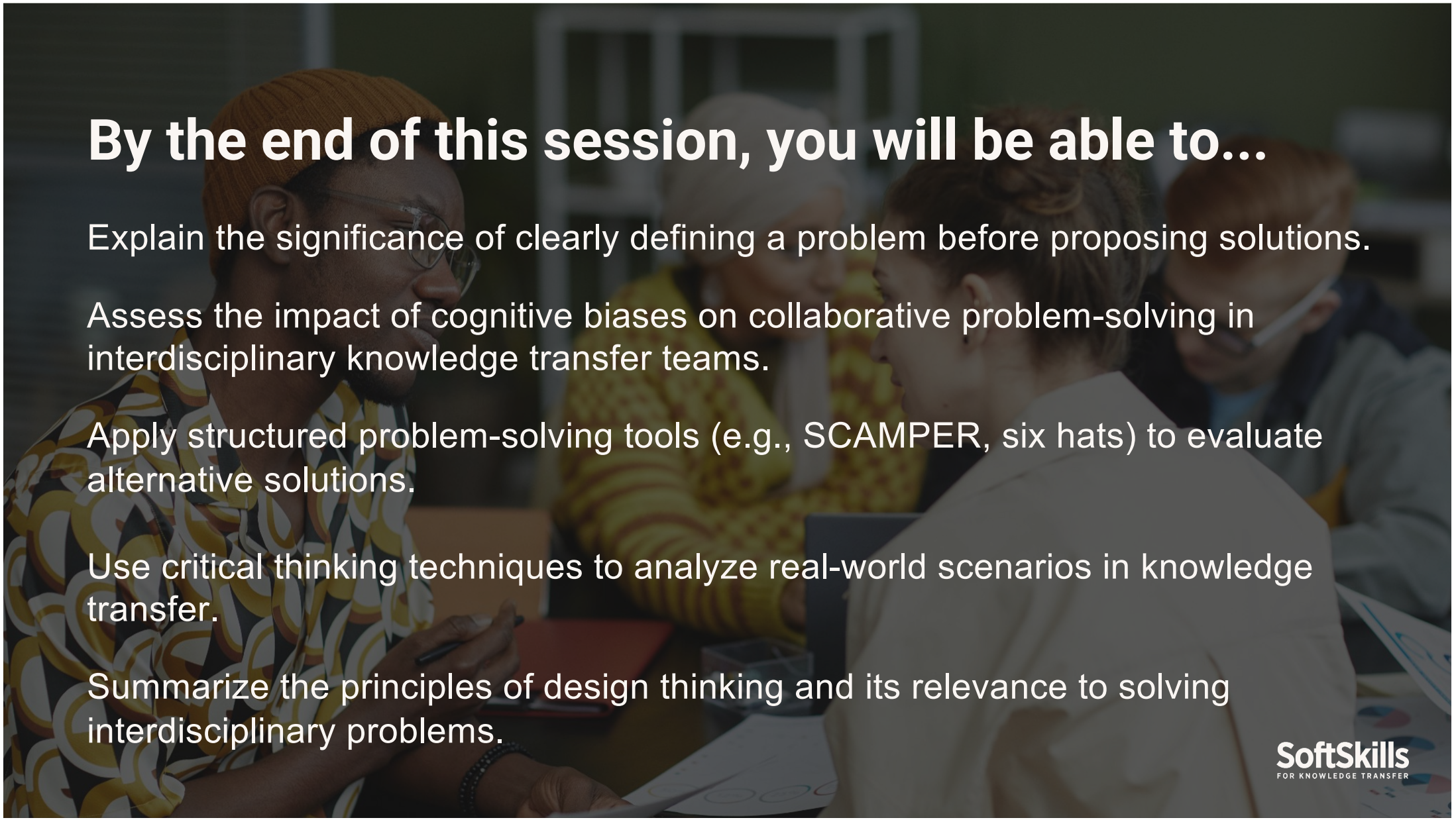
Welcome: Problem Solving for Knowledge Transfer

KTSoftSkills - Soft Skills for Knowledge Transfer
Project n. 2022-1-IT02-KA220-HED-000089663



By the end of this session, you will be able to...

Explain the significance of clearly defining a problem before proposing solutions.

Assess the impact of cognitive biases on collaborative problem-solving in interdisciplinary knowledge transfer teams.

Apply structured problem-solving tools (e.g., SCAMPER, six hats) to evaluate alternative solutions.

Use critical thinking techniques to analyze real-world scenarios in knowledge transfer.

Summarize the principles of design thinking and its relevance to solving interdisciplinary problems.

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Agenda

Time	Topic	
20 min	Introduction & Icebreaker Game	Group Exercise
60 min	Defining the Problem	Group Work & Mini Lecture
45 min	Irrational Side of Our Decisions	Group Exercises
15 min	Break	
30 min	Decision Making Tools & Critical Thinking	Mini Lecture
60 min	A Problem in KT Ecosystem	Case Study
10 min	Wrap up	Group Discussion

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Let's get to know each other better!

Check out the list of questions in the next slide.

Pick up-to 3 questions to ask each other.

Be authentic!

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- What books on your shelf are begging to be read?
- Which do you do more often: hum or whistle? Hum or whistle your answer.
- What's something you intended to do today, but didn't? Why not?
- What's the first thing that comes to mind when you hear the word "fun"?
- What's the best New Year's resolution you've ever made?
- What magic tricks do you know? Perform one now.
- What's your favorite item to cook? Why?
- Are you a hugger or a non-hugger? Why?
- Are you ever a high-maintenance person? Explain.
- Are you superstitious? Give an example.

Group Work: What's the problem?

- Work in groups.
- Read the scenario together.
- Identify at least two different ways to define the core problem in the scenario.

A university research team has developed a highly innovative material with extraordinary heat resistance and durability. However, the Technology Transfer Office (TTO) is struggling to identify a viable market or industry application. The inventors are frustrated, claiming that the office is not doing enough to commercialize the work. Industry partners have shown interest in the science but walked away after due diligence. The university administration is questioning whether to invest further in patent protection.

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Debriefing

- What was your initial instinct about what the core problem was?
  Did that change during your discussion?

- Did your group members define the problem differently at first?

In complex innovation settings, the way we frame a problem is often the first and most crucial problem to solve.

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Examples of Possible Problem Definitions

“There is no market for the invention.”
“The TTO has not explored the right application domains.”
“The communication between researchers and the TTO is broken.”
“There is a mismatch between technical potential and commercial readiness.”
“The university lacks a strategic framework for evaluating early-stage IP.”

Each framing suggests a **different problem owner**, a **different type of solution**, and a **different route forward**.

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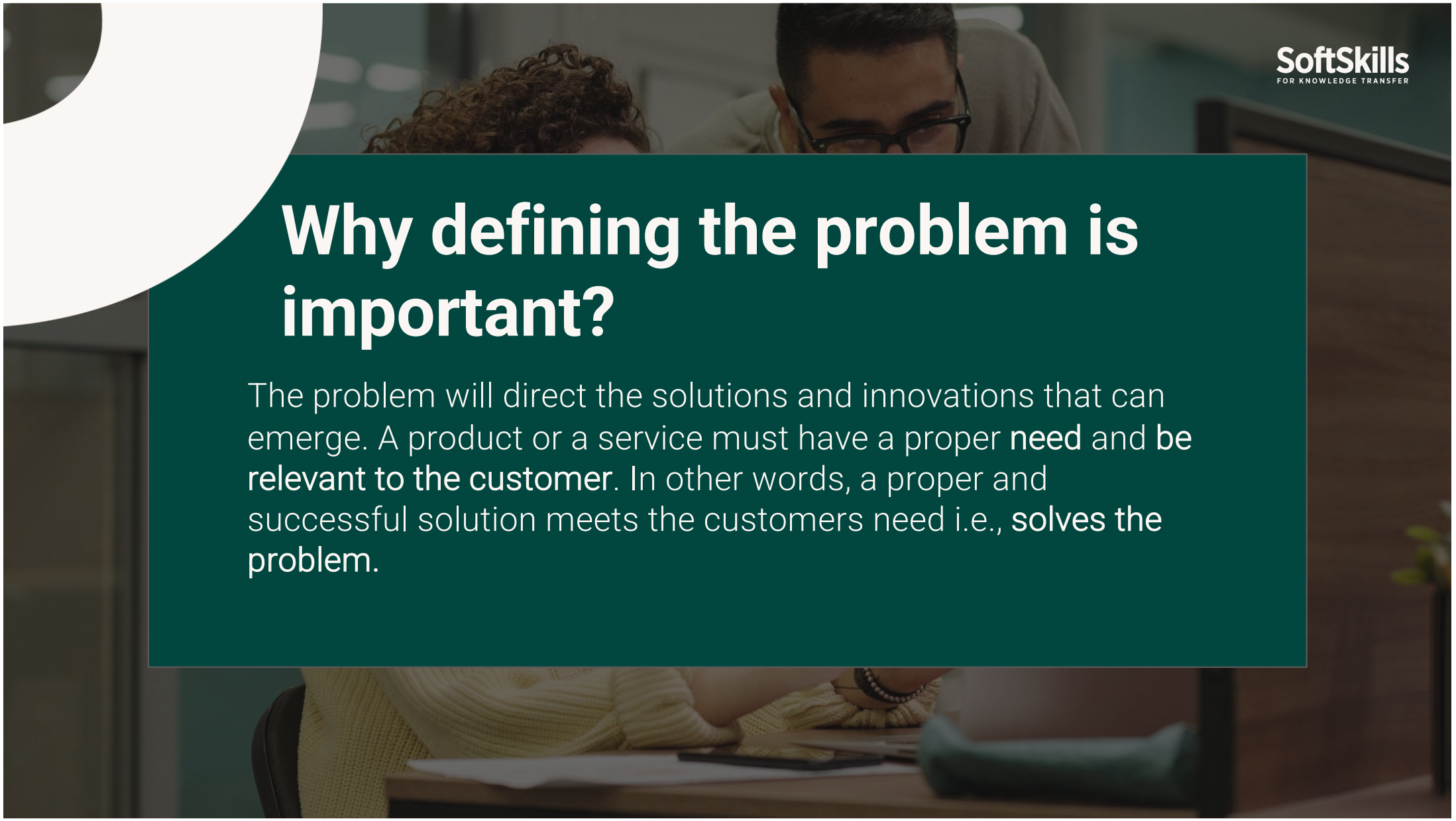
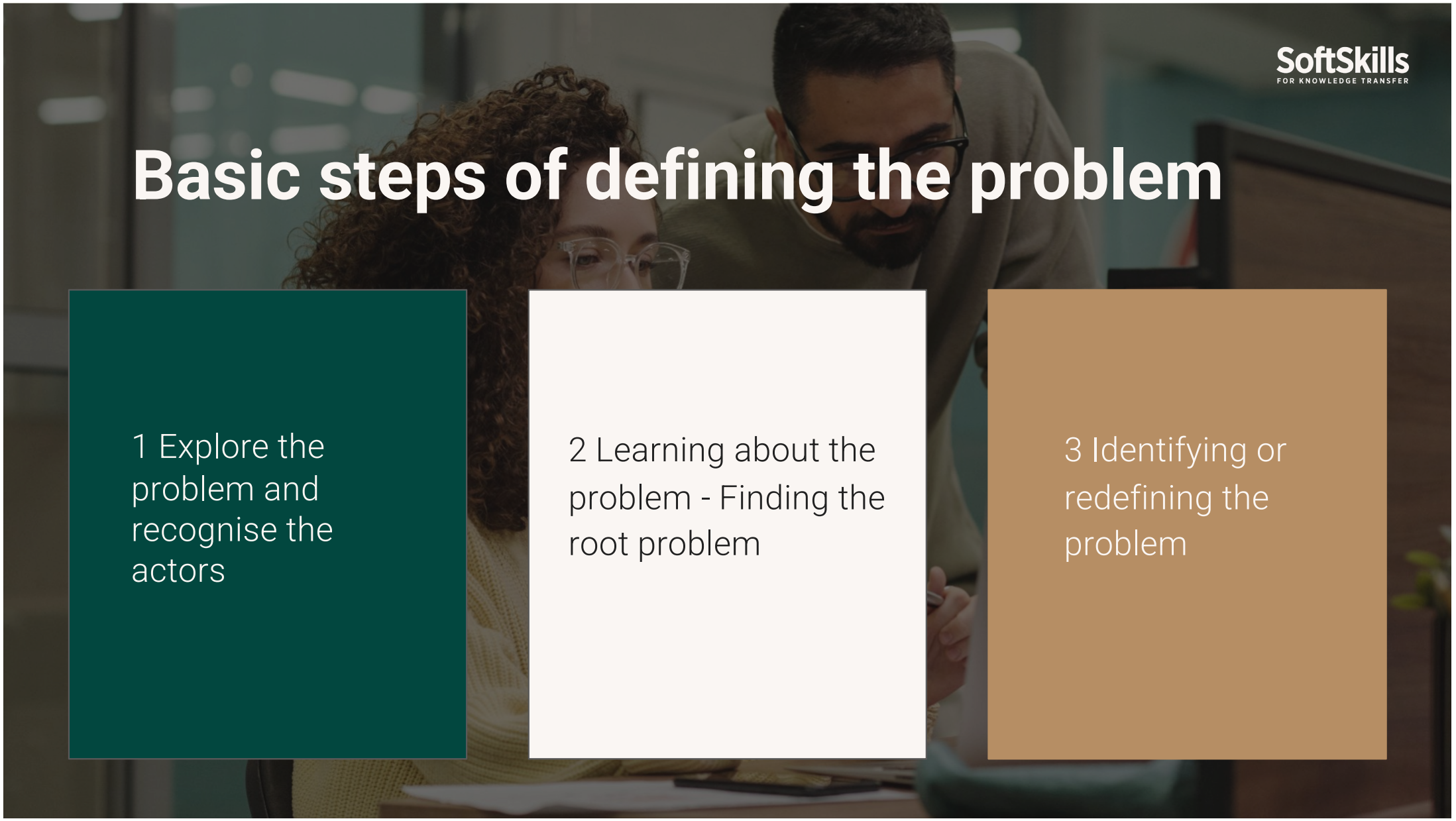


Why defining the problem is important?

The problem will direct the solutions and innovations that can emerge. A product or a service must have a proper **need** and **be relevant to the customer**. In other words, a proper and successful solution meets the customers need i.e., **solves the problem.**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Basic steps of defining the problem
1 Explore the problem and recognise the actors
2 Learning about the problem - Finding the root problem
3 Identifying or redefining the problem

1A Explore the problem

In problematic situations, the KT professional must facilitate cooperation to find a mutual understanding. Explore the problem by asking and answering questions.

- What causes the problem?
- Why is it a problem?
- How does the problem occur?
- Where does the problem occur?
- What are the consequences of the problem?
- Is the problem related to or caused by another problem?
- Who or what is perpetuating the problem?
- Who or what has an impact on the problem?
- Who suffers from the problem?
- Who or what benefits from the problem?
- What are the effects of the problem, who suffer from them?
- Consider is the problem relevant? In other words: what evidence you have that people care about the problem.

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1B Recognise the different actors

The role of the KT professional is to help understand that all actors have different objectives, motivations and needs!

Note that actors can also mean other than people, organizations and companies:
e.g. society, institutions, laws, general norms and assumptions, feelings & emotions etc.

Map out all the actors involved:

- Sufferers
- Frustrated parties
- All stakeholders that are involved in any way
- Enablers
- Beneficiaries
- Business operators: entrepreneurs, funders, users, customers, buyers, end-users, producers, suppliers etc.
- Research operators: university, researchers, funders, academic expectations, etc.

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2 Learning about the problem - Finding the root problem

It is important to know and understand motivations, underlying needs and pains of the different actors involved with the problem!

Don't assume! Find out, investigate, do research, ask, interview.

Methods to understand the problem:

- exploratory interview
- participant observation, surveys,
- qualitative and quantitative research (field research, trends research, articles, online ethnography, etc.), focus groups
- tools: 5 why’s, stakeholder map, empathy map

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3 Identifying or redefining the problem

Analyse and redefine the initial problem using research and insights that you gained in previous parts. There might be many problems. Define all and prioritise. "What is the actual problem", may seem basic, but is often missed.

A tip: Learn to identify the need by writing.
Describe the pure NEED - not the solution.

An example:
People need to get quicker from A to B.
Do not write the solution: People need to have better public transportation.

Look at the problem critically, question it and redefine the problem if needed.

Define the problem by writing:

- What (does/happens)?
- Who?
- How?
- Where
- To Whom?
- Why?

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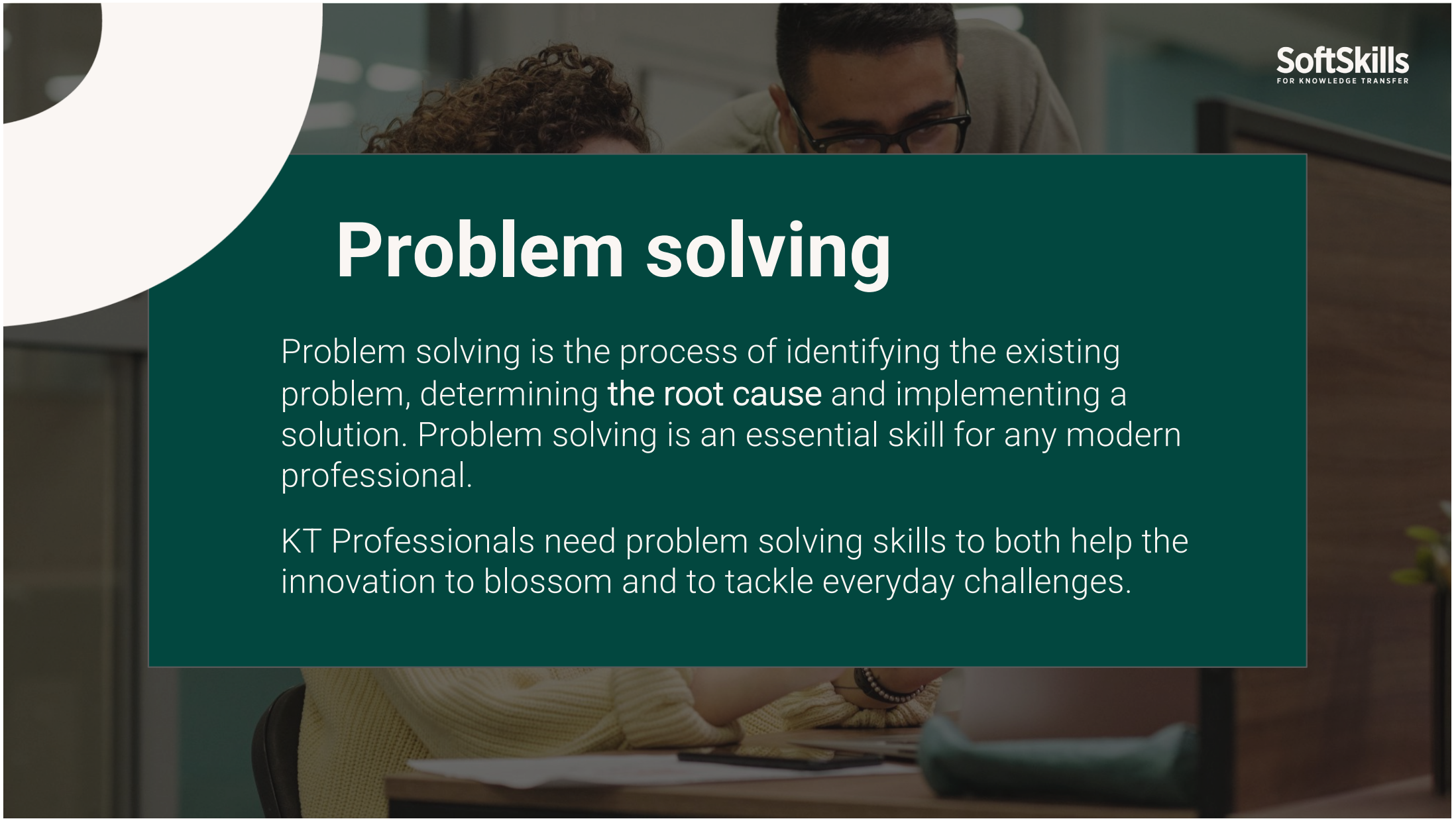

Problem solving

Problem solving is the process of identifying the existing problem, determining **the root cause** and implementing a solution. Problem solving is an essential skill for any modern professional.

KT Professionals need problem solving skills to both help the innovation to blossom and to tackle everyday challenges.


Cognitive Traps in Decision Making
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Irrational Side of Our Decision Making

The human brain is designed to process vast amounts of information quickly and efficiently.

In uncertain or time-constrained situations, we resort to intuitive thinking rather than deliberate analysis.

These shortcuts are often helpful, but they can also lead to predictable errors in thinking.

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What is the price of this planter & bench

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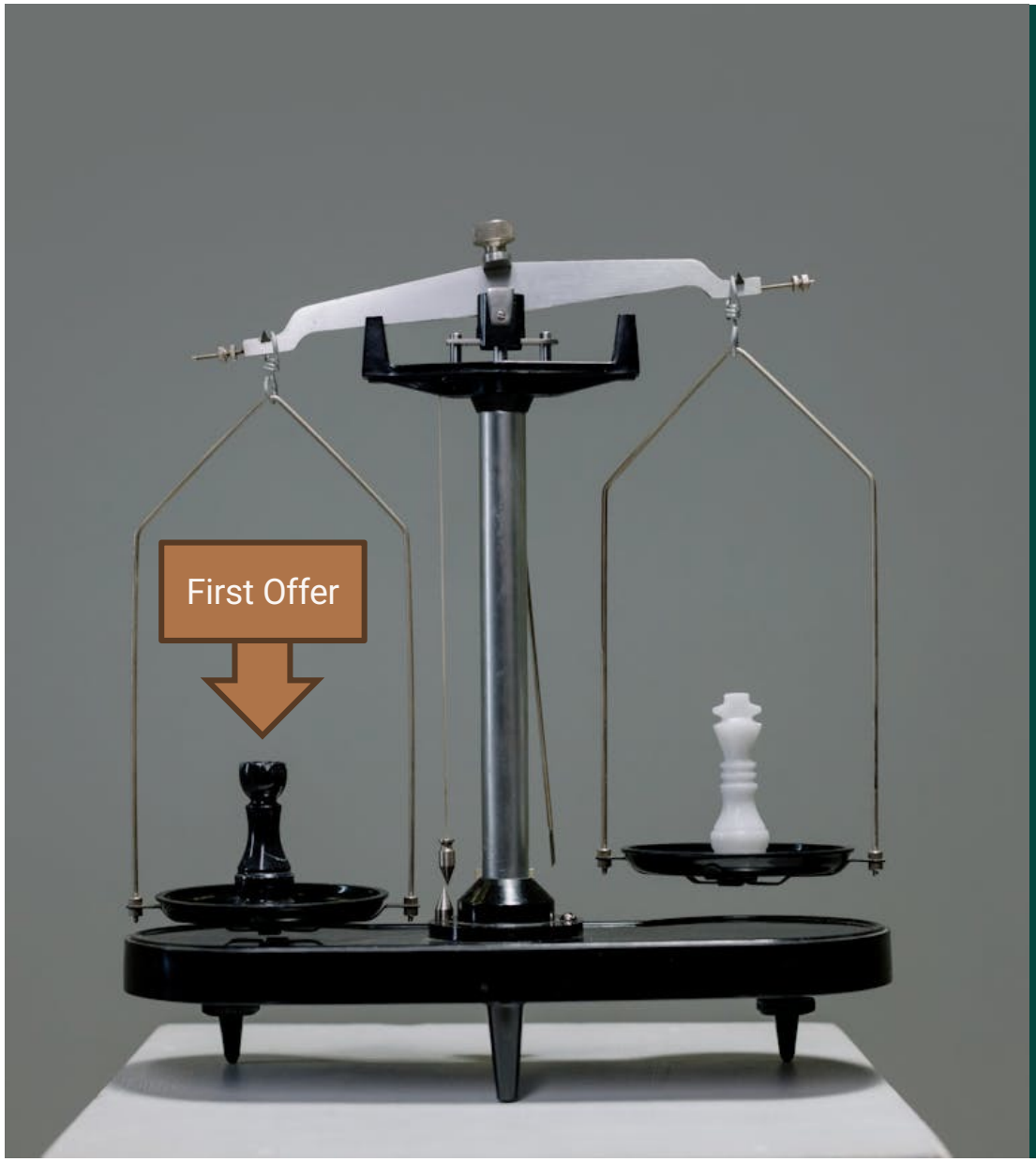

Anchoring

Relying too heavily on the first piece of information encountered (the “anchor”).

Example:
A seller names a high starting price, and it sets the tone for all further negotiation.

Tip to Avoid:
Seek out multiple reference points and question initial assumptions.

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Imagine that you are the Minister of Health when corona outbreak hits your country. The virus is expected to kill 60 people. Experts bring two alternative solutions for you to decide.

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Imagine that you are the Minister of Health when corona outbreak hits your country. The virus is expected to kill 60 people. Experts bring two alternative solutions for you to decide.

For Group 1
Option A: 20 people will be saved.
Option B: 1/3 probability that 60 will be saved and 2/3 probability that nobody will be saved.

For Group 2
Option X: 40 people will die.
Option Y: 1/3 probability that nobody will die and 2/3 probability that 60 people will die.

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Imagine that you are the Minister of Health when corona outbreak hits your country. The virus is expected to kill 60 people. Experts bring two alternative solutions for you to decide.

For Group 1

Option A: 20 people will be saved.

Option B: 1/3 probability that 60 will be saved and 2/3 probability that nobody will be saved.

LIVES WILL BE SAVED

POSITIVELY FRAMED

Popular option is risk averse.

For Group 2

Option X: 40 people will die.

Option Y: 1/3 probability that nobody will die and 2/3 probability that 60 people will die.

PEOPLE WILL DIE

NEGATIVELY FRAMED

Popular option is risk seeking.

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Framing Effect

The way information is presented affects decisions more than the information itself.

Example:
People prefer a product labeled “95% fat-free” over one labeled “5% fat,” even though they’re the same.

Tip to Avoid:
Reframe problems in multiple ways before deciding.

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Sunk Cost Fallacy

Continuing a course of action because of previously invested resources (time, money, effort).

Example:
Keeping a failing project alive because "we've already spent so much on it."

Tip to Avoid:
Focus on future value, not past investment. Cut losses when warranted.

Reciprocation

The tendency to feel obligated to return favors or concessions, even when it's not rational or required.

Example: Accepting a proposal or agreeing to terms in a negotiation simply because the other party made a small concession first — not because the terms are actually beneficial.

Tip to Avoid: Pause and evaluate offers based on merit, not emotion. Ask: "Would I accept this if they hadn't 'done me a favor' first?"

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Confirmation Bias

Tendency to search for, interpret, or recall information in a way that confirms preexisting beliefs.

Example:
Only reading data that supports your preferred strategy while ignoring contradictory evidence.

Tip to Avoid:
Actively look for disconfirming evidence.
Ask: What would prove me wrong?

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Big Picture

Always keep in mind the big picture of what you want to achieve to avoid the trap of being lost in details.


Route to a solution
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Generating ideas

- Don't get too excited about the first ideas. They are often easy and obvious.
- In brainstorming aiming for quantity will help the team move beyond the obvious to more interesting and better ideas.
- Learning to let go ideas to make way for new ones is a skill.
- Don´t try to choose the perfect idea and then immediately investing massive resources in implementing it.
- Sometimes it is good to spot a few ideas which are “good enough” to kick off an experimental, evolutionary process.
- It’s not about what’s “right,” it’s about what’s “probable” and “possible.”

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How to make new ideas?

BY COMBINING several existing concepts
in a new or unexpected way.

BY ADDING. By studying and refining prevailing ideas and practices.

BY ABANDONING prevailing practices and thinking models.

BY TURNING OVER: Reverse.

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Methods for ideating

Facilitated brainstorming, 10 + 10 method

Future visions exercise to boost creativity and unlock thinking.
It's 2075 and your problem has been solved. Write news headlines where you tell how the change shows in thinking, action or behavior of people.

How might we –exercise.
In spite of (defined problem) **how might we** (help/reduce/create/xxxx xxxx) to (xxxxxxx) so they can (xxxxxxx)?

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Thinking with six hats

With each of them, you will think about your idea based on its view!

Red hat = feelings, emotions: How do you feel about the idea
Black hat = What are the potential weaknesses and risks of the idea?
Yellow hat = Benefits, advantages. Crazy possibilities of the idea?
Green hat = Environment, climate, social justice of the idea
Blue hat = Control, structure. What kind of regulations, policies, laws are involved?
White hat = taboos, aspects that people are embarrassed, uncomfortable, unwilling to face

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SCAMPER

S Substitute - components, materials, people
C Combine - mix, combine with other assemblies or services, integrate
A Adapt - alter, change function, use part of another element
M Modify - increase or reduce in scale, change shape, modify attributes (e.g. colour)
P Put to another use
E Eliminate - remove elements, simplify, reduce to core functionality
R Reverse - turn inside out or upside down

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Critical thinking
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What is critical thinking in KT process?

Framing the Problem

Apply critical analysis to ask: How does this finding translate into actionable insight for the business? Consider the limitations of the research and how it may (or may not) scale or adapt.

Building Bridges Between Worldviews

Use critical thinking to anticipate misunderstandings between academics and practitioners.
Translate academic language into business-relevant insights, and vice versa.

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What is critical thinking in KT process?

Think about the big picture & zoom in to the human level

What are the consequences at many levels: individual, community, business, biodiversity, environmental, research, societal, etc.

- SWOT analysis (Strengths, Weaknesses, Opportunities, Threats)
- PESTEL analysis (Politics, Economics, Society, Technology, Environment, Law). Add new layers if needed: Demographics, Biodiversity, AI, Ethics, Research etc.

Futures thinking

What are the silent signals, trends, taboos, megatrends now?
What are those after 2, 5, and 10 or more years?

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What is critical thinking in KT process?

Interpreting Research Through a Strategic Lens

Apply critical analysis to ask: How does this finding translate into actionable insight for the business?

Consider the limitations of the research and how it may (or may not) scale or adapt.

Designing Experiments and Pilots

Don’t just transfer knowledge — test it!

Apply critical thinking to co-create controlled experiments or prototypes that validate knowledge before large-scale implementation.

- Engage people, customers, stakeholders in testing. Ask and listen to their feedback.

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What is critical thinking in KT process?

Reflective thinking and iterative doing

After a KT project, reflect critically: What worked, what didn’t, and why?

Feed this insight back into your practice to improve future knowledge transfer.

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Design thinking
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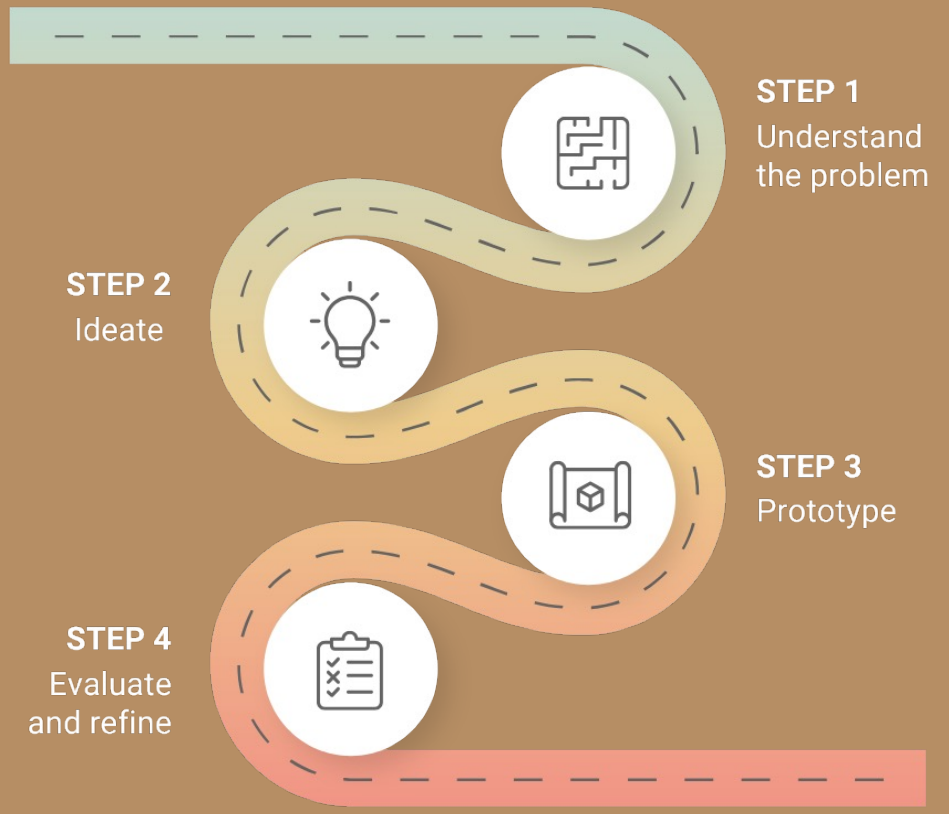
What's Design Thinking?

A human-centered approach to problem-solving that usually involves five key stages: Understand the problem, Ideate, Prototype, and Test.



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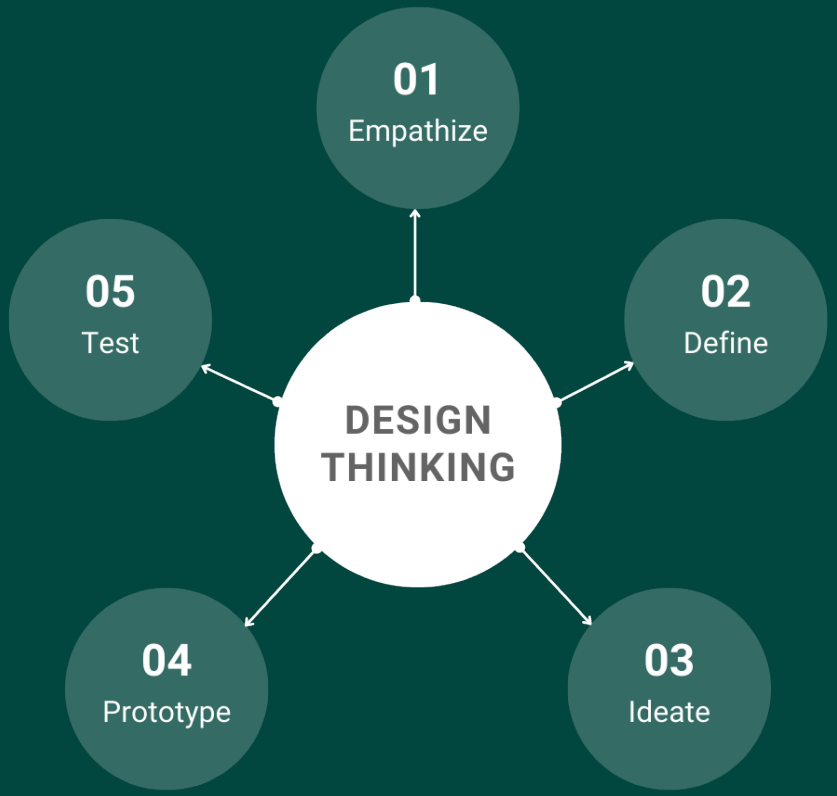
Core assumptions of design thinking.

DT is about understanding users' needs in a given situation or context, redefining initial perception of the problem or challenge, and creating innovative solutions through continuous improvement of solution prototype to adjust it to users' needs. DT encourages creativity and innovation.



Brief description of the process and stages

Each stage of Design Thinking has various instruments, that team may adapt to the specificity of current project.
The DT process is flexible and stages are not always linear.
Teams may revisit earlier stages based on new insights gained throughout the process.

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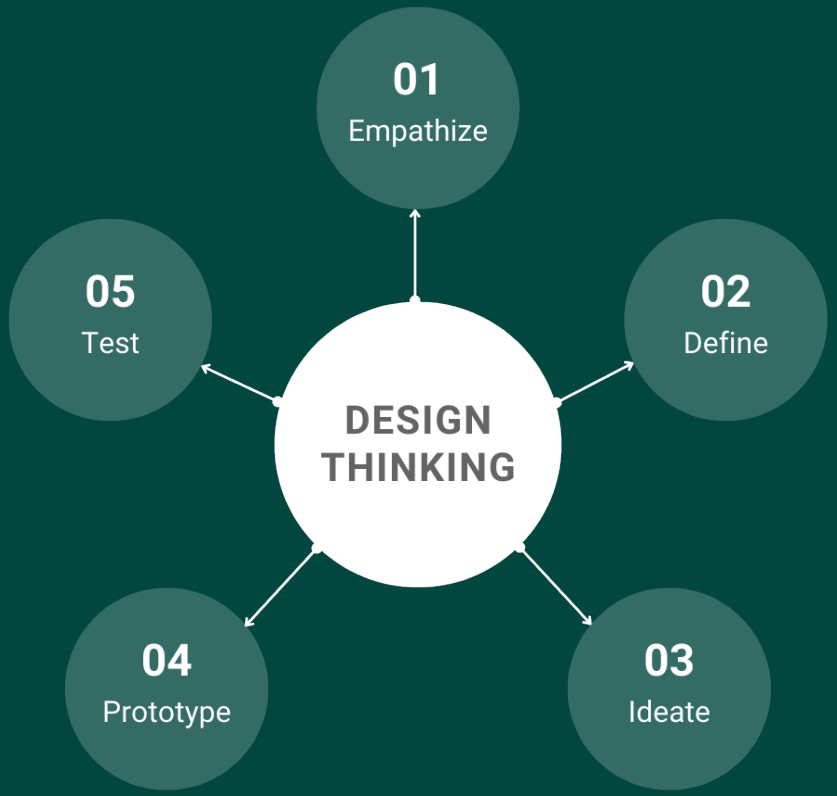

1. Empathize - involves understanding the users and their needs. It's about gaining empathy for the people you're designing for by observing them, interviewing them, and immersing yourself in their experiences.

2. Define - involves synthesizing the insights gathered from the empathy stage and identifying the core issues and user's needs, and ultimately the statement of an actual problem that needs to be solved. Statement usually has a form of How Might We question.

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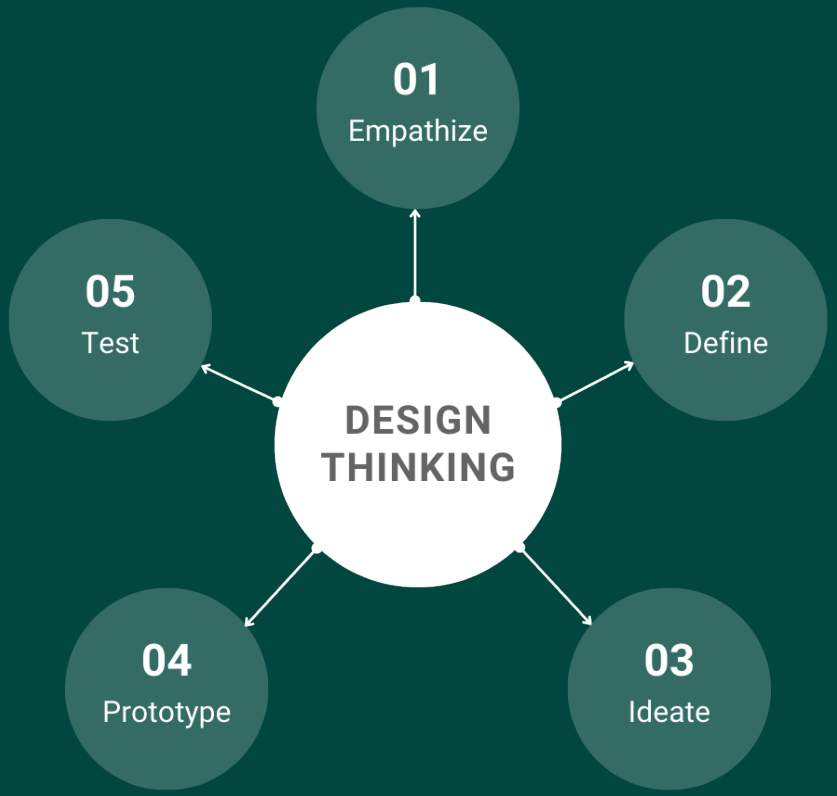

3. Ideate - focuses on generating a wide range of potential solutions to the defined problem, usually by applying brainstorming techniques.

4. Prototype – involves creating prototypes of selected potential solutions to make your ideas tangible and test them with users. First prototypes should be made fast and cheap.

5. Test - involves testing prototypes with real users to gather feedback and refine prototypes in order to get closer to the final solution.

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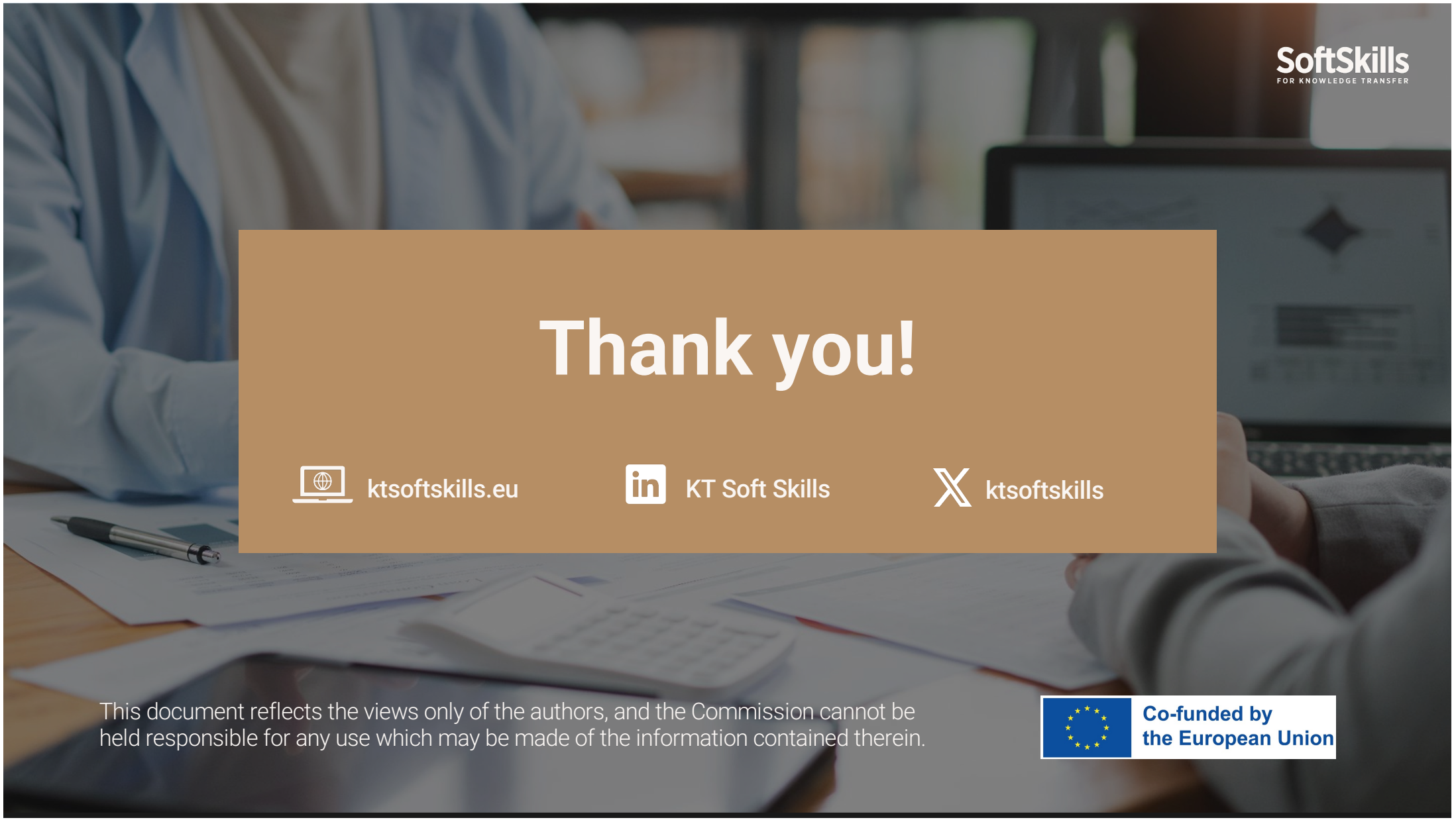

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