

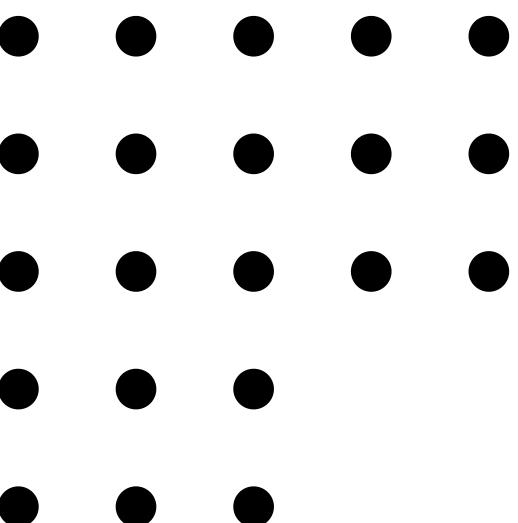
# THE MODELING VALUE CANVAS

## Guidebook

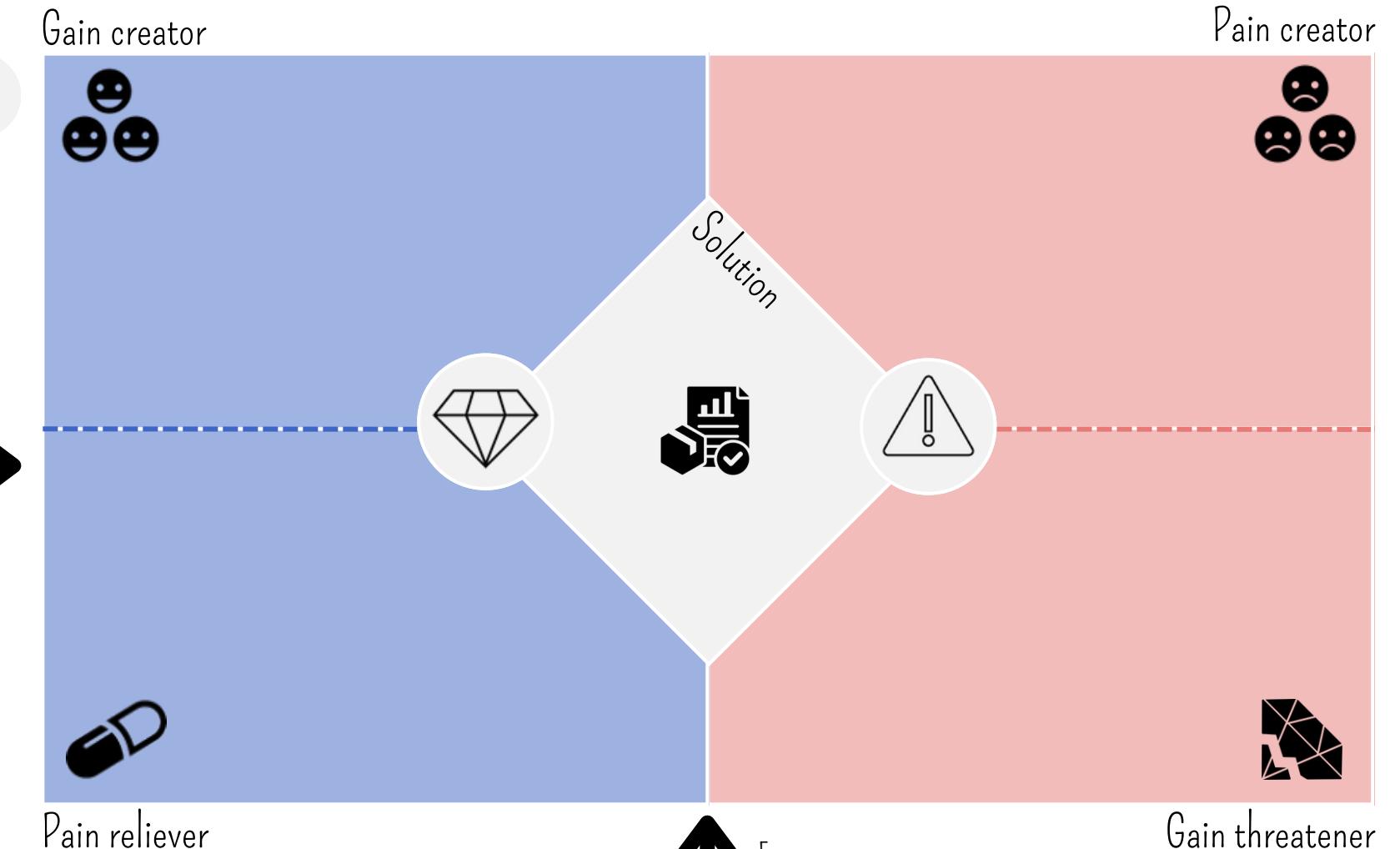
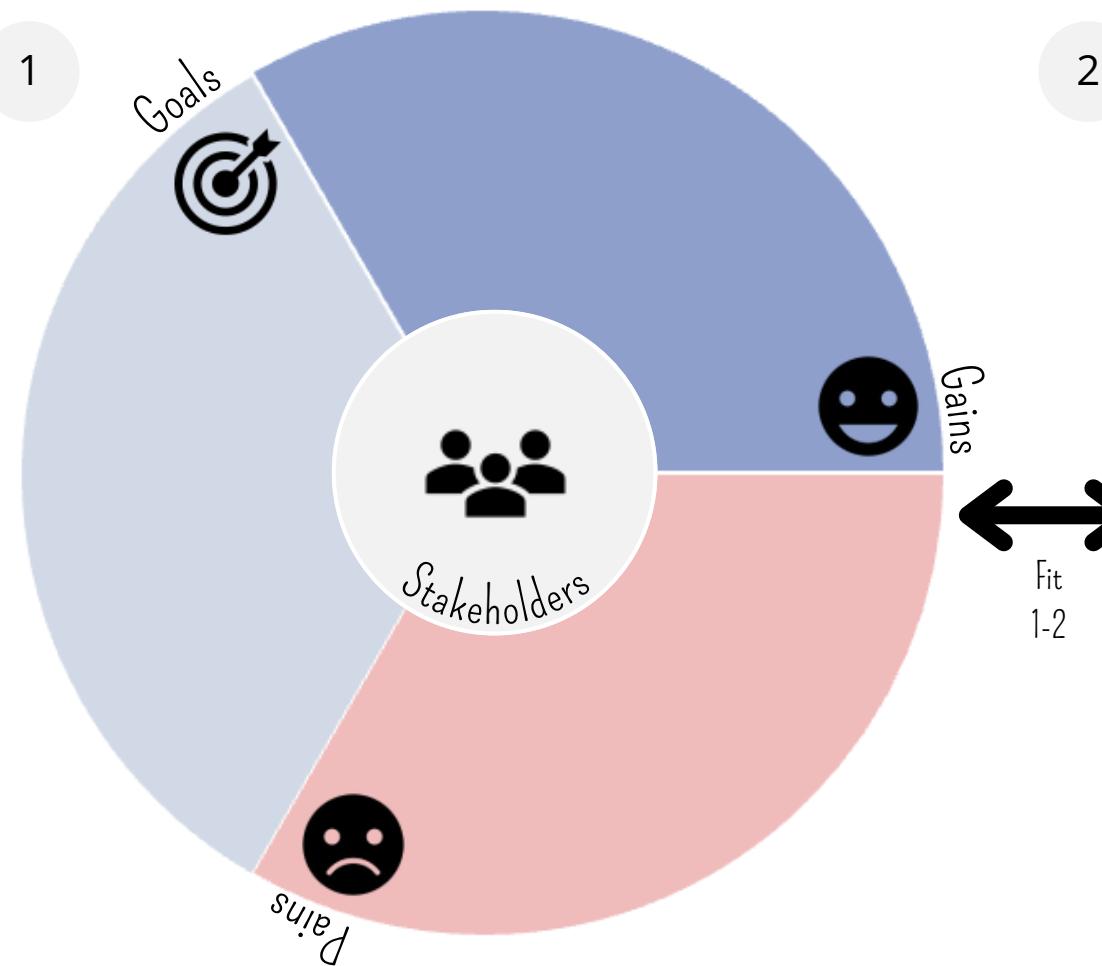


UNIVERSITY  
OF TWENTE.

Semantics  
Cybersecurity  
Services



Decision:



# THE MODELING VALUE CANVAS

It provides a practical tool for capturing and communicating the value of modeling. It helps users decide when, what, and how to model, justify modeling choices, plan efforts and investments, and reflect on outcomes. It makes modeling-related decisions more transparent, strategic, and value-driven.

# The main goals of the Modeling Value Canvas

You can use it for ...



## DECIDE

It assists in making informed decisions about whether, what, and how to model. It helps clarify questions such as: *Should we develop a model for this situation? Which type of model or modeling approach is most appropriate? Which modeling language or tool should be employed?*

## JUSTIFY

It provides a structured basis for communicating and justifying modeling choices. It facilitates reasoning around questions such as: *Why is this model an appropriate solution? Why is a graphical representation valuable here? Why was this particular modeling language selected?*

## PLAN

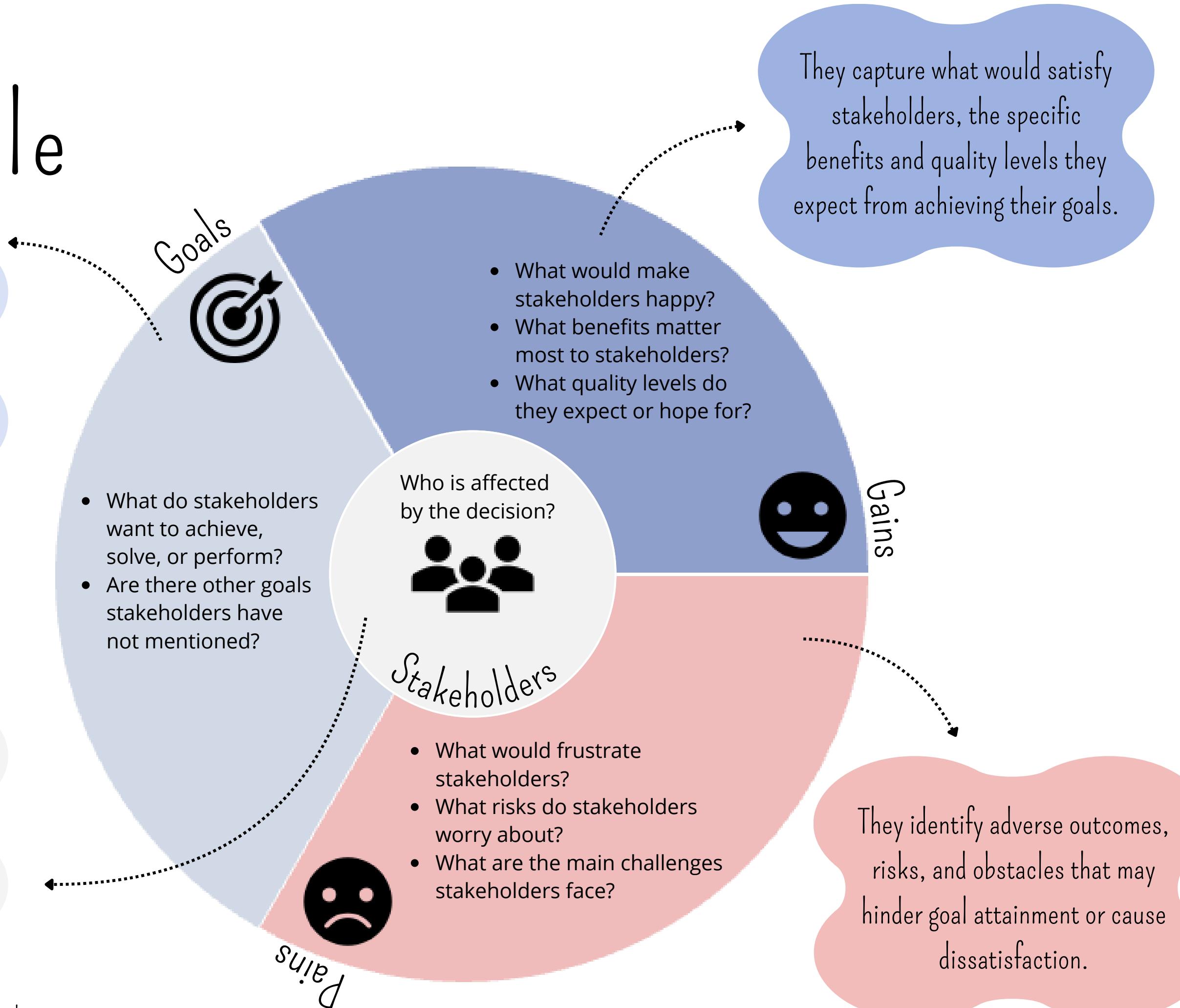
It supports the collaborative planning of modeling activities and investments. It provides a structured view to address questions such as: *Who should be involved in modeling? How much time and effort should be allocated? What scope and level of detail should the model cover?*

## REFLECT

It encourages post-hoc analysis of modeling processes and outcomes. It supports reflection through questions such as: *What was the actual value of modeling in this case? What risks or limitations emerged because of modeling? Was modeling ultimately worthwhile in this situation?*

# 1st step Stakeholder Profile

They refer to the objectives stakeholders seek to achieve, including both explicit aims and potential implicit needs.



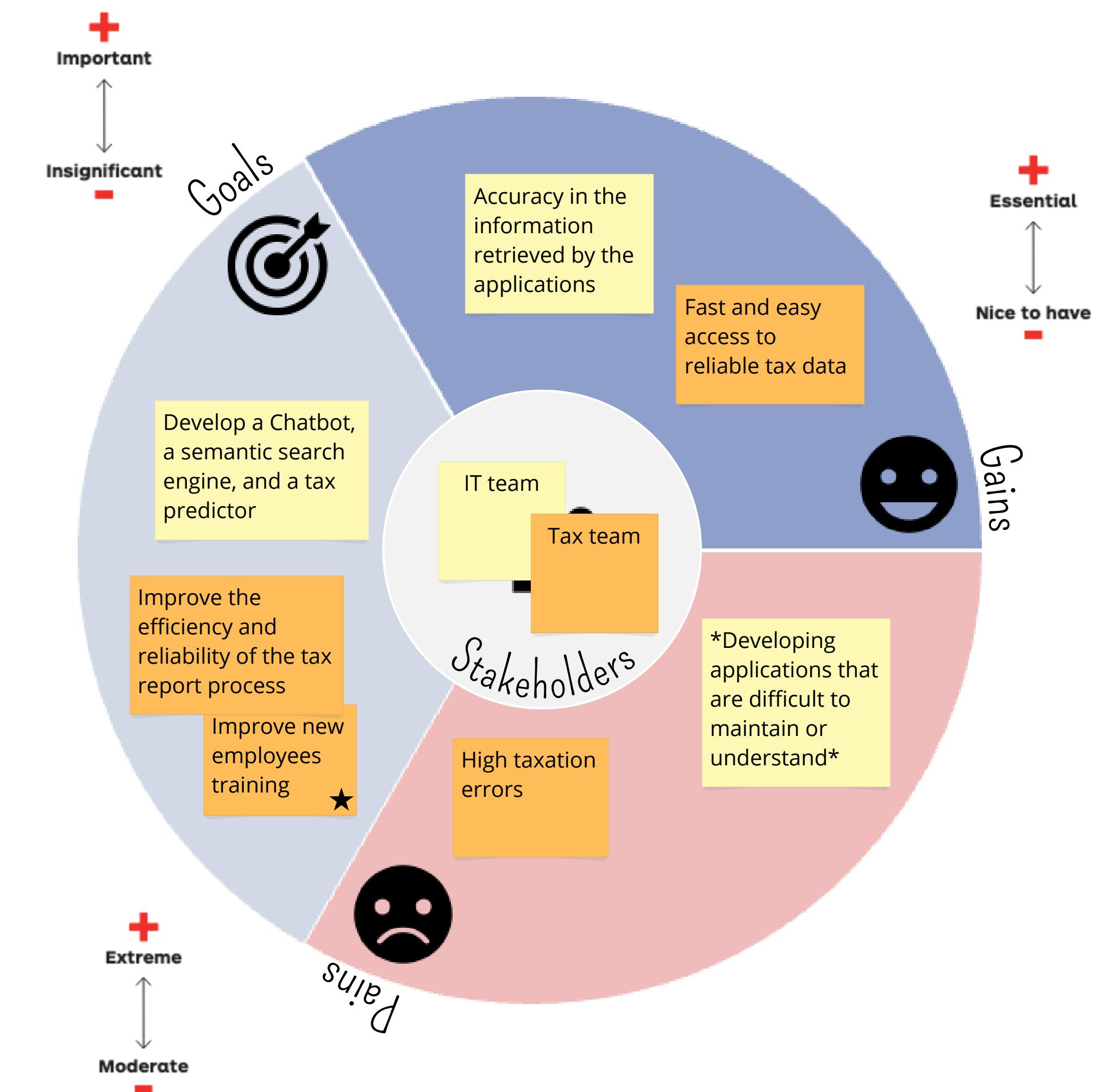
They capture what would satisfy stakeholders, the specific benefits and quality levels they expect from achieving their goals.

It specifies the individuals or groups affected by the decision and included in the analysis.

They identify adverse outcomes, risks, and obstacles that may hinder goal attainment or cause dissatisfaction.

# Fill-in tips Stakeholder Profile

- Begin by identifying each stakeholder, then define their goals, and record associated gains and pains, either sequentially or in parallel.
- Visually differentiate elements by stakeholder (e.g., using distinct colors for each stakeholder's goals, gains, and pains).
- Use an asterisk (\*) to indicate pains stakeholders seek to avoid, distinguishing them from existing pains.
- Visually differentiate goals, gains, and pains inferred from analysis rather than explicitly stated. (★)
- When numerous elements are recorded, prioritize by ranking goals by importance, gains by essentiality, and pains by severity.



2nd step

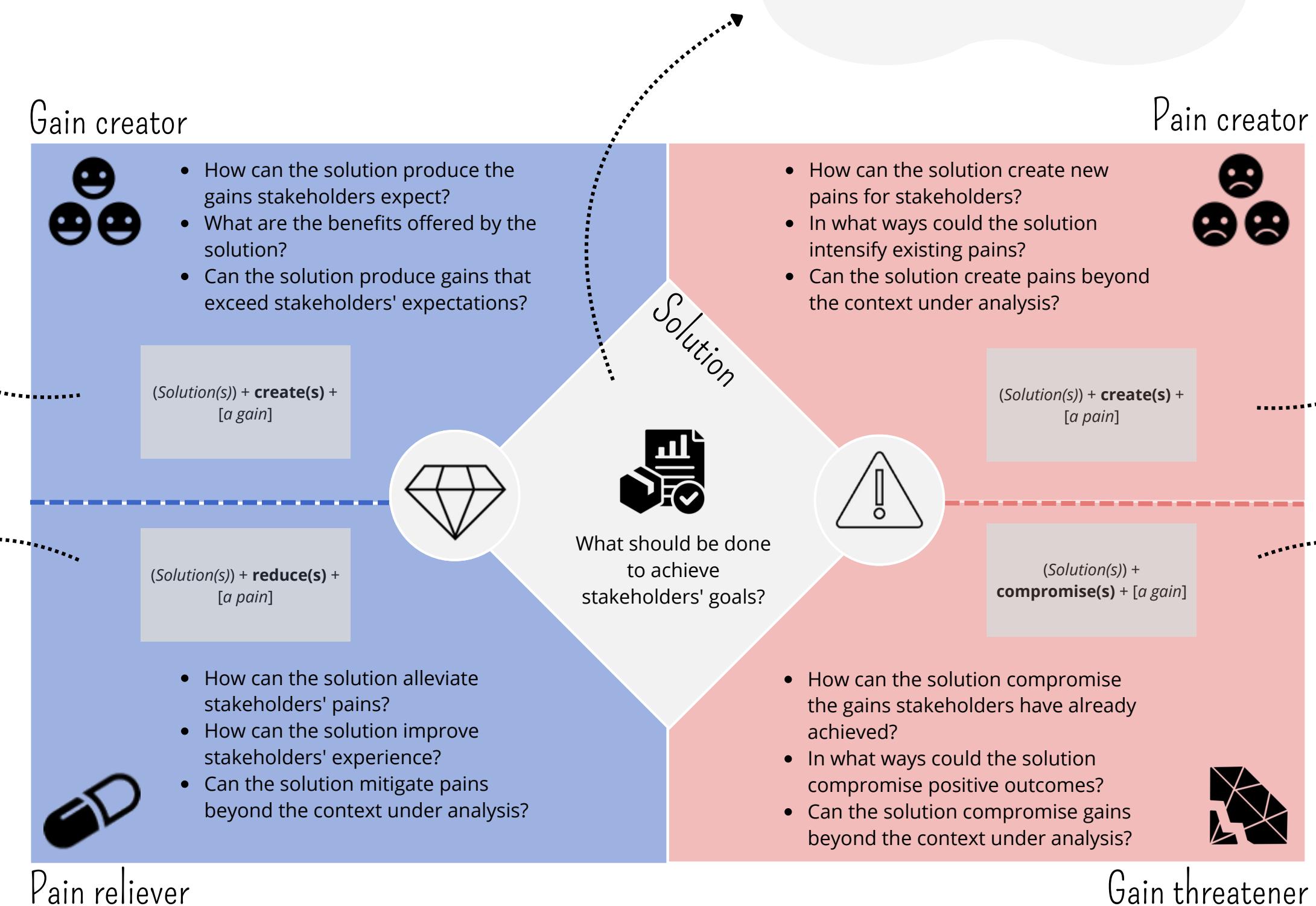
# Solution Value & Risk Map

It captures how the solution generates value by achieving stakeholders' gains.

It explains how the solution generates value by mitigating stakeholders' pains.

It specifies the object of analysis, which may be singular or multiple depending on the desired level of detail.

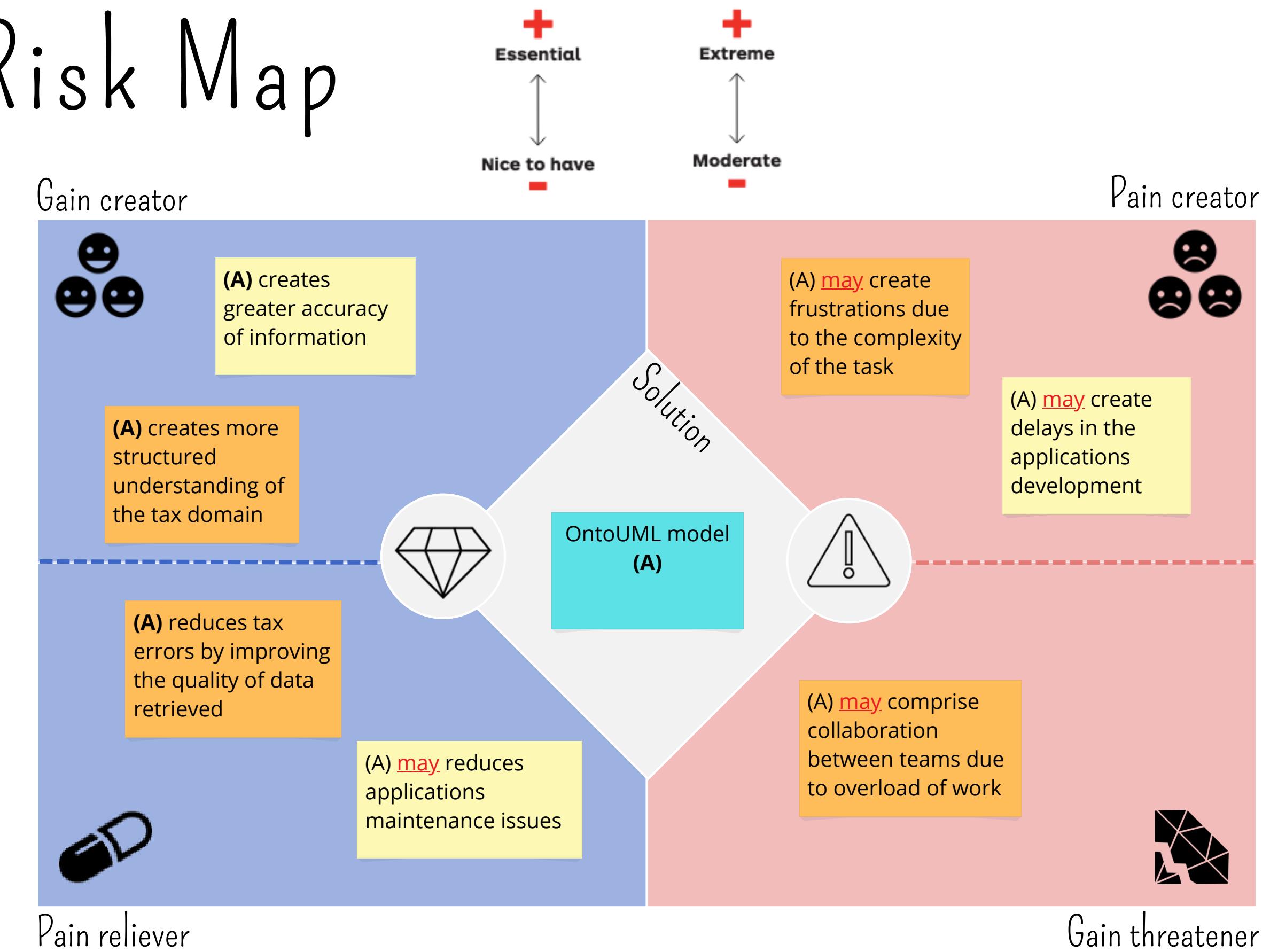
It describes how the solution introduces or exacerbates stakeholders' pains.



# Fill-in tips

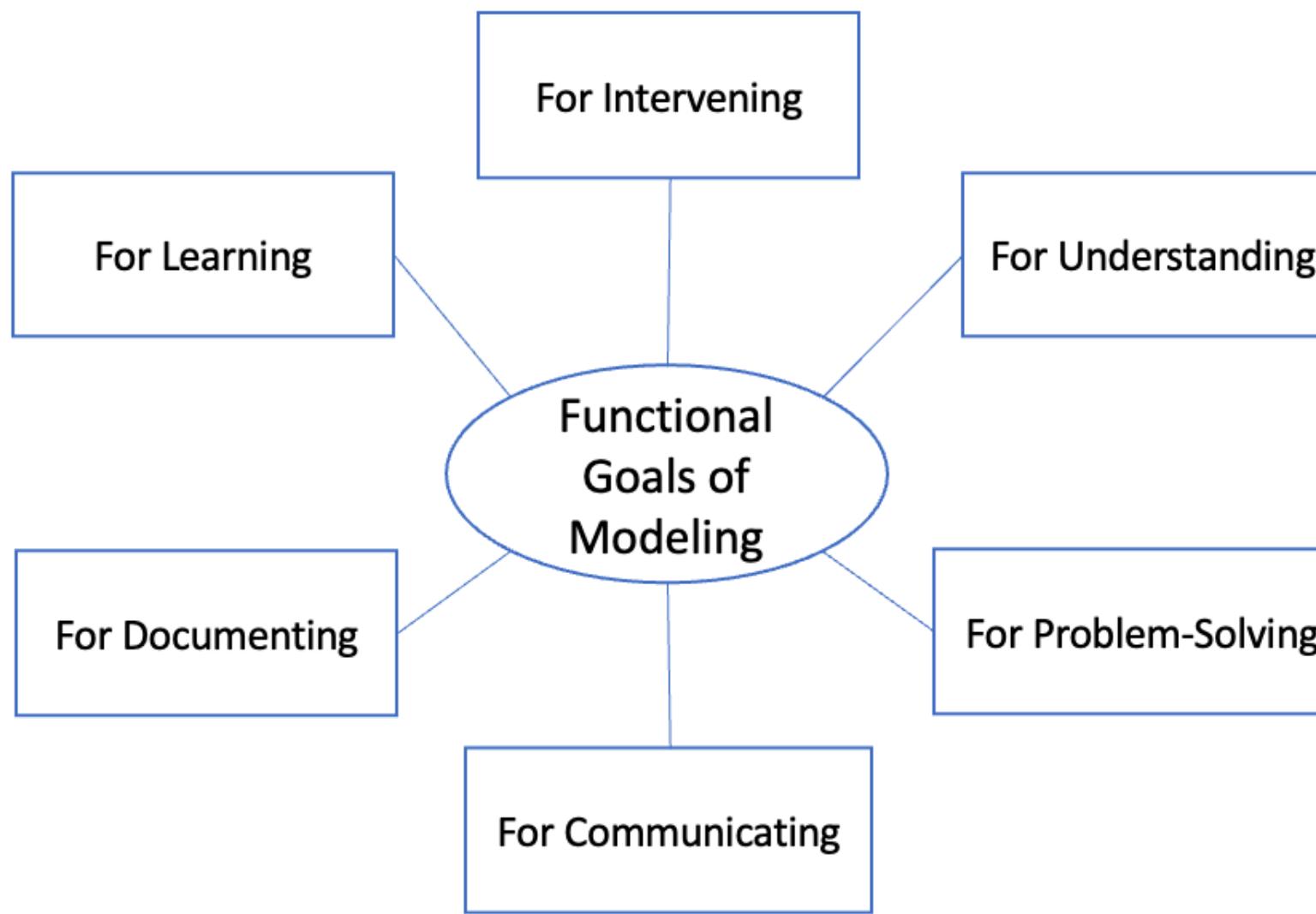
# Solution Value & Risk Map

- Define the solution first, then complete the value- and risk-related blocks either sequentially or in parallel.
- If the solution is decomposed into parts, visually differentiate them (e.g., using distinct labels).
- Clearly associate each value or risk with the corresponding solution element.
- Visually differentiate elements by stakeholder (e.g., using distinct colors).
- Use the auxiliary "may" to indicate value or risk outcomes that involve uncertainty.
- When numerous elements are recorded, prioritize by ranking gains created and pains relieved by essentiality, and pains created and gains compromised by severity.



# Fill-in tips

# Value



Academic reference

To comprehend the value of a model, it is imperative to identify the goals for which it can be used.

| Goal                | Definition  |
|---------------------|---|
| For Intervening     | A goal of using a model as an instrument through which one changes something in the world.                      |
| For Understanding   | A goal of creating a model to support domain understanding and meaning negotiation.                             |
| For Problem-Solving | A goal of using a model to guide problem-solving and decision-making.   |
| For Communicating   | A goal of using a model to support communication between people about a domain of interest.                     |
| For Documenting     | A goal of using a model to support <i>asynchronous</i> communication between people about a domain of interest. |
| For Learning        | A goal of creating or using a model to learn modeling, modeling methods, and modeling tools.                    |

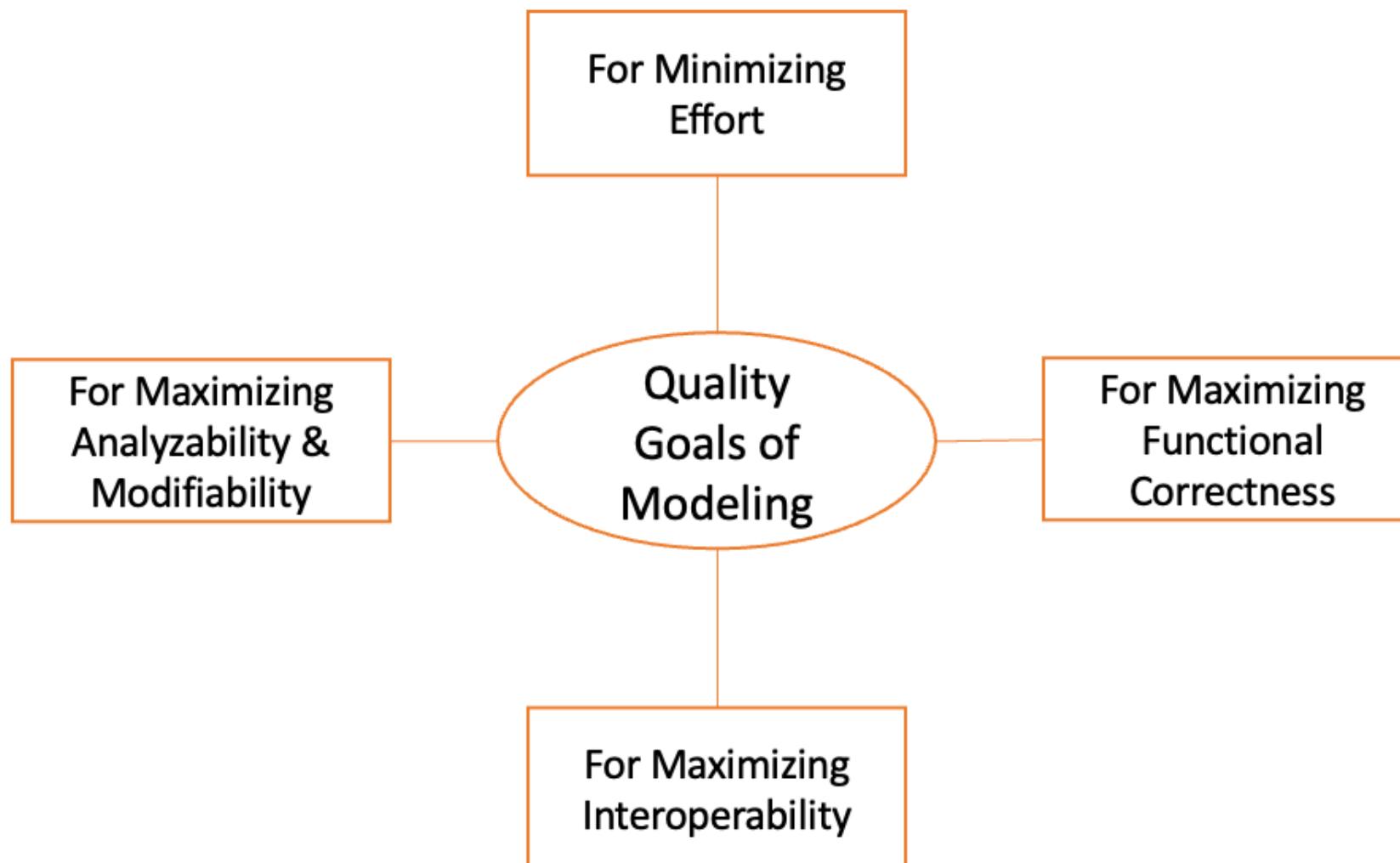
# Fill-in tips

## Value



Academic reference

To comprehend the value of a model, it is imperative to identify the goals for which it can be used.



| Goal   | Definition   |
|--|--|
| For Minimizing Effort                        | A goal of minimizing a user's effort in using a model to change the world or people's minds.   |
| For Maximizing Functional Correctness        | A goal of maximizing the degree to which a system functions correctly by using a model.  |
| For Maximizing Interoperability              | A goal of maximizing the degree to which systems, products, or components can exchange information and use the information that has been exchanged by using a model. |
| For Maximizing Analyzability & Modifiability | A goal of maximizing the degree to which it is possible to analyze and modify a system by using a model.   |

# Fill-in tips

## Risk

Models become a threat when ...

They are abandoned

They are difficult to understand

They have poor layout

They become unsuitable for use

They are semantically unreliable

They are used for inappropriate goal



Academic reference

To comprehend the risk a model may create, it is imperative to identify when it becomes a threat.

# Fill-in tips

## Risk

Out-of-date and inaccurate models may ...

Causes delay in feature creation/bug correction

Results in incorrect system integration

Leads to software maintenance issues

Leads to excessive time/effort in model maintenance

Causes incorrect domain interpretation



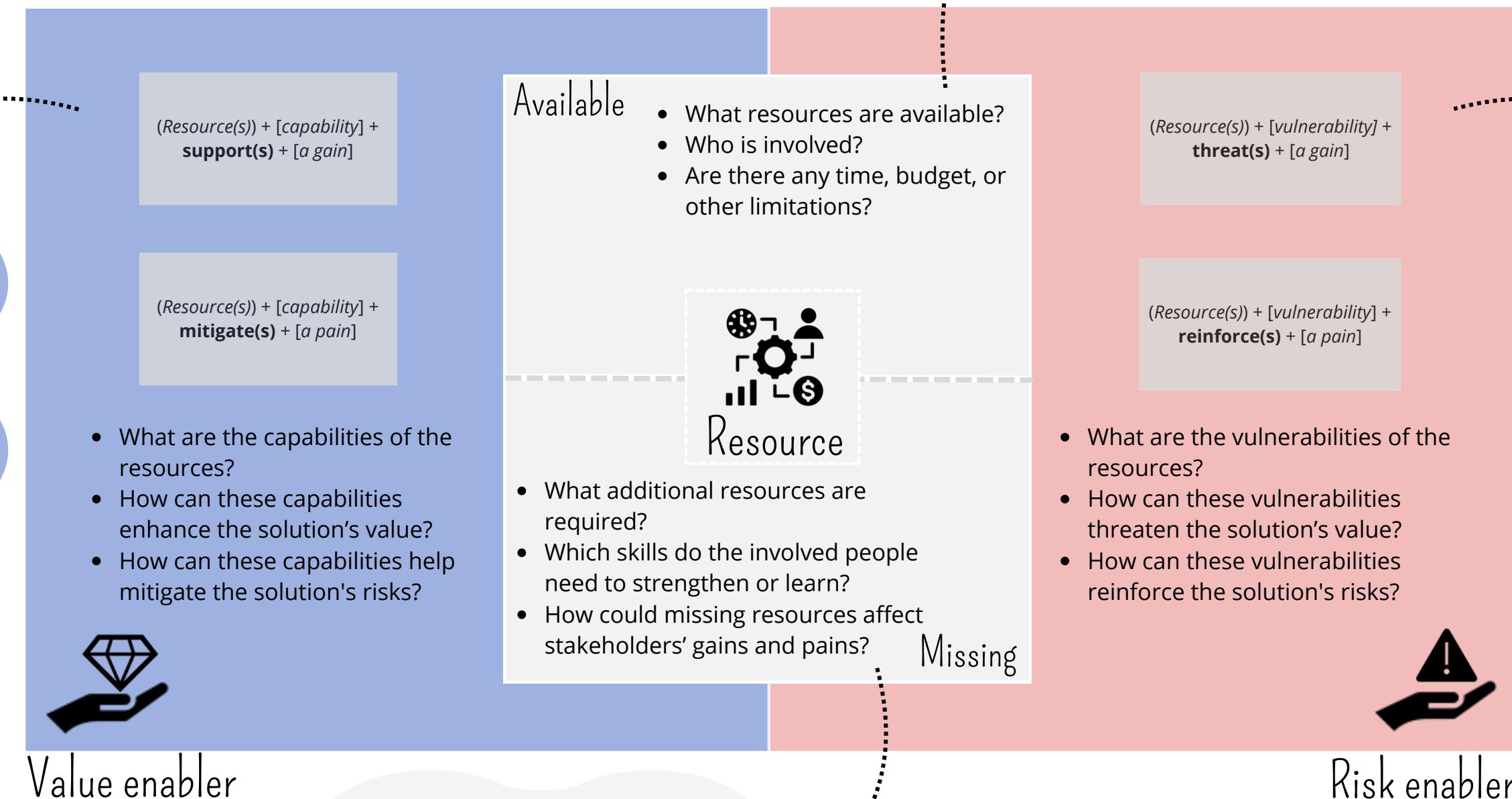
Academic reference

To comprehend the risk a model may create, it is imperative to identify the threat it may pose.

3rd step

# Resource Value & Risk Map

It explains how the resources' capabilities may support gains or mitigate pains.



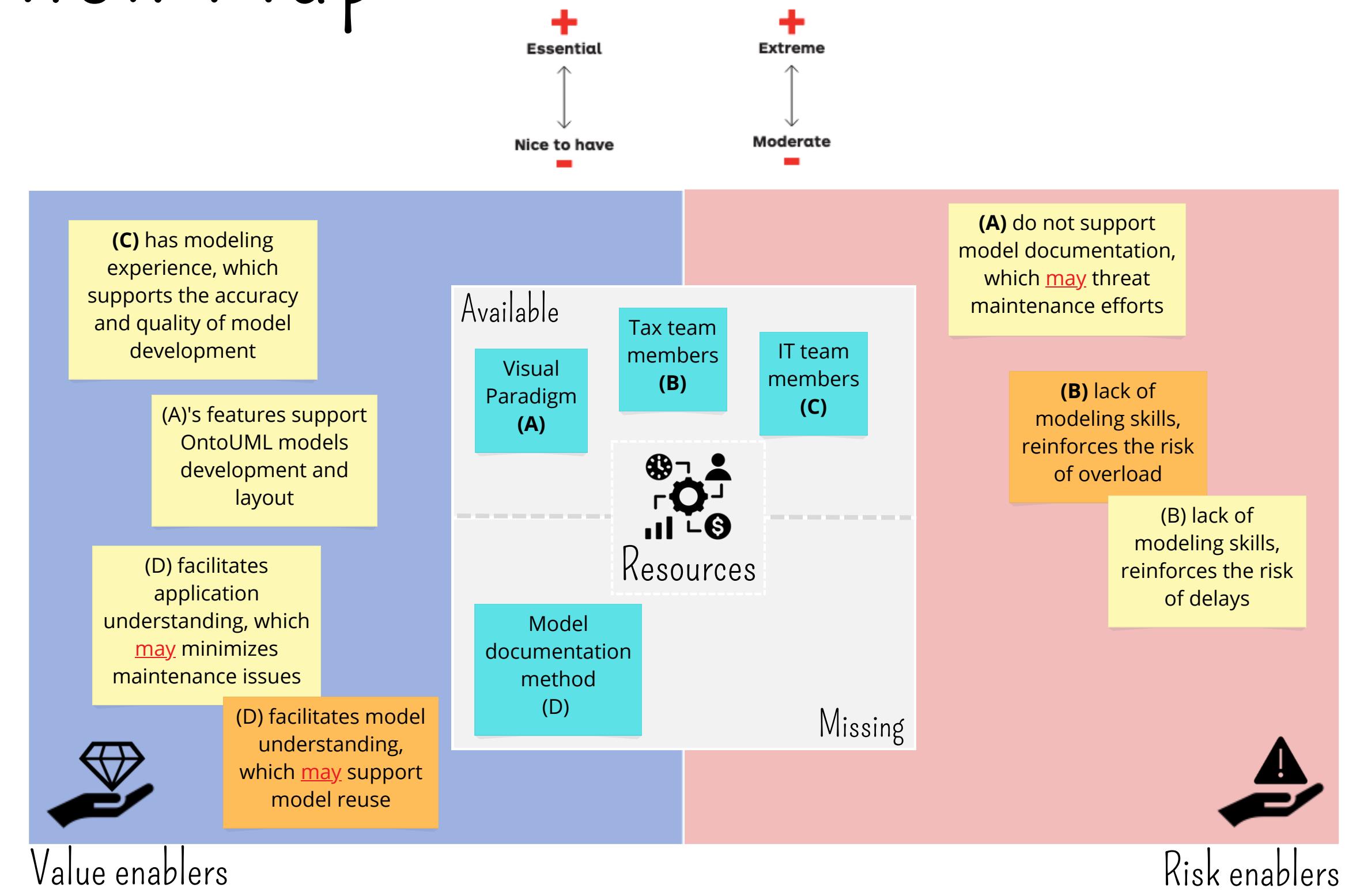
It lists the resources required but not yet available.

It lists the resources currently accessible for developing and applying the solution.

# Fill-in tips

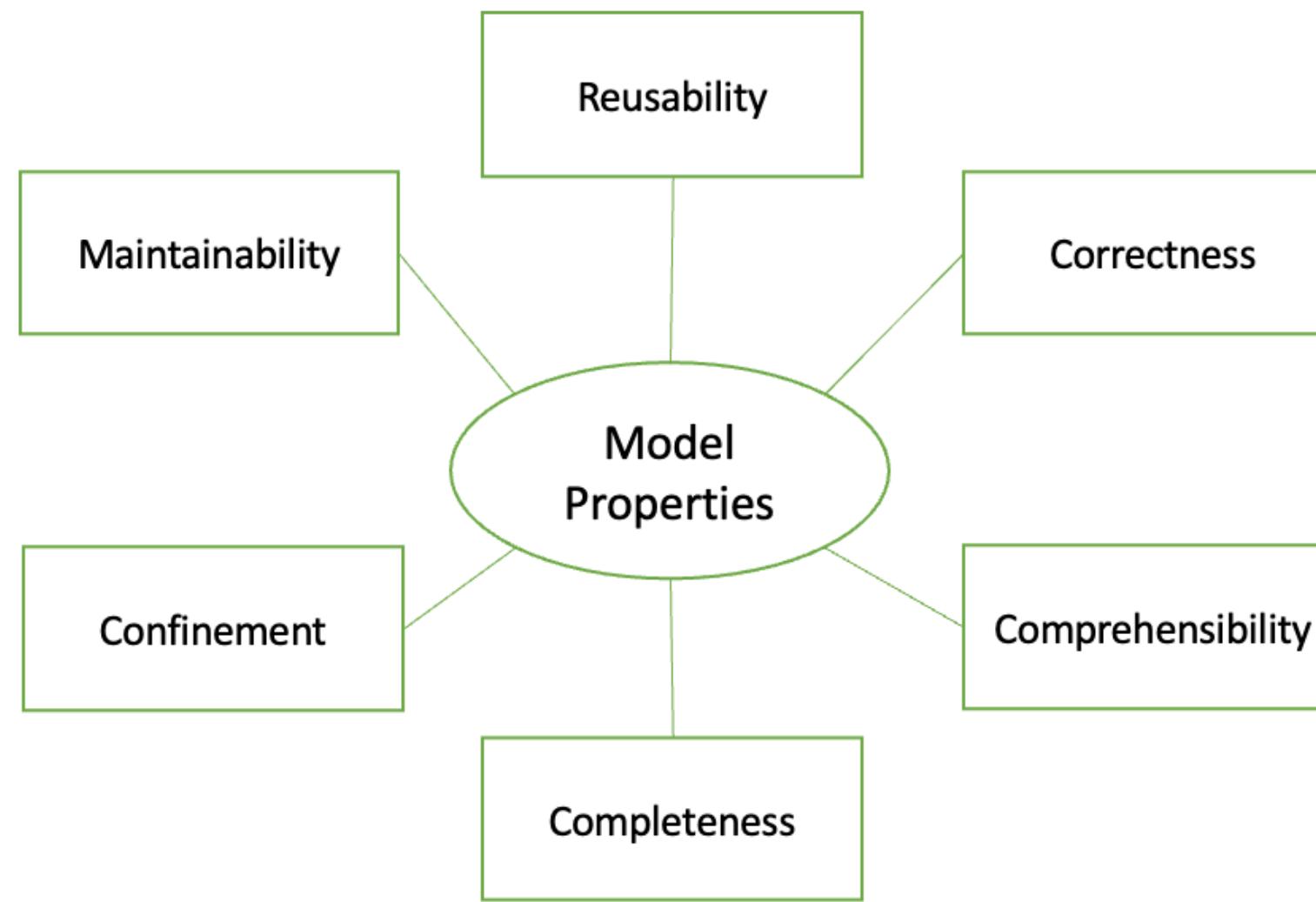
# Resource Value & Risk Map

- Identify available resources, then complete the value- and risk-related blocks either sequentially or in parallel.
- Specify missing resources by identifying gains and pains that could be influenced by resources the company does not currently possess.
- Visually differentiate the resource (e.g., using distinct labels).
- Clearly associate each identified enabler with the corresponding resource.
- Visually differentiate elements by stakeholder (e.g., using distinct colors).
- Use the auxiliary "may" to indicate enablers that involve uncertainty.
- When numerous elements are recorded, prioritize by ranking value enablers by essentiality and risk enablers by severity.



# Fill-in tips

# Value enablers



Academic reference

To define the value enablers, it is imperative to identify the resources' capabilities that support the properties of the model more relevant to the context.

| Goal              | Definition   |
|-------------------|--|
| Reusability       | The degree to which a model can be reused in a different context and{/}or for a different purpose than it originally intended. |
| Correctness       | The degree to which a model can properly represent the domain, its elements, and their relations.                              |
| Comprehensibility | The degree to which a model can be understood by its intended users.   |
| Completeness      | The degree to which a model has the necessary information to fulfill its purpose.  |
| Confinement       | The degree to which a model only has the necessary information to fulfill its purpose.   |
| Maintainability   | The degree to which a model can be changed.  |

# Fill-in tips

# Risk enablers

## The pain points of modeling



Academic reference

To define the risk enablers, it is imperative to identify the resources' vulnerabilities that may cause the pain points of modeling.

| Pain point                | Description  |
|---------------------------|--|
| Improper Requirements     | I could not properly define the model requirements. E.g., when stakeholders were unsure of their needs or the domain was unfamiliar to me.   |
| Resistance to Modeling    | My stakeholders resisted adopting modeling, a modeling language, or a tool. E.g., when they perceived modeling as unnecessary or I failed to demonstrate the value of the model I wanted to create.                            |
| Expensive Requirements    | It was costly to define the model requirements. E.g., when many requirements had to be defined and agreed among many stakeholders.   |
| Effortful Negotiation     | It was costly to negotiate a common definition among experts about a concept of the project's domain of interest. E.g., when I lacked negotiation skills or even my domain experts could not agree among themselves.           |
| Effortful Verbalization   | It was costly to verbalize my model in a way that was suitable for the different audiences that should be able to use it. E.g., when the tool I used lacked such a feature or too many different verbalizations were required. |
| Inadequate Explanation    | It was hard to explain my model to my stakeholders. E.g., because they do not know how to model or I am not good at explaining my model.   |
| Unclear Conceptualization | Writing definitions for the elements in my model was hard and boring. E.g., when domain experts were not available or I was unsure how to structure a definition.  |
| Complexity Issues         | The model has become too complex and too costly to maintain. E.g., because the tool I chose did not support documentation or the model contained too many elements.  |

# Fill-in tips

## Risk enablers

### The pain points of modeling



Academic reference

To define the risk enablers, it is imperative to identify the resources' vulnerabilities that may cause the pain points of modeling.

| Pain point               | Description   |
|--------------------------|---|
| Laborious Reuse          | I wanted to reuse an existing model, but I had to redraw it from scratch. E.g., when it was only available as an image or in a different language/tool.   |
| Tool Restrictions        | I could not choose the modeling tool I wanted. E.g., due to constraints related to cost, expertise, culture, or bureaucracy.  |
| Effortful Diagramming    | It was costly to manually split the model into visually appealing and understandable views (diagrams). E.g., when I was unfamiliar with aesthetic guidelines or the tool did not support diagram creation.                        |
| Overlooked Documentation | My colleagues did not consider it important to document the model and did not understand my efforts to do so. E.g., when they lacked modeling knowledge or I failed to show the model's value for maintenance or reuse.           |
| Limited Verification     | The tool I chose did not support model verification. My model was large and complex and verifying it by myself was not trivial. E.g., when I had to use a suboptimal tool due to organizational constraints or lacked experience. |
| Unclear Approach         | It was costly to define the model-driven approach. E.g., when my company lacked a modeling culture or I struggled to identify the best method.  |
| Disinterest in Use       | I was the only one on the team interested in using and reusing the model. E.g., when I was the sole person who understood it or my colleagues did not know how to leverage its benefits.  |
| Unclear Documentation    | I was not sure how to document my model. E.g., when I was uncertain about what to include or how much effort to invest.   |

Fill-in tips

# Risk enablers

## Potential Causes of the Pain Points



Academic reference

To define the risk enablers, it is imperative to identify the resources' vulnerabilities that may cause the pain points of modeling.

| Pain Point                       | Modeler | Stakeholder | Organization | Method | Tool | Language | Model | Domain | Project |
|----------------------------------|---------|-------------|--------------|--------|------|----------|-------|--------|---------|
| <b>Improper Requirement</b>      | X       | X           |              | X      |      |          | X     | X      |         |
| <b>Resistance to Modeling</b>    | X       | X           | X            | X      |      |          |       |        |         |
| <b>Expensive Requirement</b>     | X       | X           |              | X      |      |          |       | X      | X       |
| <b>Effortful Negotiation</b>     | X       | X           |              | X      |      |          |       | X      |         |
| <b>Effortful Verbalization</b>   | X       |             |              |        | X    | X        |       |        |         |
| <b>Inadequate Explanation</b>    | X       | X           |              | X      |      |          | X     |        |         |
| <b>Unclear Conceptualization</b> | X       | X           |              | X      |      |          |       | X      |         |
| <b>Complexity Issues</b>         |         |             |              |        | X    |          |       |        | X       |
| <b>Laborious Reuse</b>           |         |             |              |        | X    | X        | X     |        |         |
| <b>Tool Restrictions</b>         |         | X           | X            |        |      |          |       |        |         |
| <b>Effortful Diagramming</b>     | X       |             |              |        | X    |          |       |        | X       |
| <b>Overlooked Documentation</b>  | X       | X           | X            |        |      |          |       |        |         |
| <b>Limited Verification</b>      | X       | X           | X            |        | X    |          |       |        |         |
| <b>Unclear Approach</b>          | X       |             | X            | X      |      |          |       |        | X       |
| <b>Disinterest in Use</b>        | X       | X           | X            |        |      |          |       |        |         |
| <b>Unclear Documentation</b>     | X       |             | X            | X      |      |          |       |        | X       |

**Modeler-related Frustrations:** Stem from the modeler's limited skills, knowledge, or confidence, causing difficulties in using tools, creating diagrams, or collaborating effectively.

**Stakeholder-related Frustrations:** Arise when stakeholders lack the ability to understand models or clearly express goals, needs, and domain knowledge.

**Organization-related Frustrations:** Result from a weak modeling culture, missing standards, unclear processes, or low acceptance of model-based practices.

Fill-in tips

# Risk enablers

## Potential Causes of the Pain Points



Academic reference

To define the risk enablers, it is imperative to identify the resources' vulnerabilities that may cause the pain points of modeling.

| Pain Point                       | Modeler | Stakeholder | Organization | Method | Tool | Language | Model | Domain | Project |
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| <b>Resistance to Modeling</b>    | X       | X           | X            | X      |      |          |       |        |         |
| <b>Expensive Requirement</b>     | X       | X           |              | X      |      |          |       | X      | X       |
| <b>Effortful Negotiation</b>     | X       | X           |              | X      |      |          |       | X      |         |
| <b>Effortful Verbalization</b>   | X       |             |              |        | X    | X        |       |        |         |
| <b>Inadequate Explanation</b>    | X       | X           |              | X      |      |          | X     |        |         |
| <b>Unclear Conceptualization</b> | X       | X           |              | X      |      |          |       | X      |         |
| <b>Complexity Issues</b>         |         |             |              |        | X    |          |       |        | X       |
| <b>Laborious Reuse</b>           |         |             |              |        | X    | X        | X     |        |         |
| <b>Tool Restrictions</b>         |         | X           | X            |        |      |          |       |        |         |
| <b>Effortful Diagramming</b>     | X       |             |              |        | X    |          |       |        | X       |
| <b>Overlooked Documentation</b>  | X       | X           | X            |        |      |          |       |        |         |
| <b>Limited Verification</b>      | X       | X           | X            |        | X    |          |       |        |         |
| <b>Unclear Approach</b>          | X       |             | X            | X      |      |          |       |        | X       |
| <b>Disinterest in Use</b>        | X       | X           | X            |        |      |          |       |        |         |
| <b>Unclear Documentation</b>     | X       |             | X            | X      |      |          |       |        | X       |

Fill-in tips

# Risk enablers

## Potential Causes of the Pain Points

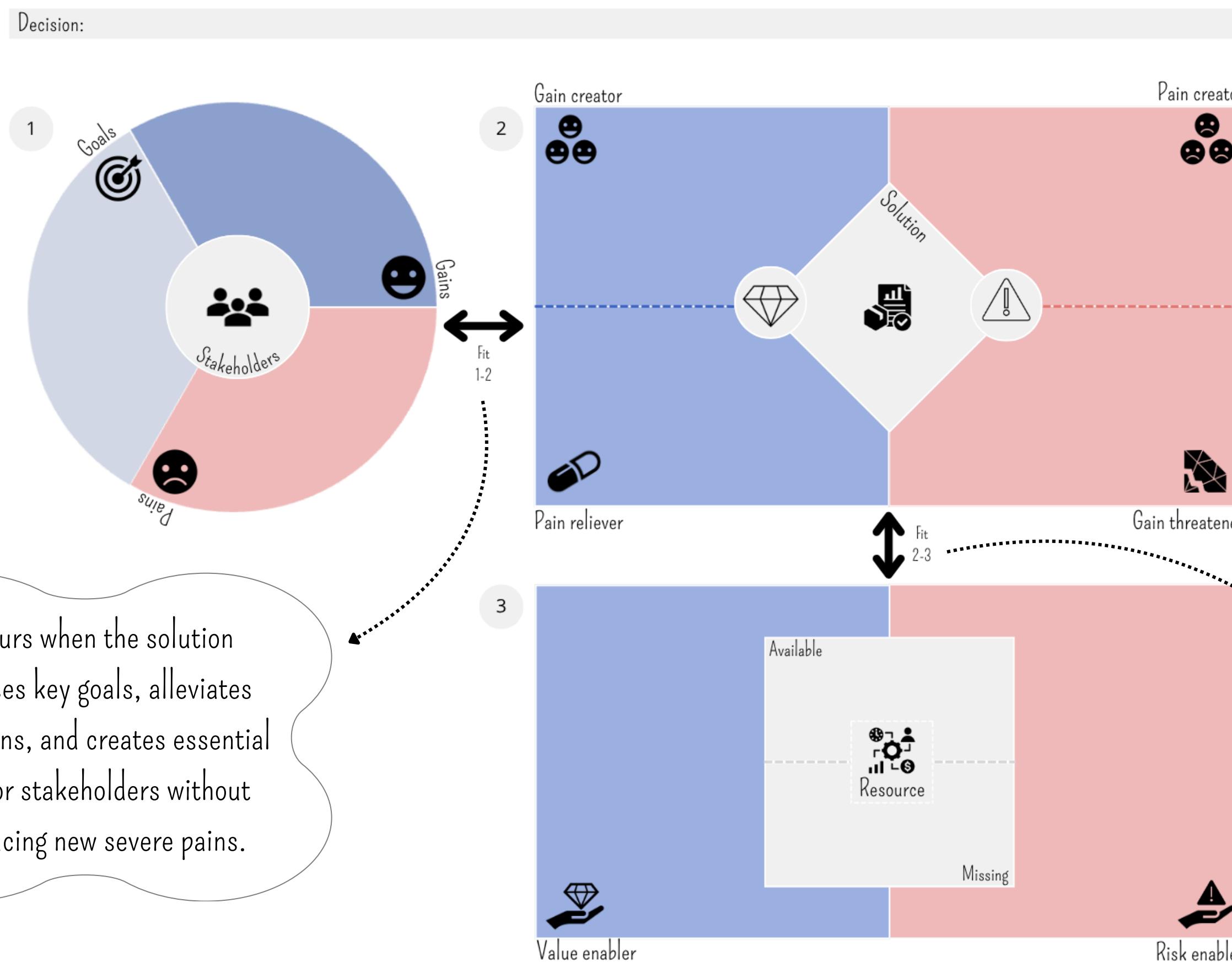


To define the risk enablers, it is imperative to identify the resources' vulnerabilities that may cause the pain points of modeling.

| Pain Point                       | Modeler | Stakeholder | Organization | Method | Tool | Language | Model | Domain | Project |
|----------------------------------|---------|-------------|--------------|--------|------|----------|-------|--------|---------|
| <b>Improper Requirement</b>      | X       | X           |              | X      |      |          |       | X      | X       |
| <b>Resistance to Modeling</b>    | X       | X           | X            | X      |      |          |       |        |         |
| <b>Expensive Requirement</b>     | X       | X           |              | X      |      |          |       | X      | X       |
| <b>Effortful Negotiation</b>     | X       | X           |              | X      |      |          |       | X      |         |
| <b>Effortful Verbalization</b>   | X       |             |              |        | X    | X        |       |        |         |
| <b>Inadequate Explanation</b>    | X       | X           |              | X      |      |          | X     |        |         |
| <b>Unclear Conceptualization</b> | X       | X           |              | X      |      |          |       | X      |         |
| <b>Complexity Issues</b>         |         |             |              |        | X    |          |       |        | X       |
| <b>Laborious Reuse</b>           |         |             |              |        | X    | X        | X     |        |         |
| <b>Tool Restrictions</b>         |         | X           | X            |        |      |          |       |        |         |
| <b>Effortful Diagramming</b>     | X       |             |              |        | X    |          |       |        | X       |
| <b>Overlooked Documentation</b>  | X       | X           | X            |        |      |          |       |        |         |
| <b>Limited Verification</b>      | X       | X           | X            |        | X    |          |       |        |         |
| <b>Unclear Approach</b>          | X       |             | X            | X      |      |          |       |        | X       |
| <b>Disinterest in Use</b>        | X       | X           | X            |        |      |          |       |        |         |
| <b>Unclear Documentation</b>     | X       |             | X            | X      |      |          |       | X      |         |

# Final step

## Fits



It occurs when the solution addresses key goals, alleviates major pains, and creates essential gains for stakeholders without introducing new severe pains.

It occurs when critical resources are used to strengthen the solution's capabilities to deliver desired value and reduce vulnerabilities that could undermine it.

# Tips to achieve Fits

Decision: Should we create a model to support the applications development?

