company could lower the fare of fitness tracker users that complete specific achievements

02 S STRATEGY

CHANNELS

Which channels will you use to reach your customers?

Examples:
Presence in physical store
Brand website
E-commerce website
Instagram channel
...

03 S STRATEGY

VALUE PROPOSITION

In one statement, explain why your customers should use your product

Example:
This Toolkit (product) helps multidisciplinary teams (customers) who want to design IoT products (jobs to be done) by reducing complexity (reduce/avoid customer pain) and enabling discussion (increase/enable customer gain)

04 S STRATEGY

REVENUE STREAMS

How will the product generate revenues?

Examples:
One-time product purchase
Usage fee
Subscription to a service
Lending/ renting / leasing
Licensing
Advertising
...

05 S STRATEGY

PRICING

How much should the product cost?

Examples:
Price range of 150-200€
Less than 100€
...

06 S STRATEGY

HOW TO USE THE CARDS?

HORIZONTAL SIDE
Introduces a topic with a key question and examples

VERTICAL SIDE
Deepens the topic with additional "what if" questions

You can use the cards for different structured activities: download the Activity Guides at mappingtheiot.polimi.it

- STRATEGY
- USER & CONTEXT
- DESIGN
- INTERACTION
- TECHNOLOGY
- EXPERIENCE
- MEANING

WHAT IF YOU

... focused on branding?

What are the values and beliefs of the brand?
How do you want your customers to feel about the product/brand?
What kind of emotions should the product/brand evoke?
What adjectives would you use to describe the product/brand?
What will be the product's name?
Will it be consistent with the product's mood?
Will it be consistent with the product's purpose?
Will it stand out among competitors?
Will it be easy to remember and pronounce?
Will you define a style guide to create a consistent image?

STRATEGY S 01

WHAT IF THE PRODUCT

...was in partnerships with other companies and services?

Who would be a great partner?
What will you get from this partnership?
What can you offer to your partner?
Will the parnership give life to a new service?
Will the partnership augment an existing one?
How will the partnership create value?
Will you get in touch with new customers?
Will you enter in new markets?

STRATEGY S 02

WHAT IF YOU

...focused on channels?

What might be the best channels to sell your product?
What might be the best channels to advertise it?
What might be the best channels to engage with your target users?
What channels will your target users prefer?
What kind of content/media will you offer?
Will the content be different for every channel?
How will your brand/product remain consistent?

STRATEGY S 03

WHAT IF THE PRODUCT

...focused on the value proposition?

Which will be the 3 main functions of the product?
What user pain points will it solve?
What tasks are users trying to complete?
How will it improve their situation?
What specific benefits will it deliver?
Will the benefits be quantifiable?
What will make your offer unique and different?
How will it be better than its competitors?

STRATEGY S 04

WHAT IF YOU

...focused on revenue streams?

What will customers have to pay for?
How will they pay?
Will users buy the product?
Will users pay to use it?
Will users own the product?
Will users rent the product?
Will users subscribe to a service?
Will they pay for premium services?
Will the product have different revenue streams?
How big will the different revenue streams be?

STRATEGY S 05

WHAT IF THE PRODUCT

...had a different price?

Will users buy the product?
Will there be service fees?
How much will customers be willing to pay?
How much will they expect to pay for this kind of product?
Will the product be more expensive than its competitors? Will it be cheaper?
How will price impact on the design of the product?
How will price impact on CMF choices (colour, materials, finishings)?
How will price impact on the selection of technical components?

STRATEGY S 06

COST STRUCTURE

What will be the most important costs in your business model?

Examples:
Hardware manufacturing
App development
...

07 S STRATEGY

TARGET MARKET

What is the target market of the product?

Examples:
A Business-to-Consumer application
A Business-to-Business solution
A product for the Chinese market
...

08 S STRATEGY

CUSTOMER SEGMENTS

Who are your most important customer groups?

Examples:
Budget travelers
Locals that want to rent out a room
Developers that want to use the app data
...

09 S STRATEGY

KEY RESOURCES

What are the most important assets to make your business work?

Examples:
Manufacturing plant
Brand strenght
A good multidisciplinary team
Venture Capital funding
...

10 S STRATEGY

KEY METRICS

What are the key activities that you should track to measure success?

Examples:
N° of new followers on social media
N° of vocal interactions with the product
N° of positive user reviews
N° of purchases made online
...

11 S STRATEGY

USER & CONTEXT CARDS

ARE ABOUT:

Target users
Needs & Behaviors
Context of use
Scenarios

ARE A SUPPORT FOR:

Defining user groups
Doing user research
Exploring personas
Exploring scenarios

U/C

STAKEHOLDERS

Which are the stakeholders* of your product/system/service?
Create an "**Actors map**"!

*A Stakeholder is an individual, group or organization who is impacted by the outcome of a project

Example:
For a coffee shop: guests, employees, owner, municipality, neighbours ...

01 U/C USERS & CONTEXT

NICHE VS MASS

Does your product target a specific niche or a less specific group of users?

Examples:
People allergic to gluten or lactose intolerant
People that want to lose weight
...

02 U/C USERS & CONTEXT

WHAT IF YOU

...focused on costs?

Where will your money get spent?

Which key activities will represent a significant expense? (e.g. manufacturing, distribution)

Which key resources will represent a significant expense? (e.g. the app, the software ...)

Which will be the most expensive parts to manufacture?

Will you have fixed costs? (e.g. salaries, rent)

Will you have variable costs? (e.g. depending on quantities)

07 S STRATEGY

WHAT IF YOU

...focused on customer segmentation?

Will there be different customer groups?

Will they have different needs?

Will they use the same functions and services?

Will they pay for the same features?

Will they use the same channels? (e.g. physical store or e-commerce)

Who will be the most profitable customer group?

Will they be a niche market?

09 S STRATEGY

WHAT IF YOU

...focused on key metrics?

Which metrics would help to track the usage of your product?

Which metrics would help to identify potential issues?

Which metrics would help to track user engagement?

Which metrics would help to reach your strategic objectives?

What key activities will you need to monitor and quantify? (e.g. n° of app downloads, n° of active users)

Which metrics will be your priority?

11 S STRATEGY

WHAT IF YOU

...focused on mapping the stakeholders?

What will be the main user groups?

What will be the relationships between different user groups?

When will different groups communicate with each other? Why and how?

Who will buy the product?

Who will use it more?

Will they have different/similar needs?

Will they use different/similar functions?

To whom will the product be advertised?

01 U/C USERS & CONTEXT

WHAT IF THE PRODUCT

...was positioned in a different market?

Would the product be more valueable?

Would the product be more competitive?

Would a different market have an impact on the aesthetics of the product?

Would a different market have an impact on the product's functions?

Will the product be a Business-to-Consumer (B2C) solution?

Will the product be a Business-to-Business (B2B) solution?

Will the market be geographycally/ culturally defined? (e.g. a product for the Italian market)

08 S STRATEGY

WHAT IF YOU

... focused on key resources?

What would be your key physical resources? (e.g. raw materials, machinery, technology, buildings...)

What would be your key intellectual resources? (e.g. brand strenght, copyrights and patents, partnerships, knowledge...)

What would be your key human resources? (e.g. employees, sales assistants, developers...)

What would be your key financial resources? (e.g. available capital and funds...)

10 S STRATEGY

HOW TO USE THE CARDS?

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WHAT IF THE PRODUCT

...was for a specific user niche?

What niche of users could be interested in it?

Will they have specific needs?

Will they have more "general" needs?

Will they need more/less functions?

Will they need premium features?

What kind of performance will they require? (e.g. professional, basic functions?)

Will the product design be affected?

Will the materials' choice be affected?

Will interaction be affected?

What will be the main competitor products?

02 U/C USERS & CONTEXT

DIRECT AND INDIRECT USERS

Who are the direct and indirect users of the product?

Example:
For a smart dog collar, the direct user is the dog, the indirect user is the owner

03
U/C
USERS & CONTEXT

KNOW YOUR USERS

What do your users have in common?
Create user **Personas***!

*A user persona is a specific, but brief, description of an individual user.

Example:
Amy is a "millennial" living in Milan, loves travelling, she's planning a trip alone in Japan, backpacking

04
U/C
USERS & CONTEXT

NEEDS

What are the core needs that the product tries to fulfill?
Sketch your **User Journey***!

**A user journey is the pathway for the user to complete a goal in a given context.*

Example:
How does the user control the room temperature?

05
U/C
USERS & CONTEXT

EXPECTATIONS

What features do your users expect from your product?

Examples:
They expect it to be waterproof
They expect it not to get stained easily
They expect the battery to last at least 1 day
...

06
U/C
USERS & CONTEXT

CULTURAL DIMENSION

Are there any specific cultural aspects* that your product must take into account?

**Culture defines values, behaviors, orientation, taste ...*

Examples:
Different countries, regional/ethnical aspects, religious, linguistics, genders, age and generation, education ...

07
U/C
USERS & CONTEXT

IDEAL, TARGET CONTEXT

Where do you expect that the product will be used?

Examples:
At home
In the shower
"On the road"
...

08
U/C
USERS & CONTEXT

EXTREME SCENARIO

What would be an extreme usage scenario?

Examples:
Using the product for many consecutive hours
Multiple users interacting with the product
No Internet connection

09
U/C
USERS & CONTEXT

DESIGN CARDS

ARE ABOUT:

Design principles
Design details
Functions & materials
Shape & aestethics

ARE A SUPPORT FOR:

Being inspired
Concept generation
Defining priorities
Evaluating alternatives

D

WHAT IF THE PRODUCT

...was addressed to different direct and indirect users?

Who will use it more frequently?

Who will use it for a longer time?

Will they use the same functions?

Who will buy it?

Who will wear it?

Who will be monitored?

Who will access/visualize data?

How will the interface be influenced?

Will direct/indirect users interact through the product? (e.g. a pet camera that lets users play with their cat when they are not home)

03 U/C

USERS & CONTEXT

WHAT IF YOU

...focused on your users' needs?

What kind of task will users want to complete?

What kind of objective/outcome/goal will users want to reach? (e.g. peace of mind of knowing that your baby isn't crying)

What will be the most relevant "pain points" with the current situation?

What will be your **user journey**?

Which will be the most relevant moments in the journey?

How will you find out your users' needs? (e.g. user interviews, digital ethnography)

Which kind of existing data will you find? (e.g. existing reports)

Will you directly interview and observe users?

How will you test your assumptions?

05 U/C

USERS & CONTEXT

WHAT IF THE PRODUCT

...was influenced by specific cultural aspects?

What peer group will your user/persona belong to? (e.g. soccer fans in Italy)

Will culture influence the way people interact with the product? (e.g. different rituals)

Will culture influence the visual design of the product? (e.g. color, materials, symbolism)

Will culture influence the way data are displayed? (e.g. public display VS private display)

What behavior could make the product feel inappropriate/ackward/rude? How can it be avoided?

07 U/C

USERS & CONTEXT

WHAT IF THE PRODUCT

...was used in an extreme scenario?

What would be the worst usage scenario for the product?

How likely will this scenario occur?

What could you do to mitigate/avoid a it?

Could the product be damaged? (e.g. by rain)

Could the product be dangerous if misused?

What is the worst mistake that users could do?

Will users need to be informed about it?

09 U/C

USERS & CONTEXT

WHAT IF YOU

...focused on your users' characteristics?

Will they be in the same demographic group? (e.g pre-schoolers, teenagers, 25-30-year-old ...)

Will they be in the same geographic area? (e.g. country, state, city, neighbohood)

Will they have a similar lifestyle? (e.g. vegans)

Will they have similar physical characteristics? (e.g. being taller than 1.90m, wearing glasses)

Will they share similar values/beliefs/interests?

Will they share similar skills/knowledge?

Will they have a common problem/issue? (e.g. bike theft)

Will they share similar habits/behaviors? (e.g. going to gym twice a week)

04 U/C

USERS & CONTEXT

WHAT IF YOU

...focused on what users expect from your product?

What are the minimum/basic functions that users will expect? (e.g. at least: set an alarm)

What kind of performance will they expect? (e.g. a medical device should be extremely precise)

What kind of features will they expect from the physical product? (e.g. scratch resistant screen)

What kind of features will they expect from the software/app perspective? (e.g. be compatible with their smartphone)

Which features will have the most impact? (assign priorities, don't "overdesign")

How could you reduce your idea to the bare minimum? (minimum viable product)

06 U/C

USERS & CONTEXT

WHAT IF YOU

...focused on the product's ideal use context?

Where will users most definitely interact with the product?

Where will users probably interact with the product?

What would be the most ideal "use scenarios" for the product? (e.g. user is relaxing on the sofa)

Will the context impact on the user's attention span? (e.g. while in a hurry catching the train)

What if the product was used in a different context?

What if it was used in a public or private context? (e.g. with other people or alone)

What it was used in a context without internet connection?

08 U/C

USERS & CONTEXT

HOW TO USE THE CARDS?

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STANDALONE VS PARASITE

Is the product standalone or a parasite*?

**A parasite (add-on) is an element to be applied on existing products*

Example:
A smart bottle is a standalone product;
A smart tap that can be applied on every bottle is an add-on "parasite"

01 D DESIGN

WEARABLE

Can the product be worn?

Examples:
Bands, smart clothes, brooches, necklaces ...

02 D DESIGN

TRADITIONAL OR UNUSUAL SHAPE

In relation to the function of the product, is its shape traditional/expected?

Or is it unusual/unexpected?

Examples:
A smart cup that looks like a cup is expected
A connected camera shaped like an animal is unexpected

03 D DESIGN

SHAPE AFFORDANCE

Does the product shape suggest its function?

Examples:
The product is a simple button without any label, users know that they will have to push it but it is not clear what it will switch on.

04 D DESIGN

COLLECT DATA

Does the product have sensors?

Does the product collect data?

Example:
A lamp that uses weather data and an embedded light sensor to create light scenarios

05 D DESIGN

USE & EMBODY DATA

Which data will the product use?

Will the product be the physicalization of digital content?

Examples:
A physical Facebook "Like counter" uses Facebook APIs to display the number of Likes that a specific page has.

06 D DESIGN

STYLE AND PERSONALITY

Does the product have a clear style and personality?

Create a **Moodboard***!

**A moodboard is a visual collage of images, text, materials. It can be used for inspiration, for presentation, and as a design tool to share ideas with your team*

07 D DESIGN

MATERIAL EXPERIENCE

What materials will the product be made of?

What impact will the materials choice have on the user experience?

Example:
For this product, white glossy plastic will be perceived as cheap. Fingerprint-resistant finishing is seen as premium

08 D DESIGN

WHAT IF THE PRODUCT

...was an add-on?

Will it be applied on an existing expensive product?

Will it augment the functions of the existing product?

Will it offer new functions or services?

Will it change the user experience?

Will it appeal more users?

Will it be used in different contexts?

Will it have a different aestethics?

Will it be hidden or visible/highlighted?

Will it be made of different materials?

Will it help in saving resources?

01 D DESIGN

WHAT IF THE PRODUCT

...had a traditional or unexpected shape?

What shape do these products usually have?

What materials do these products usually use?

What will the product resemble?

Will it be evident that the product is smart?

Will shape and function be correlated?

What will users expect by looking at the product?

Will users need to learn how to use it?

Will the product be interactive?

Will it need to display information?

03 D DESIGN

WHAT IF THE PRODUCT

...collected data?

What kind of data?

How will data be collected? (e.g. sensors, usage data, data generated by users)

How will data be used?

Why will this data be relevant?

Who will benefit from this data?

Will the product react/behave according to the collected data?

Will the product "learn" from the collected data?

How will data be visualized?

Who will/could see the data? When?

How will the product shape affect data gathering?

Will users know that the product is collecting data? Will they know how data is used?

05 D DESIGN

WHAT IF YOU

...made a moodboard of your product?

If you had to choose 3 words/adjectives that the product should communicate, which would you choose? (e.g. playful, hygienic, soft, premium...)

What mood should the product elicit?

Which images could you select to describe this "mood" and values? (e.g images of existing products)

Which shapes would better express these concepts?

Which materials would better evoke them?

Which textures and finishings?

Which colour palette?

07 D DESIGN

WHAT IF THE PRODUCT

...could be worn?

Could it cause discomfort?

Will it be made of a bio-compatible/comfortable material?

Will it need to be worn for a long time?

Will it be hidden or visible when in use?

Will it be stylish to wear?

Will it allow personalization?

Will it get dirty/worn out?

Will it be easily lost/stolen?

Will it gather data?

Will the battery last for the intended use time?

02 D DESIGN

WHAT IF THE PRODUCT

...had a strong shape affordance?

How important will shape affordance be for this product?

Will it be easy to understand what the product is?

Will it be easy to understand what it does?

Will it be easy to understand how to use it?

Even by people with different physical abilities?

Even by people that speak a different language?

Even by people that share a different culture?

Will the product use colors with a meaning? (e.g. red = bad, green=good)

Will the product use explanatory icons?

Will the product use explanatory text?

04 D DESIGN

WHAT IF YOU

...focused on how the product uses data?

What kind of data will be used? (e.g. from sensors, from third party APIs ...)

Will the product use data to improve in time?

Will data be visualized? How?

Will the product react to data?

How? (e.g. by changing colour, shape ...)

Will a digital content/service be made tangible? (e.g. press a tangible button to order something online)

Will this physicalization create a new service?

06 D DESIGN

WHAT IF YOU

... focused on the material experience?

Which adjectives/emotions should the product elicit? (e.g. premium feeling)

Which physical properties should the product have? (e.g. water resistant)

Which materials and finishings would better express these requirements?

Will materials influence the interaction with the product? (e.g. a glass product must be handled with care)

How will the product surface feel? (e.g. rough/smooth, warm/cold, soft/hard, flexible/rigid ...)

Visually, how will the material be? (e.g. gloss/matte, opaque/transparent ...)

08 D DESIGN

PRODUCT PRESENCE

What presence will the product have in the environment?

Examples:
It will be mainly on display
It will usually be hidden in a cabinet
It will have a fixed position in the house
It will be moved around frequently

09 D DESIGN

PRODUCT AS A SERVICE

How central to the service is the physical device?

Examples:
For a smart thermostat, the device is the center of the experience for the user.
When a user buys a smart alarm system, the service itself may be more important than the devices

10 D DESIGN

UPDATES AND OBSOLESCENCE

Will the product be updated/upgraded?
What will be its life expectancy?

Examples:
A software update may offer a new function
If a specific service is not supported anymore, the product may stop working

11 D DESIGN

PERSONALIZATION

What could users personalize?

Examples:
Personalize settings, visualizations
Personalize product behaviors
Customize the aestethic and dimensions

12 D DESIGN

DESIGN FOR ALL

Is the product designed with an inclusive approach, with accessibility in mind?

Examples:
Color-contrast to assist those with visual problems
A barrier free ramp for wheelchairs

13 D DESIGN

MODULARITY

Is the product modular?
Does it exploit modularity?

Examples:
A smart sock may need to provide different sizes
A smart watch may have different accessories

14 D DESIGN

INTERACTION CARDS

ARE ABOUT:

Physical + digital
Inputs & outputs
Touchpoints
Behaviors

ARE A SUPPORT FOR:

Defining touchpoints
Interaction flow
Finding usability issues
Interface strategy

I

MACHINE TO MACHINE

Is interaction mainly Machine to Machine?

Example:
Objects interacting with other objects automatically, without the need of human intervention.

01 I INTERACTION

WHAT IF YOU

...focused on the product presence in the environment?

How important will aestethics be for the product?

Will this impact the product shape?

Will this impact the product CMF? (colours, materials, finishings)

Will the product have a fixed position in the environment? (e.g. yes, because it requires wiring)

Will it usually be visible/ on display?

Will it usually be hidden/ stored away?

Will it usually be moved around?

How will it be charged?

09 D DESIGN

WHAT IF YOU

... focused on the product's upgrades and life cycle?

Which functions could be added in the future thanks to software over-the-air updates?

Will these functions need additional hardware components?

Will the product be physycally upgraded/ need replacements?

What could extend/shorten its life cycle?

What likely could cause the product end-of-life?

For how long the product/service will be supported? (e.g. with updates)

Will the product be obsolete even if perfectly functioning?

11 D DESIGN

WHAT IF THE PRODUCT

...was *"designed for all"*?

Will it be designed for inclusion?

Will it be equally usable by people with different needs/abilities? (e.g. physical impairments, age)

Will the product allow flexibility? (e.g. customize settings, left/right hand use...)

Will it be simple and intuitive to use? (e.g. reduce complexity, provide feedback)

Will it consider people with different physique/ measures?

Will the most important information be easily perceptible? (e.g. legibility)

Will the product tolerate and minimize possible mistakes?

13 D DESIGN

HOW TO USE THE CARDS?

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WHAT IF THE PRODUCT

... offered a service?

What will be the role of the product in the service? (e.g. central role)

Will there be other touchpoints to access the service? (e.g. an app, a dashboard, other products)

Compared to other touchpoints, which different functions will the product offer?

Could the product be completely replaced by an app? Why?

Will users need to buy the product?

Will the product follow a sharing, pay-per-use or leasing approach?

10 D DESIGN

WHAT IF THE PRODUCT

...could be personalized?

Will it be personalized before the purchase?

Will personalization be physical? (e.g. different bands for a smartwatch)

Will the product's behavior be personalized?

Will the interface be personalized?

Will it offer personalized data visualizations?

Will the product automatically recognize users and their preferences?

Will the product behave differently based on the context?

Will the product offer personalized suggestions/ content to the users?

12 D DESIGN

WHAT IF THE PRODUCT

...was modular?

Will modularity be employed for aestethic reasons? (e.g. different product "skins")

Will modularity be employed to add/change functionalities? (e.g. different product "heads" provide different sensors)

Will modularity be employed to simplify the manufacturing process? (e.g. less components)

Will the product be part of a line/family?

Will there be modularity among the product line?

Will there be different accessories? (eg. different bands for a smartwatch)

Will there be modularity among different sizes?

14 D DESIGN

WHAT IF THE PRODUCT

...way of interaction was mainly Machine to Machine?

Which objects will be connected?

Will the objects communicate automatically?

Will the system require human intervention?

Will the product serve for monitoring purposes? (e.g. remote monitoring, smart meters)

Will the product serve for automation purposes?

Will the product control other objects?

Will the product produce data used by other objects?

Will communication be one-way or back and forth?

01 I INTERACTION

HUMAN TO MACHINE

Is interaction mainly Human to Machine?

Example:
A smart door lock. The main focus is designing the interaction and interface between the product (Machine) and the user (Human)

02

I

INTERACTION

HUMAN TO HUMAN

Is interaction mainly Human to Human?

Examples:
A smart video intercom
The products connects people together
Users interact with other people by using the product

03

I

INTERACTION

INTERACTION JOURNEY

How will users interact with the product?
What will be the most important touchpoints?
Let's describe the **User Journey**!

Example:
The user puts a plate in the smart oven; suggestions are displayed; an option is selected; oven starts; user receives a notification then dinner is ready

04

I

INTERACTION

FREQUENCY & DURATION

With what frequency is the product supposed to be interacted with? For how long?

Examples:
Should be worn everyday, all day
Should be used in the morning to check sleep data
Should be accessed only when the user is notified

05

I

INTERACTION

INTERFACES

How many interfaces will the user interact with? Which kind of interfaces?

Examples:
User can directly interact with the product;
User will interact through an external interface, like a smartphone screen, a dashboard, a website

06

I

INTERACTION

APP

Does the product have one or more apps?
What is the role of the app?

Examples:
It has one app, which is the main way to control the device functions and behavior;
The app is mainly used to visualize data

07

I

INTERACTION

CONSISTENT AND SEAMLESS

Is interaction consistent among all the elements of the product system?

Example:
Interacting with the tangible product and with the app is similar. It offers the same functions, with the same icons, look-and-feel. Data are synchronized.

08

I

INTERACTION

NOTIFICATIONS

Will users need to be notified by the product? About what?
How will notifications be?

Examples:
When the battery is low a red LED will light up
Every morning, app notification with your sleep data
Vibration when you receive a phone call

09

I

INTERACTION

WHAT IF THE PRODUCT

...way of interaction was mainly Human to Machine?

Will the product always interact with the same user?

Will users always interact with the same product?

Will the product be used by more users at the same time?

Will it be personal or shared?

Will users tangibly interact with the product?

Will users remotely interact with the product?

02

INTERACTION

WHAT IF YOU

...focused on the user's journey interacting with the product?

What will be the most relevant moments?

What will be the sequence of actions required to complete a specific task? A **Storyboard** may help!

Could this sequence be changed or interrupted?

What actions and gestures will users perform?

Will tangible interaction be needed? (e.g press buttons, rotate dials ...)

Will digital interaction be needed? (e.g. app use)

Will touchless interaction be needed? (e.g. voice interaction, gesture recognition)

What kind of feedback will the product provide?

04

INTERACTION

WHAT IF THE PRODUCT

...had more interfaces?

What will be the main functions of each UI?

What will be the main data to be visualized/ interacted with?

How should users interact with it? Let's represent it in a **Flow Diagram**!

Will interfaces be tangible or digital?

Will interfaces be internal or external?

Could interfaces be personalized?

06

INTERACTION

WHAT IF THE PRODUCT

...design and interaction was consistent across different elements?

Will the functions be accessed in a similar way?

When will data be synchronized?

Will users receive feedback about data synchronization? (e.g. "last checked 25 min. ago)

Will the visual mood and palette be consistent?

Will the same words be used? (e.g. "sleep mode")

Will symbols and icons be consistent?

08

INTERACTION

WHAT IF THE PRODUCT

...mainly supported Human to Human interaction?

Will the product connect people together?

Will people interact with each other by using the product?

How many people will interact?

Why will they interact?

How will they interact? (e.g. *voice,* motion ...)

Will they interact directly?

Will they interact in real time?

Will people be geographically close or far away?

Will they know each other?

03

INTERACTION

WHAT IF YOU

...focused on the lenght and duration of user interaction?

On average, how frequently will the product be used?

On average, for how long will interaction last?

Will different functions/tasks require different time lenght/frequency?

Will the product need to be constantly switched on? (e.g. for monitoring purposes)

When will the product require user attention?

05

INTERACTION

WHAT IF THE PRODUCT

...had at least an app?

How important is the app for the user? (e.g. it is the only way to interact with the product)

Prioritize: which features will users appreciate more?

When will the app be used?

Which functions will be only accessible through the app?

Will the product be used even without the app?

Will each user need to install the app?

07

INTERACTION

WHAT IF THE PRODUCT

... sent notifications?

Which notifications will be relevant for the user?

When will be the right time to notify?

What will be the message of the notification?

How will users be notified? (e.g. app, sound ...)

Will notification be private or public/on display?

Will the meaning of the notification be understood by anyone?

What will happen if notifications were missed?

09

INTERACTION

ONBOARDING INTERACTION

For first-time-users, how will be the first interaction with the product?
What activities needs to be done?
A **storyboard** may help!

Example:
Downloading the app, creating an account, pairing with the smartphone, personalize settings, following an app tutorial ...

10 I

INTERACTION

TESTING USER INTERACTION

What are the most critical interaction touchpoints that need to be tested?
How could you test them?

Example:
Test if the users manage to complete a relevant task by using an interactive mockup

11 I

INTERACTION

NO SMARTPHONE... AND NOW?

Which functions can still be accessed without using a smartphone/app?

Example:
Users can still open the smart door lock with fingerprint recognition or with a tangible key

12 I

INTERACTION

NO INTERNET...AND NOW?

Wich functions can still be accessed when there there is no internet connection?

Example:
Users can still open the smart door lock with a key

13 I

INTERACTION

TECHNOLOGY CARDS

ARE ABOUT:

Components
Connection
Opportunities & issues

ARE A SUPPORT FOR:

Exploring requirements
Defining components
Defining the system
Finding possible issues

T

COMPONENTS: SENSORS

Does the product have sensors?
Does it use external sensors?

Example:
The product may have a GPS module, or may use the smartphone's GPS

01 T

TECHNOLOGY

COMPONENTS: ENERGY SOURCE

How will the product be powered?

Examples:
Battery, plugged to an electric socket ...

02 T

TECHNOLOGY

CONNECTIVITY

How is the product connected?
What is the connectivity range?

Examples:
Long range, Wi-Fi
Short range, Bluetooth
Very short range, RFID, NFC

03 T

TECHNOLOGY

WHAT IF YOU

...focused on the product's onboarding interaction?

Will users need external assistance or services? (e.g. paid installation, electric wiring)

Will users need specific skills or knowledge?

How will pairing occur?

Will users need to personalize settings?

Will users need a tutorial?

When will users see the real product value?

10

I

INTERACTION

WHAT IF THE PRODUCT

...could be used without a smartphone/app?

Will it be a relevant feature?

How crucial will the smartphone/app be for the product?

Which core functions will be accessible?

Which relevant functions will users still expect to access?

Which relevant notifications will still need to reach the user?

12

I

INTERACTION

HOW TO USE THE CARDS?

HORIZONTAL SIDE
Introduces a topic with a key question and examples

VERTICAL SIDE
Deepens the topic with additional "what if" questions

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WHAT IF YOU

...focused on the product's energy source?

How long will the battery be expected to last? (e.g. users expect at least a week)

How often will it need to be changed/recharged?

How will battery be changed/charged? (e.g. with a new standard button cell; with an USB cable)

How big will the battery be?

Will the product need to be plugged?

Will it be possible to save energy?

Will it be possible to harvest energy?

Will battery life be displayed on the product?

How will energy levels affect the product's behavior? (e.g. lights are dimmed; functions are not available)

02

T

TECHNOLOGY

WHAT IF YOU

...focused on user testing?

Which key features will you need to test?

Prioritize by "user-pain" level: which will be the most relevant tasks to test?

How could you simulate it? (e.g. "wizard of oz" user testing, video scenario, interactive prototype, product mockups)

How many users will you require for the test?

Could you do A/B testing?

What will be the core insights that you want to gather from user tests?

11

I

INTERACTION

WHAT IF THE PRODUCT

...was without internet connection?

Which core functions will be accessible?

Will users be notified that the connection is lost?

What is the worst that could happen?

Could users lose important data?

Will users require assistance?

What could happen if the connection was unreliable? (e.g. intermittent connection, high latency)

13

I

INTERACTION

WHAT IF THE PRODUCT

...used sensors?

Why will the product need sensors?

What will it need to achieve? (e.g. to switch the light on when the user is near; to gather air quality data)

With which sensors could this result be acheived?

How often will sensors collect data? (e.g. once every hour)

Will sensing be continuous? For how long?

When will sensor data be needed? Why?

What will be the required accuracy level? (e.g. a medical device may need high accuracy, very close to the misured phenomenon)

What will the sensor range be?

01

T

TECHNOLOGY

WHAT IF YOU

...focused on connectivity?

How will the product be connected? (e.g. direct connection to the cloud; connection through a gateway)

How will this choice impact on interaction? (e.g. the product will need to be connected to a hub)

Will it have an impact on the product's functions?

How often will the product need to exchange data?

Will it require constant cloud access?

Will this choice impact the battery life?

Will it affect the product shape and dimensions?

Will it affect price?

03

T

TECHNOLOGY

HOW DOES IT WORK?

Can you list the basic hardware components required by your product?

Can you schematize how the product is supposed to work?

Example:
A speaker, micro-controller, bluetooth module battery, buttons... It pairs with the phone to play music.

04
T
TECHNOLOGY

PRODUCT ECOSYSTEM

What is the product connected to?

Is the product compatible with other devices?

Example:
It is connected to the cloud through a smartphone app (gateway). It is compatible with other products of the same brand.

05
T
TECHNOLOGY

CLOUD SERVICE

Which functions will require cloud/ internet connection to operate?

Example:
In a fitness wearable, without cloud connection you may not track your running path with GPS, but you can still count steps and consumed calories

06
T
TECHNOLOGY

API

Does the product use third party APIs?

Will it provide APIs for developers?

Examples:
A lamp that uses online weather data
A fitness tracker provides API, so that independent developers can make apps for it

07
T
TECHNOLOGY

SOFTWARE UPDATES PLAN

Which functions could be added in the future thanks to software updates?

Will them require specific hardware components?

Example:
Your smart thermostat embeds a humidity sensors that isn't used yet. It has been planned in advance to offer a new function that will be updated on all shipped products.

08
T
TECHNOLOGY

CHALLENGES AND INNOVATION

From a technological point of view, what is the biggest challenge?

Which are the most innovative components of the product?

Examples:
The software, a specific algorithm
A flexible PCB

09
T
TECHNOLOGY

PRODUCT SECURITY

How will the device be protected?

Who can access it and how?

Examples:
Encrypted data transmissions
Passwords and autentications

10
T
TECHNOLOGY

EXPERIENCE CARDS

ARE ABOUT:

Emotions & feelings
Perception
Concerns
Trust in technology

ARE A SUPPORT FOR:

Creating empathy
Humanizing tech
Being ethical
UX design

EX

WHAT IF YOU

... focused on the hardware components?

Which components will have greater impact on the product's shape/dimension?

How will they be arranged?

Will they require a specific disposition?

Which components will have greater impact on the product's price?

Could a different technology/components be used?

Will this choice influence the product shape and interactions?

Which components will be standard?

Will the product need personalized/ad-hoc hardware?

04 T TECHNOLOGY

WHAT IF YOU

... focused on the cloud-service?

Which functions of the product will work without cloud connection? Which functions will run on the edge device?

Will data be stored in cloud?

Will data be stored in the edge device?

How often will the product exchange data with the cloud? (e.g. send/get requests)

How will data be elaborated in cloud? (e.g. analytics, machine learning)

Will the cloud allow remote access to the product? Through which interfaces?

Who will have access to the cloud?

06 T TECHNOLOGY

WHAT IF YOU

...planned in advance software updates that require hardware?

How will the product evolve over time?

What if you tried to list a 3-step update plan? (e.g. step 1: interface personalization, step 2: air monitoring function added, step 3: enable voice command)

Which kind of hardware components will be needed to support these updates?

Will new functions be added?

Will the interface be updated?

Will the interaction with the product evolve in time? (e.g. new gestures)

08 T TECHNOLOGY

WHAT IF YOU

...focused on product security?

Will the product have/need access to sensible informations?

Will the product be password secured?

Will data be encrypted? (e.g. data stored on the device or in cloud, data transmission ...)

Will the product store data locally?

Who could connect with the device? How will pairing occur?

Will users have access to their data? How is the access secured?

What would happen if it was hacked?

If hacked, which kind of data could be accessed?

If hacked, could the product be dangerous?

10 T TECHNOLOGY

WHAT IF YOU

...focused on the product ecosystem?

Will the product be directly connected to the Internet and cloud?

Will it be connected thanks to a gateway/hub/bridge? (e.g. a smartphone)

Will the product interact with other products?

Will users be able to create "recipes" and program behaviors

Will it be compatible with

... other products of the same brand?

... products of different companies?

... apps of different providers?

... third parties APIs? (e.g. services, social networks)

05 T TECHNOLOGY

WHAT IF THE PRODUCT

...used external APIs or provided their own?

What data will the product require?

Will the product use external API? (*e.g. Google's*)

Will APIs be open or private?

Which device capabilities could developers control?

Which data could developers access?

07 T TECHNOLOGY

WHAT IF YOU

... focused on what makes the product challenging/innovative?

What will be the most innovative element of the product?

Will the product use technologies that are common in a different field/market? (e.g. technology transfer)

Could other technologies be used?

Will the product's performance be remarkable? (e.g. high-performance loudspeakers)

Will the product's dimensions be remarkable? (e.g. a very compact wearable)

Will it require custom components?

Which standard components could be used?

How will it be prototyped?

09 T TECHNOLOGY

HOW TO USE THE CARDS?

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PRIVACY AND TRANSPARENCY

Is it clear what data is required and how it is being used?
How do users feel about it?

Example:
Under direct user consent, customer data are used for profiling

01
EX
EXPERIENCE

SECURITY AND MALFUNCTION

What could happen if the security was breached or the product malfunctioned?
How do users feel about it?

Example:
If the smart door lock fails or is hacked, the door remains open

02
EX
EXPERIENCE

AUTOMATION AND CONTROL

Does the product work autonomously?
How users can control its behavior?

Example:
An autonomous car still provides manual override

03
EX
EXPERIENCE

LEARNING

Does the product "learn" from usage?
By using the product, do users learn something?

Examples:
A smart thermostat that learns patterns of usage
A smart keyboard that teaches users to play music

04
EX
EXPERIENCE

MOTIVATION & ENGAGEMENT

How are users motivated to keep using the product?

Example:
With positive feedback loops and game elements, such us points and rewards

05
EX
EXPERIENCE

COGNITIVE OVERLOAD

What could make users feel overwhelmed?

Example:
The system is too complex to set and maintain, and users need to learn how to operate it

06
EX
EXPERIENCE

MEANING CARDS

ARE ABOUT:

Being objective
Finding Strenghts
Finding Weaknesses
Value & relevance

ARE A SUPPORT FOR:

A critical perspective
Evaluating ideas
Idea selection
Making ideas stronger

M

USEFULNESS AND RELEVANCE

Be critical:
Do you think that the product is useful?
Do you think that solves a relevant issue?

Examples:
...It is a nice-to-have gadget
...It will let users save a lot of electricity

01
M
MEANING

WHAT IF YOU

...focused on user privacy and data transparency?

What data will the product collect?

Will it require personal/sensitive information? (e.g. credit card data)

Will it be clear for what purpose are required?

Will it be clear how data is used?

Will it be clear who can access the data?

Will it be clear with whom data might be shared?

Will data be used for profiling?

Did users consent?

How will users have control over the data?

01 EX

EXPERIENCE

WHAT IF

... the product was autonomous?

Will users trust the device?

Will users feel in control of its behavior?

What could users personalize?

Will human intervention be needed? When?

Will the product use machine learning?

Will the product offer personalized suggestions?

How could users deal with exceptions? (e.g. change in programmed routine)

03 EX

EXPERIENCE

WHAT IF YOU

... focused on how the product engages users?

Will the product challenge users?

Will it reward them? How?

Will it show progress?

Will it evolve in time?

Will it unlock new content?

Will it offer personalized features?

Will it involve social peers and friends?

Will the product have a personality?

05 EX

EXPERIENCE

HOW TO USE THE CARDS?

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WHAT IF YOU

...focused on security ?

Will users trust the device?

For this product, how much are users worried about security?

What could happen if the device was hacked?

Which data could be accessed?

How will the product be protected form unauthorized access?

Will it require passwords or authentication?

02 EX

EXPERIENCE

WHAT IF THE PRODUCT

... could learn? And users too

What could be the benefits of machine learning?

What will the product learn?

How will the product be trained?

Will it provide suggestions/predictions?

How will the product improve in time?

What will users learn?

How will the product support the learning process? (*e.g. feedback vibration*)

How will users quantify their improvements?

04 EX

EXPERIENCE

WHAT IF

... users felt overwhelmed?

Will the product offer too many features?

Will it require too much effort?

Will users need specific skills or knowledge?

How will users be guided and supported?

Will the product behave differently based on users / skill level / programmed recipes / usage context?

Will data visualizations be relevant and immediate to understand?

Will the product provide actionable data and feedback?

06 EX

EXPERIENCE

WHAT IF THE PRODUCT

...wasn't useful/ didn't address a relevant issue?

Could you find proof that the issue is relevant?

Could you better analyze users and context?

Could you explore the topic with users? (e.g. with surveys, interviews, focus groups ...)

Could you make user tests? (e.g. of mockups)

Why should people buy it?

Could you better analyze the market and competition?

Could you find related products and services?

Could you find proof that there is a market for this solution?

01 M

MEANING

IOT VALUE

Be critical:

Does connectivity add a real value to the product?

Examples:
...being connected is an additional feature
...being connected enables a core function
...being connected is what makes it desirable

02

M

MEANING

DATA VALUE

Be critical:

How users will benefit from the data produced by the product?

How will data be valueable for you?

Examples:
...data will be used for machine learning
...data will be used for a next product

03

M

MEANING

DIGITAL VERSUS PHYSICAL

Be critical:

Do you think that an app could replace the physical product?

Example:
Some of the functions of a fitness tracker may be done by a smartphone, but there are benefits in having a tangible product in terms of comfort and usability

04

M

MEANING

STRENGHTS AND WEAKNESSES

Be critical:

What will you identify as strong/weak points of the product?

You can do a **SWOT* analysis**!

Internal* ***S**trenghts &* ***W****eaknesses, external* ***O****pportunities &* ***T****hreats*

Example:
Strenghts (performance, easy installation), Weaknesses (price >200€, battery life)

05

M

MEANING

PRICE AND COMPETITION

Be critical:

Do you think that the product is cheap/ expensive for what it offers?

How will the product be positioned among competitors?

Example:
For its price (>200€) it will be positioned among high end products

06

M

MEANING

PRODUCT STORYTELLING

What are the best use scenarios to communicate the value of the product?

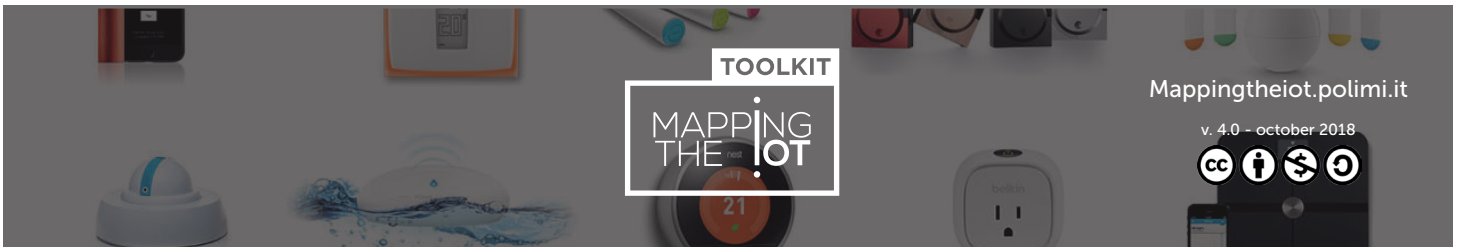
Create a **storyboard**!

Example:
You aren't close to your smartphone; it rings but it's in silent mode; your smartwatch vibrates and the screen displays who is calling

07

M

MEANING



WHAT IF...

...connectivity didn't add a real value to the product?

Why should the product be connected?

Which key functions will it enable?

Will connectivity be a desirable key function for your users? (e.g. for remote control, automation)

Will the product be updated in the future?

Will connectivity enable new services? (e.g. will simplify diagnostics in case of malfunction)

Will connectivity make the product appealing for more users? Or for a specific niche?

Will connectivity just add complexity to the product?

02

MEANING M

WHAT IF

...the product could be replaced by an app?

What will be the most relevant benefits of having a physical product?

Will the product be part of a bigger service? (e.g. a touchpoint)

Will a tangible product be more desirable for your users?

Will it enable different functions?

Will it simplify the interaction?

How will it provide a better user experience?

04

MEANING M

WHAT IF YOU

... focused on price and competitors?

Could you identify competitors with similar products and price range?

Which will be the strongest competitors?

How will the product be positioned among them?

Compared to the products in the same price range, what will it offer more?

What will consumers expect from this price?

Could you identify alternative products that address the same need?

06

MEANING M

WHAT IF YOU

... focused on the value of the product's data?

How will data be used?

What will users do with the produced data?

Will data produce actionable insights? (e.g. personalized suggestions)

Will data enable personalization? (e.g. contextual notifications, personalized product behavior)

How will you benefit from the data produced by the product?

Will data be accessible from third parties?

Will data be private or open?

03

MEANING M

WHAT IF YOU

...focused on the strong/weak points of the product?

In your market, what will be seen as strenght? (e.g. a low price)

What will you do better than the competition?

What will really make the product innovative?

What factors could be perceived as weaknesses? (e.g. lack of reputation, lack of internal competences in the organization ...)

What external factors could be an Opportunity for your product/organization? (e.g. new user lifestyles, specialized funds, international events)

What external factors could be a Threat? (e.g. strong competition)

05

MEANING M

WHAT IF YOU

...focused on the product's storytelling?

Which situations will better highlight the value of the product?

Which will be the most relevant scenario?

Which will be the most relatable scenario?

Which will be the most effective scenario to advertise the product?

Compare: how will the scenario be without the product?

What activities will be enabled/simplified?

What issues/needs will be addressed?

07

MEANING M