UNDERSTANDING A PROBLEM

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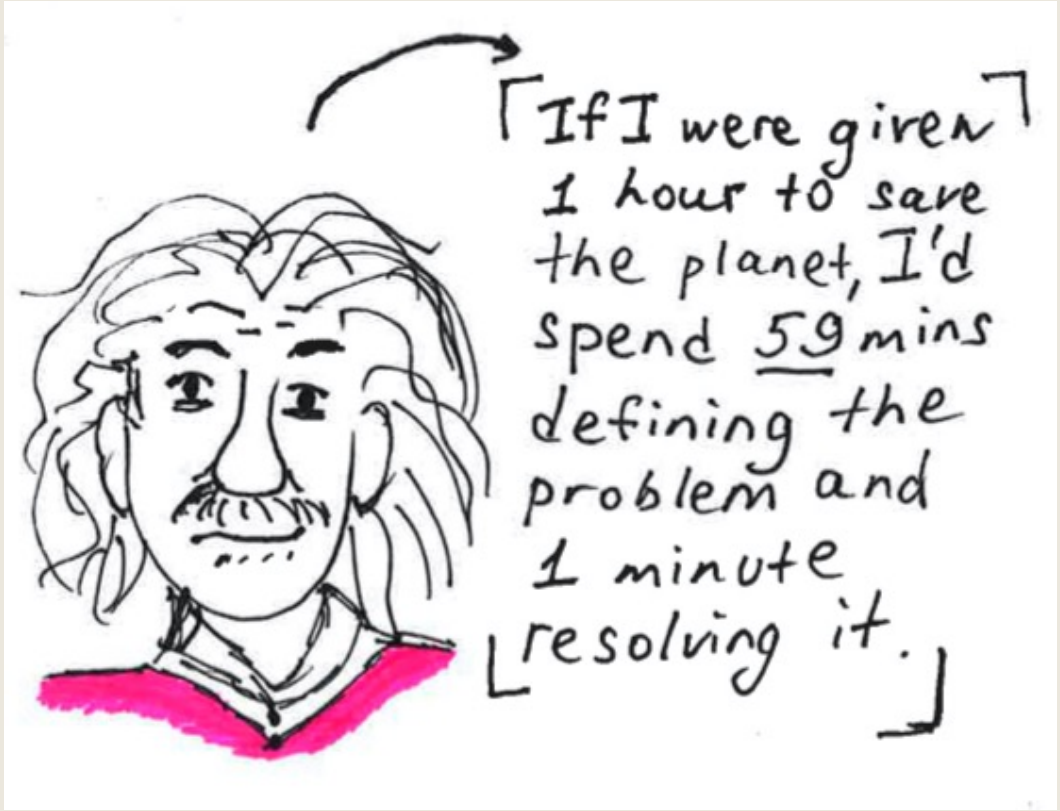
Why understanding a problem is important?

- Poor understanding of a problem can lead to poor solutions, solutions that fail in the long term.
- **A computer does what it is told, it does not validate or critically analyse the solution.**
- **Illusion of explanatory depth** : we believe that we understand the way the world works far better than we actually do.



Key aspects to problem understanding..

- Identify rigor in defining the problems you are solving.
- Articulate why those issues are important.
- Without these:
  - *Organizations miss opportunities.*
  - *Waste resources.*
  - *Pursue innovation initiatives not aligned with their strategies.*
- **Asking the right questions, so that right problems can be tackled.**

InnoCentive Firm

- Has helped more than 100 corporations, government agencies, and foundations improve the quality and efficiency of their innovation efforts, and overall performance.
- Follows ***challenge-driven innovation.***
  - *clients define and articulate their business, technical, social, and policy issues and present them as challenges to a community of more than 250,000 solvers—scientists, engineers, and other experts who hail from 200 countries—on InnoCentive.com, an innovation marketplace.*
- Success rate: 34% in 2006, 39% in 2009, and 57% in 2011.
- Shows the increasing quality of questions being asked.
- *the rigor with which a problem is defined is the most important factor in finding a suitable solution".*
- *Firms's obervations:*
  - *Most organizations are not proficient in articulating their problems clearly and concisely.*
  - *Difficulty in identifying which problems are crucial to their missions and strategies.*
  - *Most clients do not realize they may not be tackling right issues.*

Consider this exchange

InnoCentive staffer: *"Why do you need the lubricant?"*

Client's engineer: *"Because we're now expecting our machinery to do things it was not designed to do, and it needs a particular lubricant to operate."*

InnoCentive staffer: *"Why don't you replace the machinery?"*

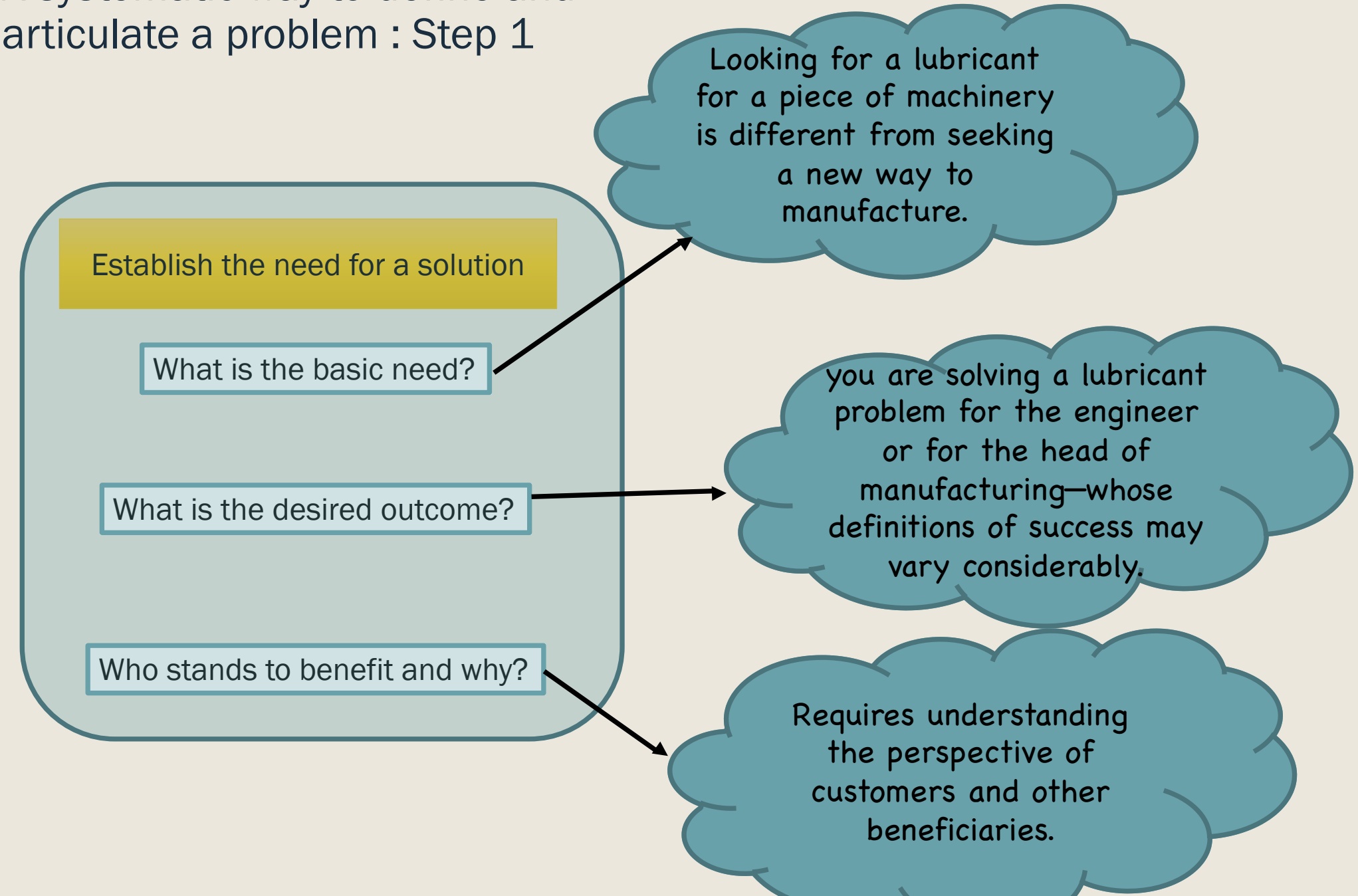
Client's engineer: *"Because no one makes equipment that exactly fits our needs."*

Does the company need the lubricant, or does it need a new way to make its product?

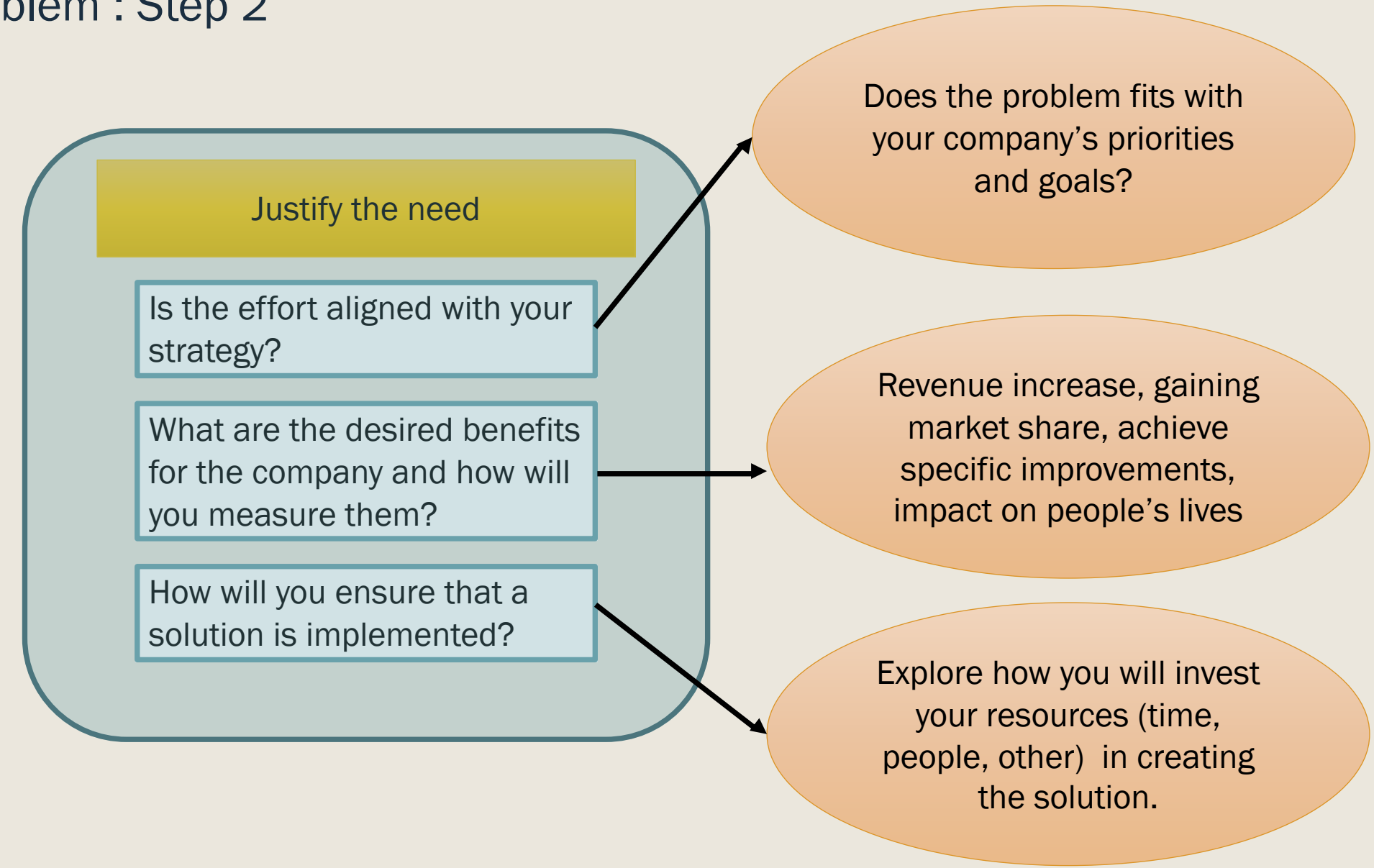
Organizational teams speed toward a solution, fearing that if they spend too much time defining the problem, their superiors will punish them for taking so long to get to the starting line.

Ironically, that approach is more likely to waste time and money and reduce the odds of success than one that strives at the outset to achieve an in-depth understanding of the problem and its importance to the firm.

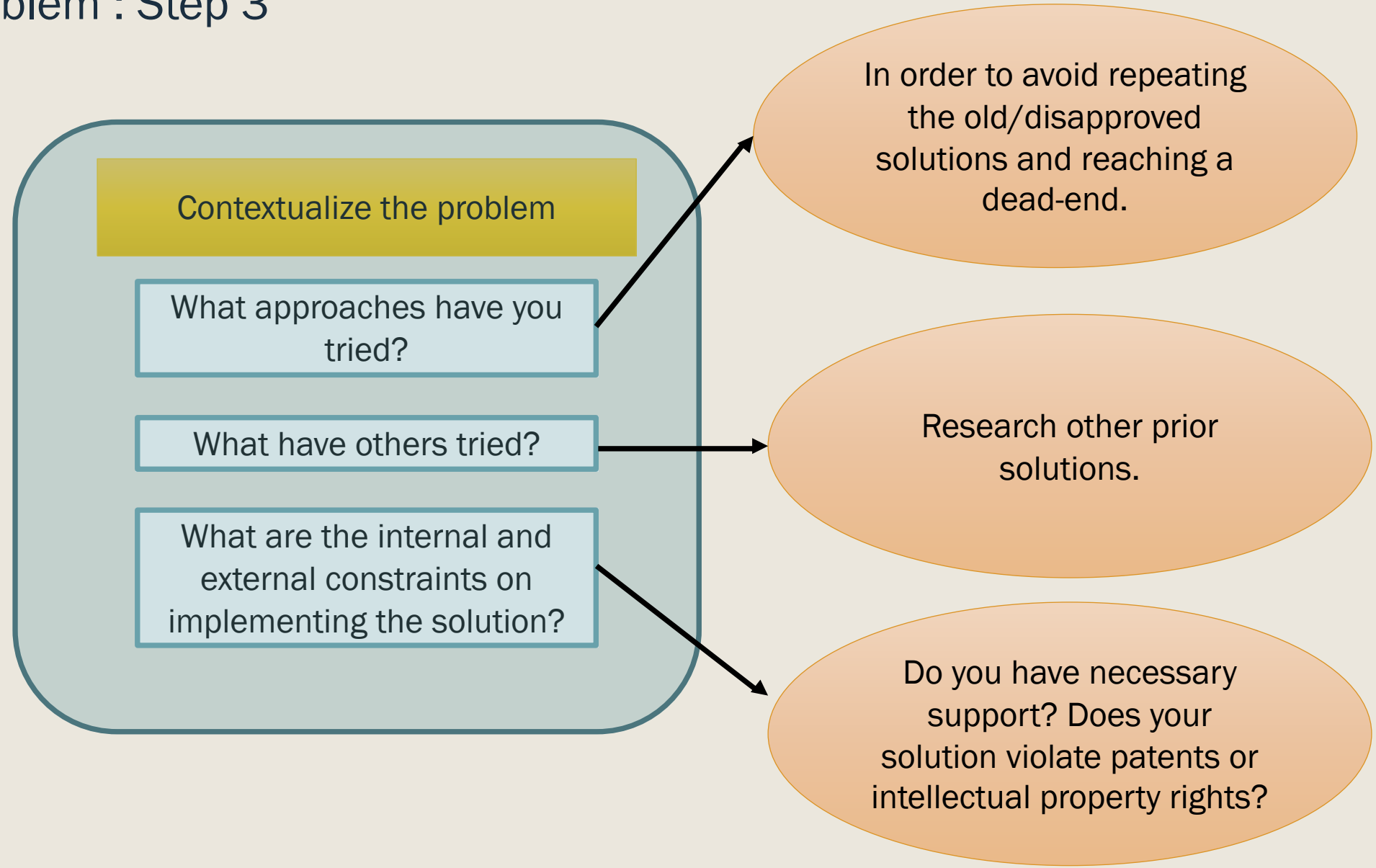
A systematic way to define and articulate a problem : Step 1



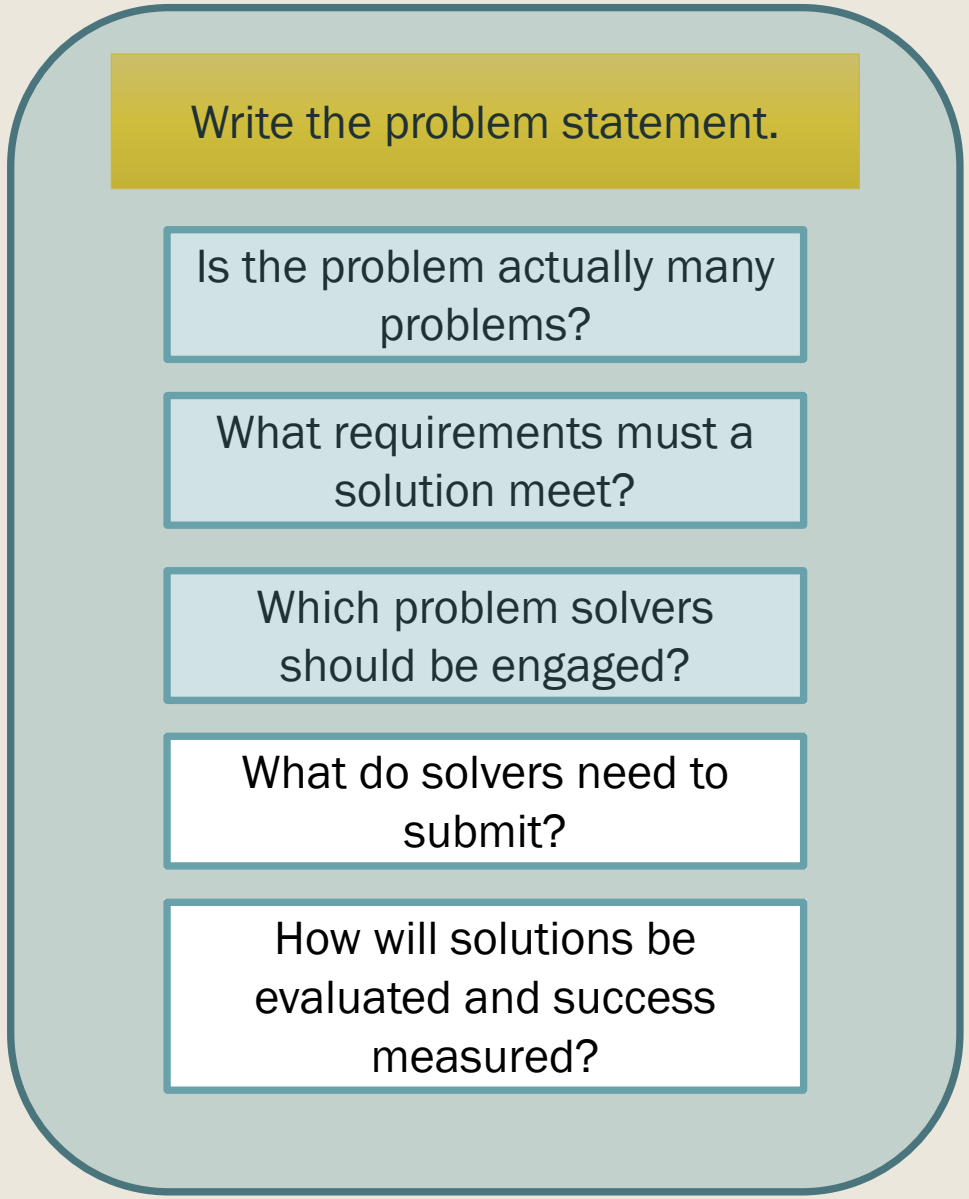
A systematic way to define and articulate a problem : Step 2



A systematic way to define and articulate a problem : Step 3



A systematic way to define and articulate a problem : Step 4



Case Study

- an initiative to expand access to clean drinking water undertaken by the nonprofit EnterpriseWorks/VITA (EWV), a division of Relief International.
- EWV's mission is to foster economic growth and raise the standard of living in developing countries by expanding access to technologies.

Steps	Contextualized Description
ESTABLISH THE NEED FOR SOLUTION	
Establish the basic need.	The basic need EWV identified was access to clean drinking water for the estimated 1.1 billion people in the world who lack it.
Desired outcome?	Access to water? Or convenient access to water? Thus: Provide water for daily family needs without requiring enormous expenditures of time and energy. Eg. Uganda long distance walk for fetching water.
Who stands to benefit?	Individuals and families in the region.

Steps	Contextualized Description
JUSTIFY THE NEED	
Is the effort aligned with strategy?	Simply improving access to clean drinking water would not be enough. Economic development generation is necessary. Business is important.
Desired benefits and how to measure them?	Being recognized as the leader in helping world's poor by transferring technology through private sector. Benefit measured by market impact: family level, economic level for their families.
How will you ensure solution is implemented?	Initiate conversations on resources for solution, people required for initial research, testing of possible solutions.

Steps	Contextualized Description
CONTEXTUALIZE THE PROBLEM	
What approaches have you tried?	Digging wells near homes did not work, only accessible to those households near the water source. So, EWV focused on rainwater harvesting, which falls everywhere.
What have others tried?	Went through previous research papers on rainwater harvesting. Found : having solid roof is half problem solved, the next is the expense of storage container. They developed low-cost household rainwater-storage devices.
What are the internal and external constraints to solving the problem?	External : examining government policies around rainwater harvesting. Found support in Uganda, thus, initiated solution there first.

Steps	Contextualized Description
WRITE THE PROBLEM STATEMENT	
Is the problem actually many problems?	EWV made it clear that the solution was a storage product.
What requirements must a solution meet?	EWV set up a price of $20 for the product, but experts told this price was unachievable. EWV was not willing to go for a subsidized price, as it was against their strategy and philosophy.
What problem solvers should be engaged?	EWV hit a dead end, and EWV began engaging with experts outside the field to solve the problem. s
What do solvers need to submit?	Written explanation of the solution and detailed drawings.
How will solutions be evaluated and success measured?	EWV criteria : evaluate solutions on their ability to meet the criteria of low cost, high storage capacity, low weight, and easy maintenance.

Solution ultimately

- Came from German inventor who used a plastic bag within a plastic bag with a tube at the top as a storage.
- Initial version was developed and tested in Uganda.
- End users were asked question about the product. Eg. Color, weight of the product, whether or not it met their needs.
- Feedback was used to further improvise the product.
- 14 months of field testing and the product was rolled out commercially.

What do we learn?

- Critically analyzing and clearly articulating a problem can yield highly innovative solutions.
- Organizations that apply these simple concepts and develop the skills and discipline to ask better questions and define their problems with more rigor can create strategic advantage, unlock truly groundbreaking innovation, and drive better business performance.
- **Asking better questions delivers better results**.

Next lecture…..

- The analogy of problem understanding in the Software Engineering Domain.