

Lecture 2

Requirements Discovery & Analysis

Context Diagram

Com S/SE 4090/5090

Robyn Lutz

rlutz@iastate.edu

Contacts & office hours (see Canvas for any updates)

Robyn Lutz: rlutz@iastate.edu

Office Hours: 3:30 Wed (230 ATAN); 1 Fri (<https://iastate.zoom.us/my/rlutz>), & by appointment

TAs' Office Hours start next week:

Carter Wunsch (10 hrs/wk)

Email: cwunsch@iastate.edu

Office hours: 12:30 Wed (0145 Pearson?) & by appointment

Abdurahman Mohammed (10 hrs/wk)

Email: abdu@iastate.edu

Office hours: 11:30 Wed (0145 Pearson?); 2 Thurs (<https://iastate.webex.com/meet/abdu>) & by appointment

Pratik Maitra (10 hrs/wk)

Email: pmaitra@iastate.edu

Office hours: 4:30 Wed (0145 Pearson?) & by appointment

Assignment: form teams by Friday

- Teams: HW and Project may be done in teams of 3 or 4
- 4090 teams & 5090 teams
- Email Pratik pmaitra@iastate.edu by this Fri, 8/29:
 - Option 1: with the **names & emails** of your team's members. If your team has 2 members & you'd like more, put that in your email.
 - Option 2: with a statement that you want to work individually
 - Option 3: otherwise, we'll assign you to a team

IceBreaker

- Case study we'll use based on [Robertson & Robertson, 3rd ed.]
Abbreviated here as "R&R". Optional, & available through ISU library at <https://learning.oreilly.com/search/?q=MASTERING%20REQUIREMENTS%20PROCESS&rows=100&language=en>
- Software product to predict when and where ice will form on roads, & to schedule trucks to treat the roads with de-icing material.



vaisala.com/en/roaddss-manager

IceBreaker

Q: What's the *problem* to be solved?

“PAM” for IceBreaker

The *problem* to be solved is that ice on the roads causes accidents.

IceBreaker as a *solution*:

Purpose? (What’s a viable solution to the problem that that provides a business advantage?)

Ex: Accurately forecast road freezing times & schedule de-icing treatment.

Advantage? (What’s advantage to business of achieving goal?)

Ex: Client (road authorities) reduces road accidents by reducing icy roads

Measurement? (What’s measurement of success?)

Ex: Accidents attributed to ice shall be less than 15% of winter accidents.

Types of Requirements

Requirements describe:

- what the product is intended to accomplish for its users,
- in what manner it is to accomplish it
- what constraints it must satisfy in its context

1. A **functional** requirement is something the product must do (p. 10 R&R)

Ex: “The product shall produce an updated schedule when a truck’s status changes.”

2. A **nonfunctional** requirement is a quality (a property) that the product must have (p. 10)

- Ex: “The product shall produce this amended schedule in less than 0.25 seconds.”

3. A **constraint** is a restriction placed on the project or eventual design of the product (p. 10)

- Ex: “The product shall be available at the beginning of the new tax year.”
- Ex: “The product shall operate on an iPad.”

Step 1. Agree on the project's **scope**

- What is the scope of the work (the processing activity and information that your product will support)?
- The scope is that part of the business that will change when you install the product you intend to build.
- Model the scope in a **Context Diagram**

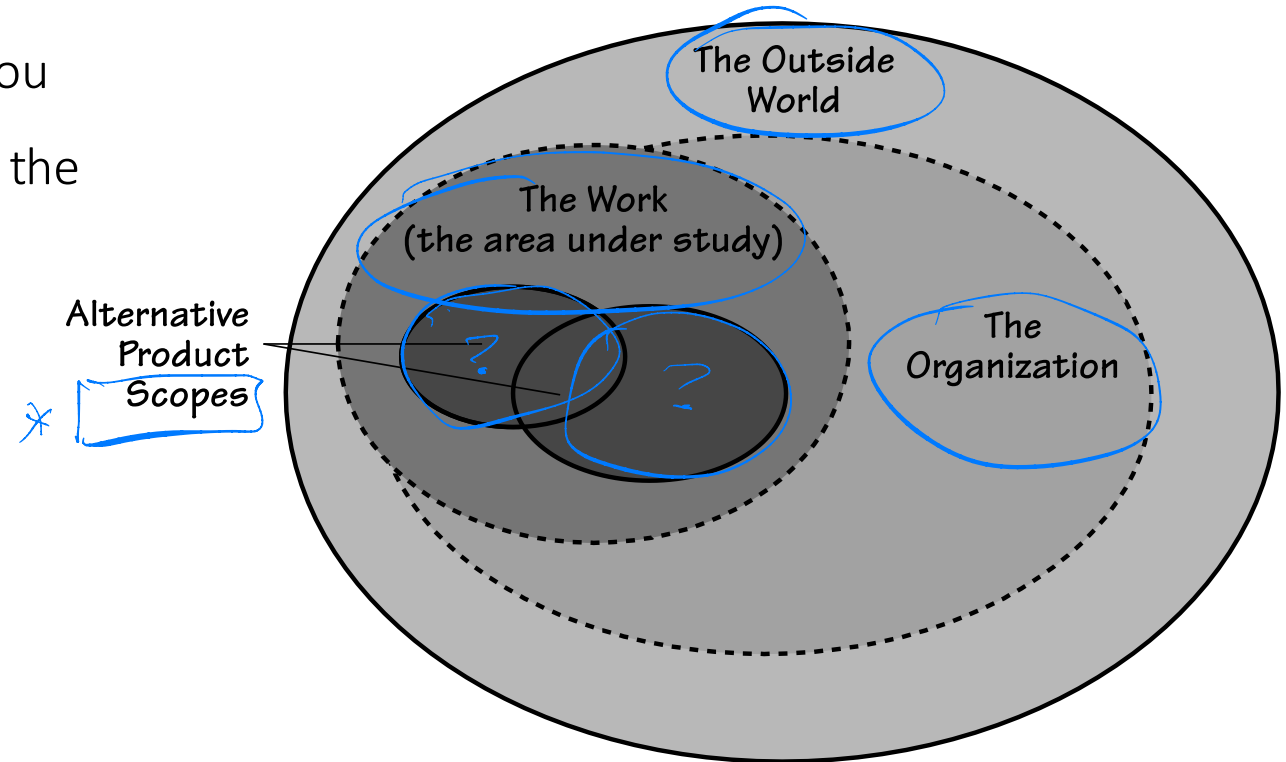
Figure 3.3

“The work is the part of the organization that you need to study to discover the requirements.

The work is usually connected to other parts of the organization and to the outside world.

You must study the work well enough to understand how it functions.

This understanding will enable you to come up with alternative scopes for the product and eventually choose the one to build.”



AGREE on which product to develop*

*Blue annotations are mine, placed on top of figures from R&R

Figure 3.5

The work context diagram identifies the scope of the work to be studied.

It shows the work as a single activity, surrounded by the adjacent systems.

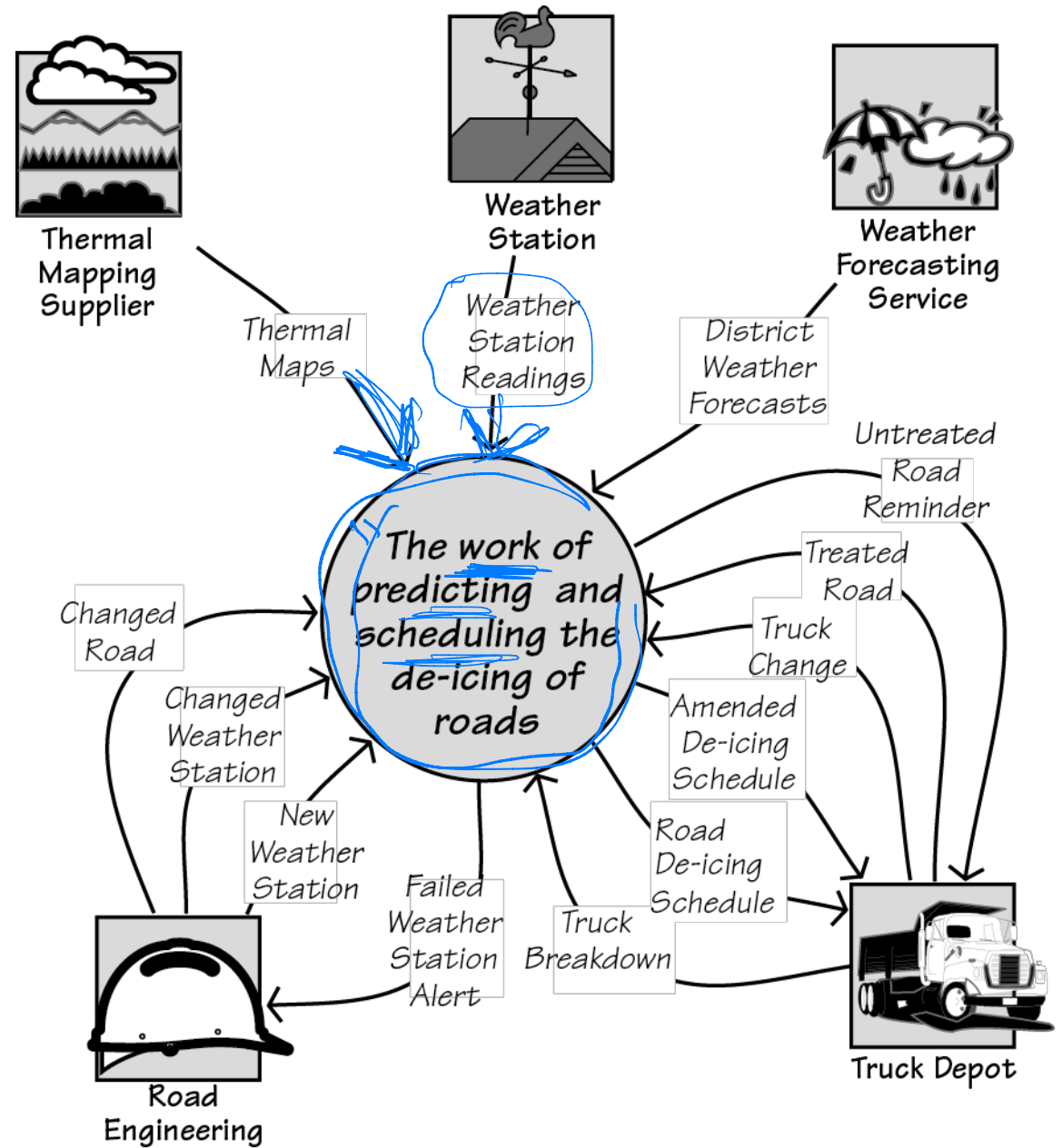
The named arrows represent the data that flows between the work and the adjacent systems.

The adjacent systems are the activities that you have decided not to study.

IceBreaker Context Diagram

model

Adjacent systems are automated or human systems that receive data or services from your work activity &/or supply data or services to your work (R&R pp. 190-192.)



Step 2. Identify the Stakeholders

- Anyone with an interest in, or an effect on, the outcome of the product
- Why do we care?
- Because stakeholders are a source of requirements! If you don't find all the stakeholders, you'll miss some requirements.
- Who are the stakeholders for the IceBreaker?

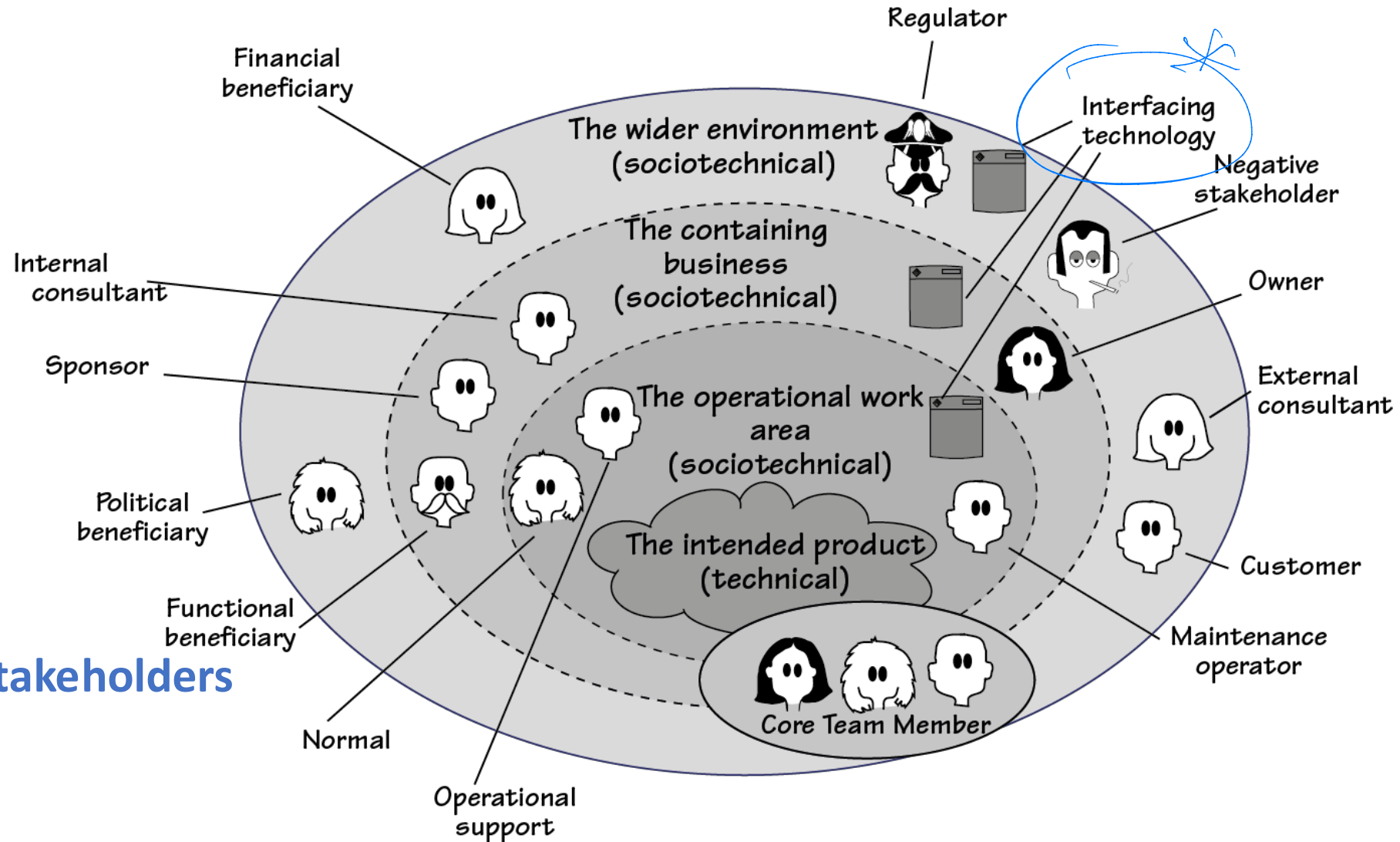
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Q: Who are the stakeholders for the IceBreaker?

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Q: Who are the stakeholders for the IceBreaker?

A: Stakeholders include *road engineers, truck depot supervisors, road safety experts, weather forecasters, . . .*



Candidate stakeholders

Figure 3.7

This stakeholder map shows the organizational rings surrounding the eventual product, and the classes of stakeholders who inhabit these rings. Use this map to help determine which classes of stakeholders are relevant to your project and which roles you need to represent them.

Step 3. Discover the high-level requirements (aka **Goals**)

- What are the **Business Goals** of the IceBreaker project?
- Software product is there to solve a business problem; understand it.

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Q: What are the **Business Goals** of the IceBreaker project?

A:

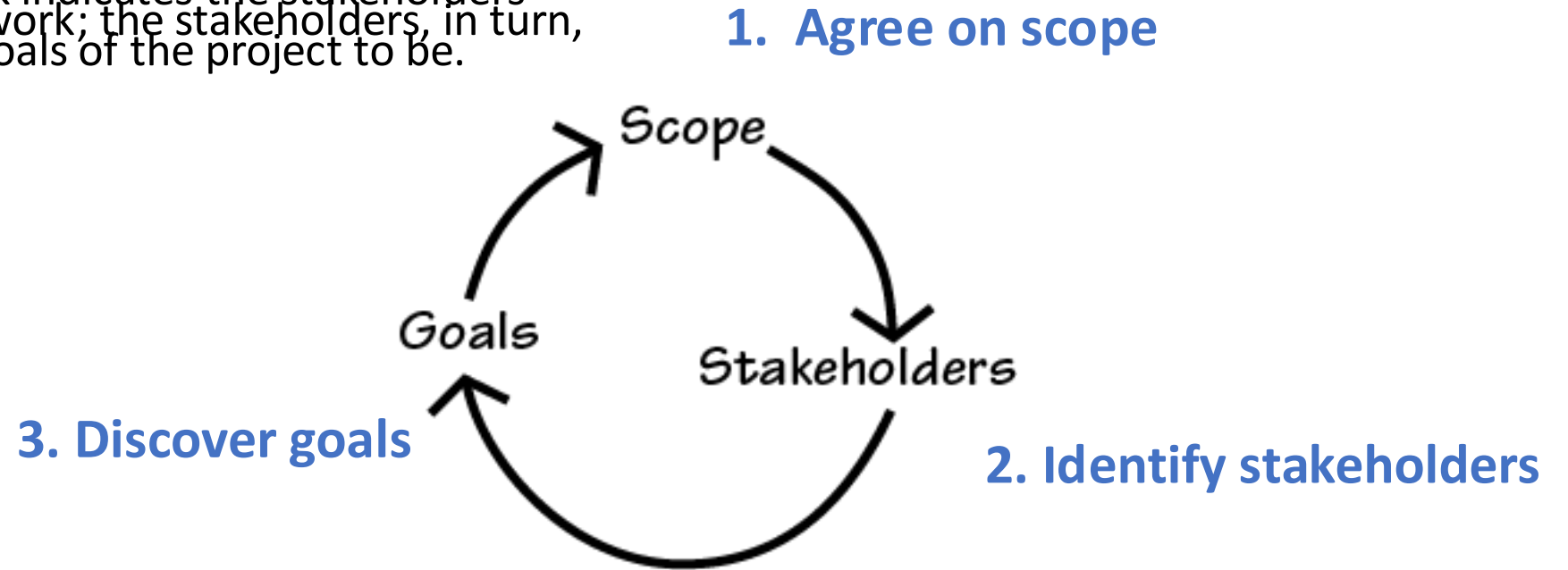
- more accurate prediction & de-icing schedule
- safer roads
- reduced waste of de-icing supplies

Software product is there to *solve* a business problem → understand the problem

Figure 3.6

The scope, stakeholders, and goals are not decided in isolation from one another.

Rather, the scope of the work indicates the stakeholders who have an interest in the work; the stakeholders, in turn, decide what they want the goals of the project to be.



Discovering the requirements

Risk: “You must come to the correct understanding of the requirements and have your client agree with them, or your product will be seriously deficient.”

Risk Reduction:



1. Scope (with context diagram),
2. Identify stakeholders with requirements/constraints for the product, and
3. Understand the business goals

R&R subtitle: “getting requirements right” has it right!

Practice: develop a 1st-draft **Context Diagram**

Mars Science Lab landing: https://www.youtube.com/watch?v=Ki_Af_o9Q9s

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