Requirements Engineering is the Compass that Guides Successful Solutions:

An Engineering Experience Report

By: Funmilayo Olaiya

July 13, 2023

Today's Agenda

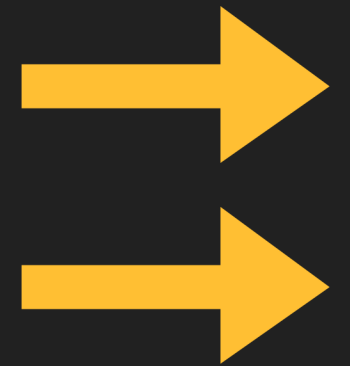**1** Introduction to the Purpose of the Study
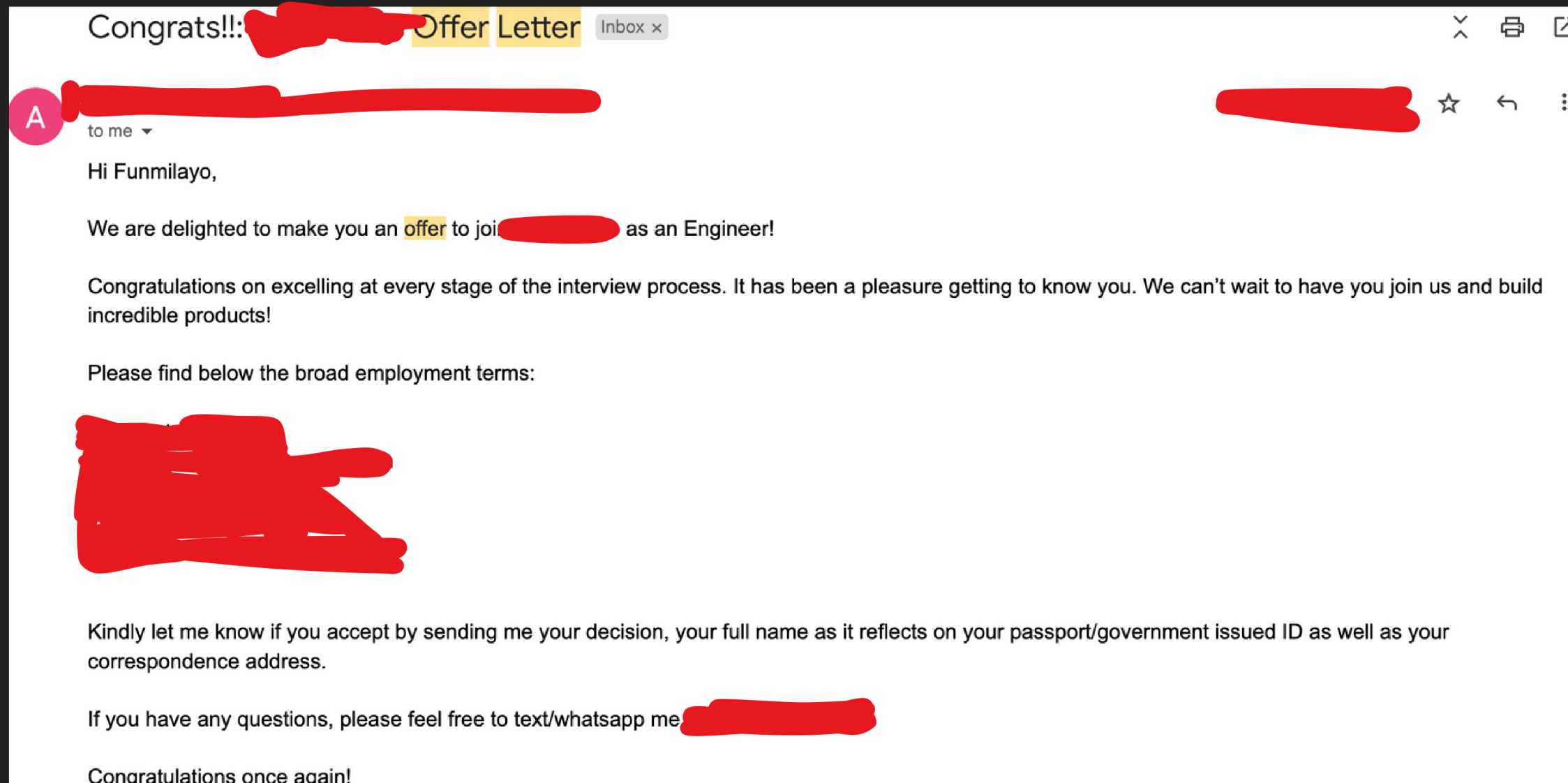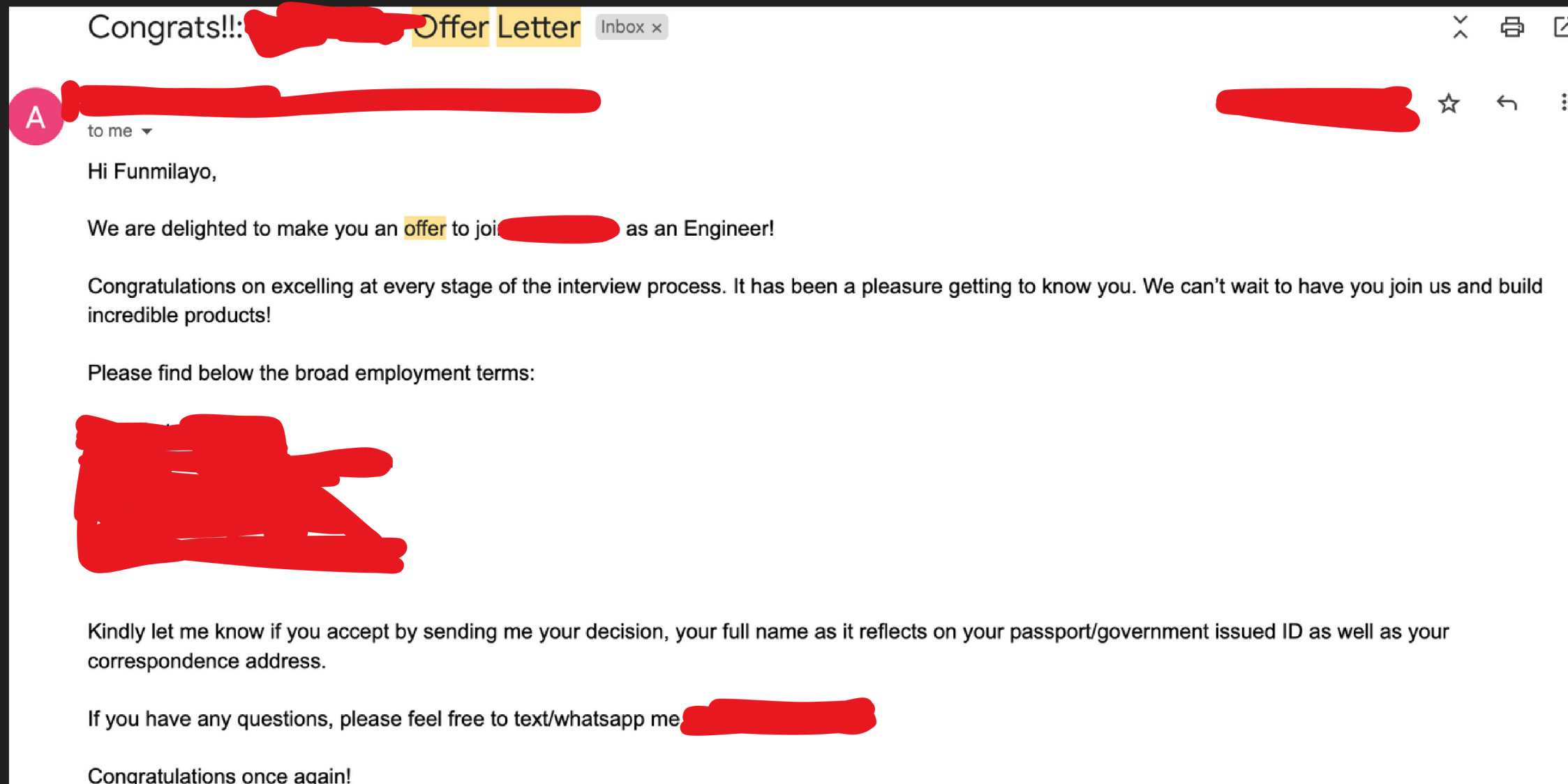
2 Work Case-Study

3 Discussion

4 Key Takeaways

1 Introduction to the Purpose of the Study

Congrats!!: ~~████~~ Offer Letter Inbox ×

A ~~██████████████~~   ~~████████~~ ☆ ↩ ⋮

to me ▾

Hi Funmilayo,

We are delighted to make you an offer to joi~~████~~ as an Engineer!

Congratulations on excelling at every stage of the interview process. It has been a pleasure getting to know you. We can't wait to have you join us and build incredible products!

Please find below the broad employment terms:

~~███████████████~~

Kindly let me know if you accept by sending me your decision, your full name as it reflects on your passport/government issued ID as well as your correspondence address.

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PURPOSE

Early-stage startups could be a menace sometimes

RQ - To comprehend and identify the reasons why technical debt started existing very early and requirements being constantly reviewed, re-interpreted, changed or added

Wastage of money & resources, burnt-out co-workers, technical debt and etc
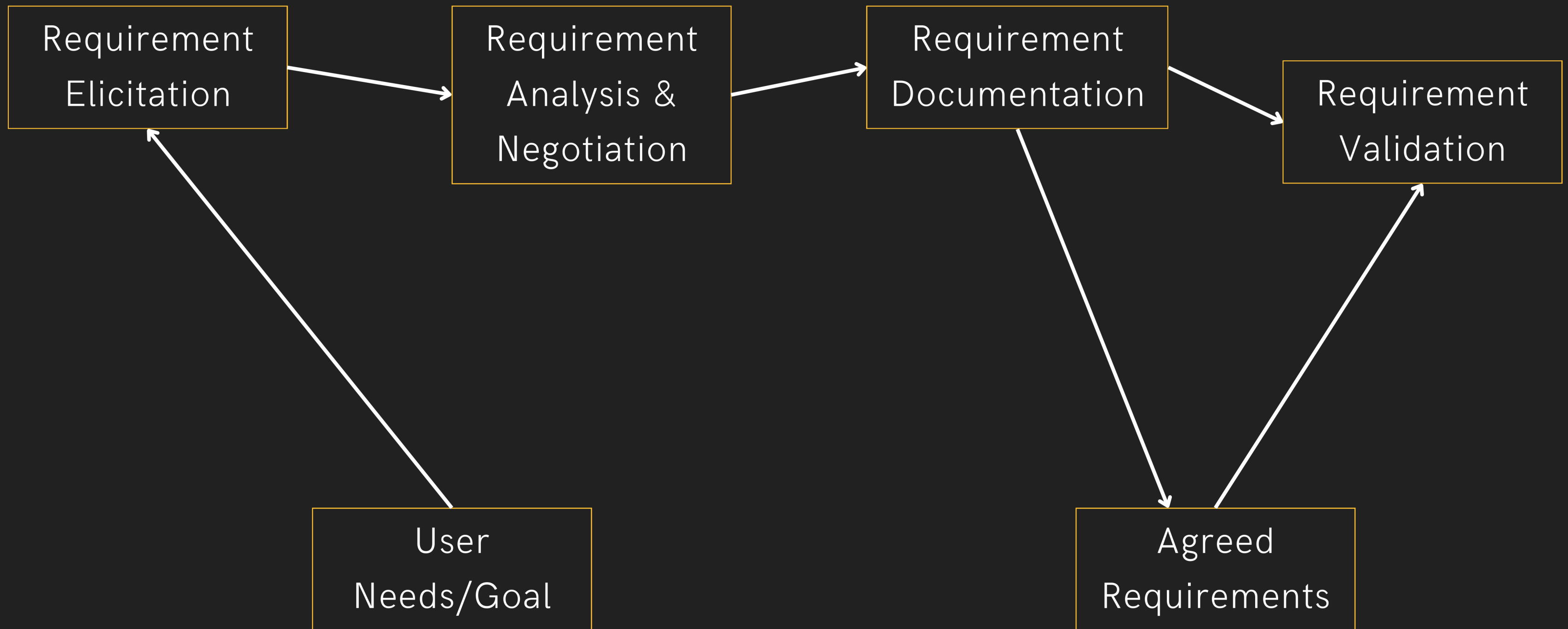
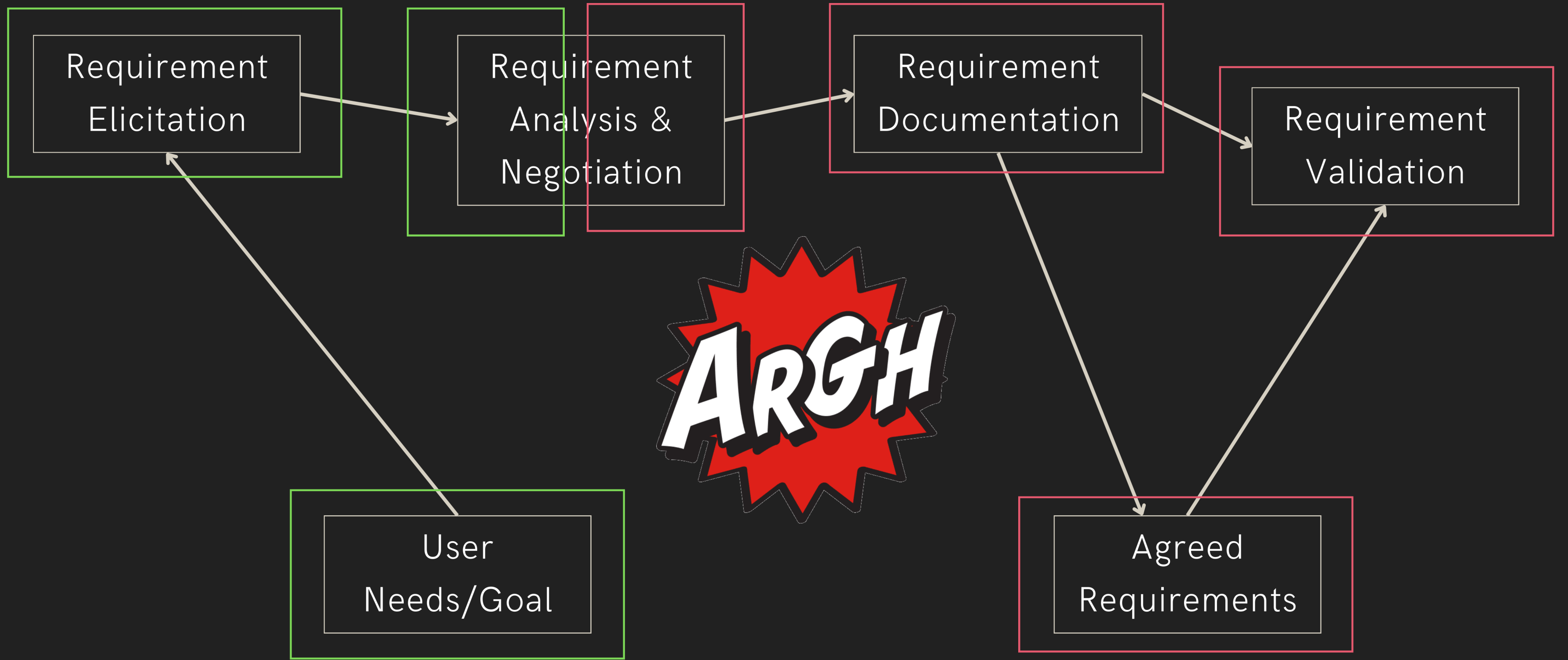**2** WORK-CASE STUDY

Figure 1: Requirements Engineering Process

Figure 1: Requirements Engineering Process

I realised something was fundamentally wrong with our processes

- There were other engineers, but was the only one working as FULL-STACK, I was the wire-man, responsible for overseeing & connecting the F.E & B.E
- I had to start re-fixing the back-end, that's what F.E does, it exposes the flaws. I knew nothing WOULD scale.
- We spent so much time re-iterating.
- Manager was only concerned on how the UI looked.
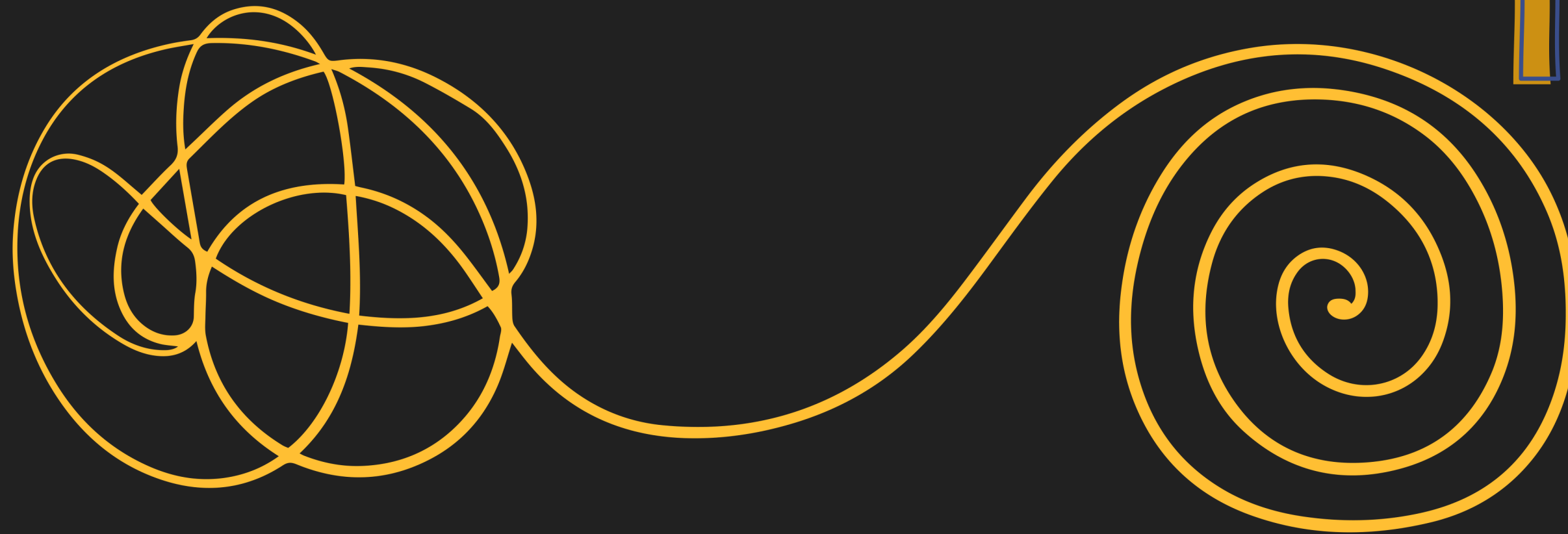- Build SHIT fast mentality.
- Let's get to the MARKET fast.

YES

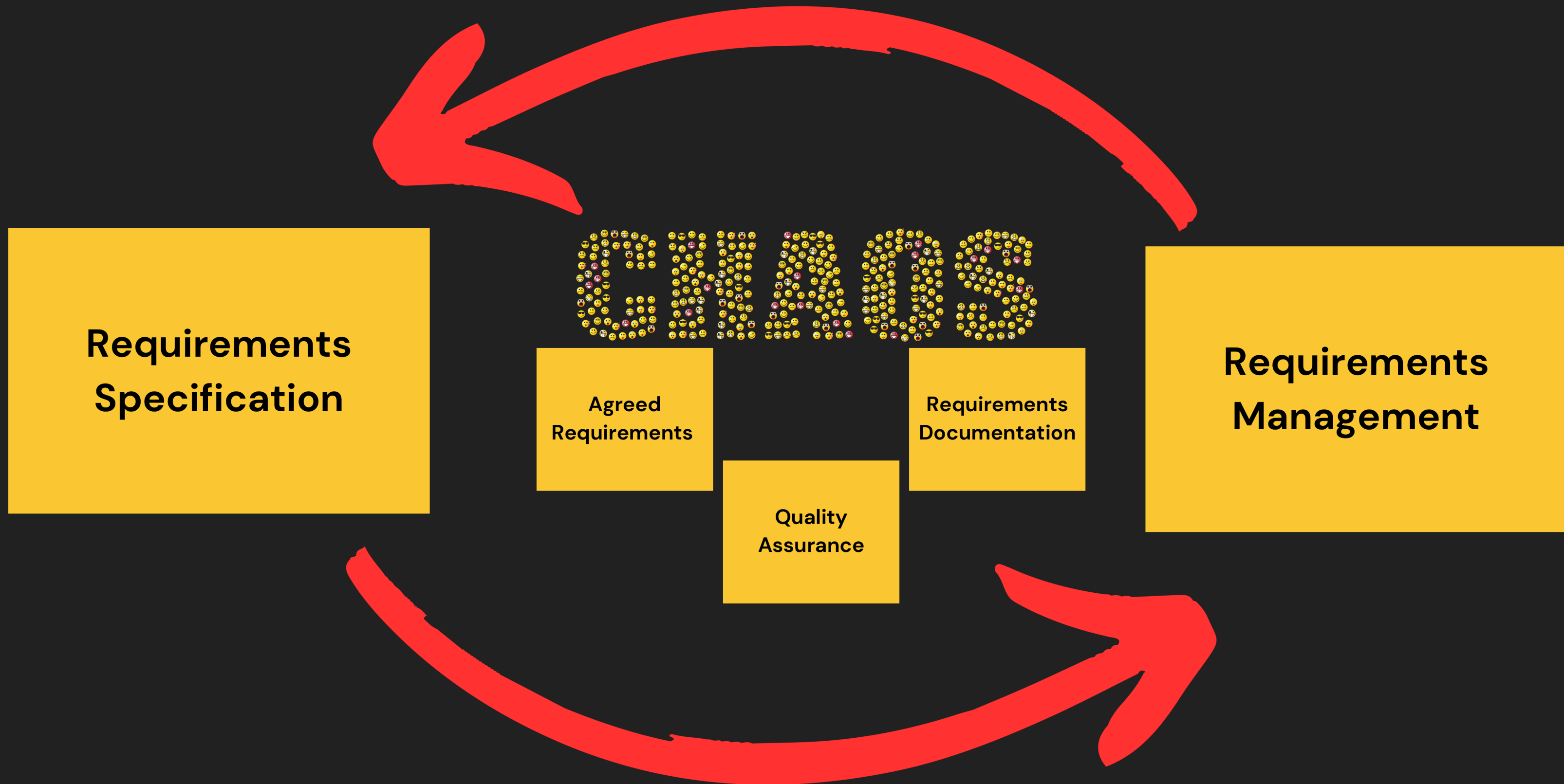Using certain papers to explain AND UNDERSTAND the problems.

A. The Main Complaint:

RA: "So there's never money or time put into project for ... keeping [the requirements and design] documentation up to date."

RA: "Give us enough time."

RA: " ... the major problem our *RAs* have is time.... To do requirements properly, you need time to collect data about the current state and to do analysis and document. In the majority of time, the timelines that are set by the executives or other groups do not give our *RAs* enough time to do the job properly...."

RA: "We don't have the time."

RA: "We can't control the timelines that are set by upper management."

Tester: "... Time to market.... Get something working out there quickly.... They are trying to shrink our testing time."

Requirements Determination is Unstoppable:
An Experience Report BY Dan Berry at al.

Requirements Engineering in a Start-up is Challenging

Problem:

- Rushing to have a MVP
- Lack of strong research
- Investor holding the legs of the S.Hs

In the startup environment, it is difficult to establish an engineering process for gathering, specifying, and maintaining requirements. RE practises are frequently simplified to a few core activities. Initially, because startups frequently build software for a growing target market, customers and end users are frequently unknown, and requirements are thus market-driven rather than customer-specific.

SOFTWARE DEVELOPMENT IN STARTUP COMPANIES: A SYSTEMATIC MAPPING STUDY BY PATERNOSTER ET AL.

Management Cannot Fully or Control or Determine RD

Problem:

- Manager believes that because he makes the call, RD is done.
- Bad S.E practices severely alters requirements work, and vice versa.
- I looked like the bad guy for months:
  - Code reviews could have helped determine RD better
  - Had to solve technical debt for a long time because of the F.E.

Management appears to believe that it has complete control on how much RD is done. There is no getting around having to do enough RD to create the code, and if not enough time has been allocated to allow the RAs to do enough RE before creating a (RS) to be given to the programmers and testers, then the programmers and testers will do the additional RD as they do their tasks.

REQUIREMENTS DETERMINATION IS UNSTOPPABLE: AN EXPERIENCE REPORT BY DAN BERRY ET AL.

Software Requirements are Simply Uncertain

Problem:
- So much uncertainty, we could have managed this better if what we had on ground (RS&RD) was solid.

Due to the inherent uncertainty in software requirements, such as the uncertainty about customer (or market) requirements, the context and environment of the project, and the feasibility, cost, and duration of developing each requirement, requirements engineering processes, requires more specifically requirement specification.

USING REAL OPTIONS TO MANAGE TECHNICAL DEBT IN REQUIREMENTS ENGINEERING BY ABAD & RUHE

Requirements Specification was Hazardous

Problem:
- No proper documentation on reqs.
- Poorly-defined requirements.
- At least, other places took notes, we did none.
- Sprints could have helped ~ Faulty Agile ways

Attempts to adequately specify requirements usually fail, sometimes fatally. One cause is the lack of a process that is formally defined and directly addresses the needs of requirement specification.

CORE - A METHOD FOR CONTROLLED REQUIREMENT SPECIFICATION by MULLERY

Requirements Validation

Problem:
- No RA.
- No proper testing done, TDD.
- The M was concerned more about out things looked on the outside and the 'it works' mentality
- Hold on- we did not even have a specs document. LOL

- Most businesses perform requirements validation on an ad hoc basis due to a lack of trained personnel or a lack of training or exposure to requirements validation.
- More emphasis is placed on the software testing phase, which is typically completed at the end of a software project after all modules have been integrated.
- Requirements validation techniques; requirements reviews, prototyping, use case based modelling etc.

EMPIRICAL STUDIES OF REQUIREMENTS VALIDATION TECHNIQUES BY RAJA

Requirements Management

Problem:

- Since there was no sensible RE done, there was simply no RM.

Requirement changes are unavoidable as a result of system errors and a better understanding of the evolution of consumers' true needs.

Requirements management activities include maintaining the project plan up to date with requirements, controlling requirements versions, tracking the state of requirements, and tracing the requirements.

IMPORTANCE OF REQUIREMENT MANAGEMENT : A REQUIREMENT ENGINEERING CONCERN BY PANDEY & PANDEY

When to Stop RE?

Problem:

- "*Underlyingly*", we kept on doing R.E (even though we had no name for it).
- We did not know when to stop reqs, everyone had something to say concerning UI, BE, FE etc
- Ego situation with some developers.
- This Led to STRONG undocumented processes ~ no feedback to engineers not present.

To notify the RAs on the RE team when the RS fits the condition, the RE team must include at least one member from the eventual coding team and at least one member from the eventual testing team.

REQUIREMENTS DETERMINATION IS UNSTOPPABLE: AN EXPERIENCE REPORT BY DAN BERRY ET AL.

- At LAST, we ran out of FUNDING.
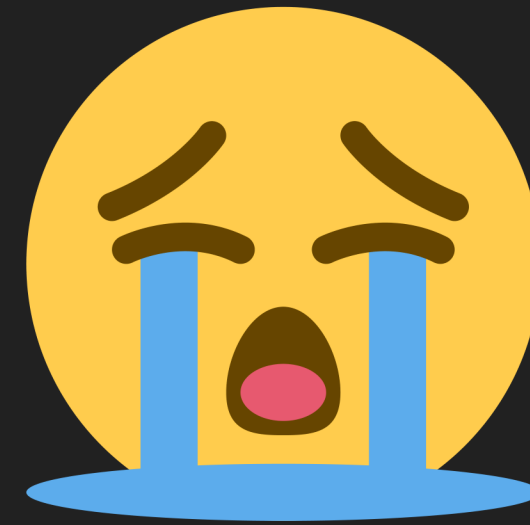
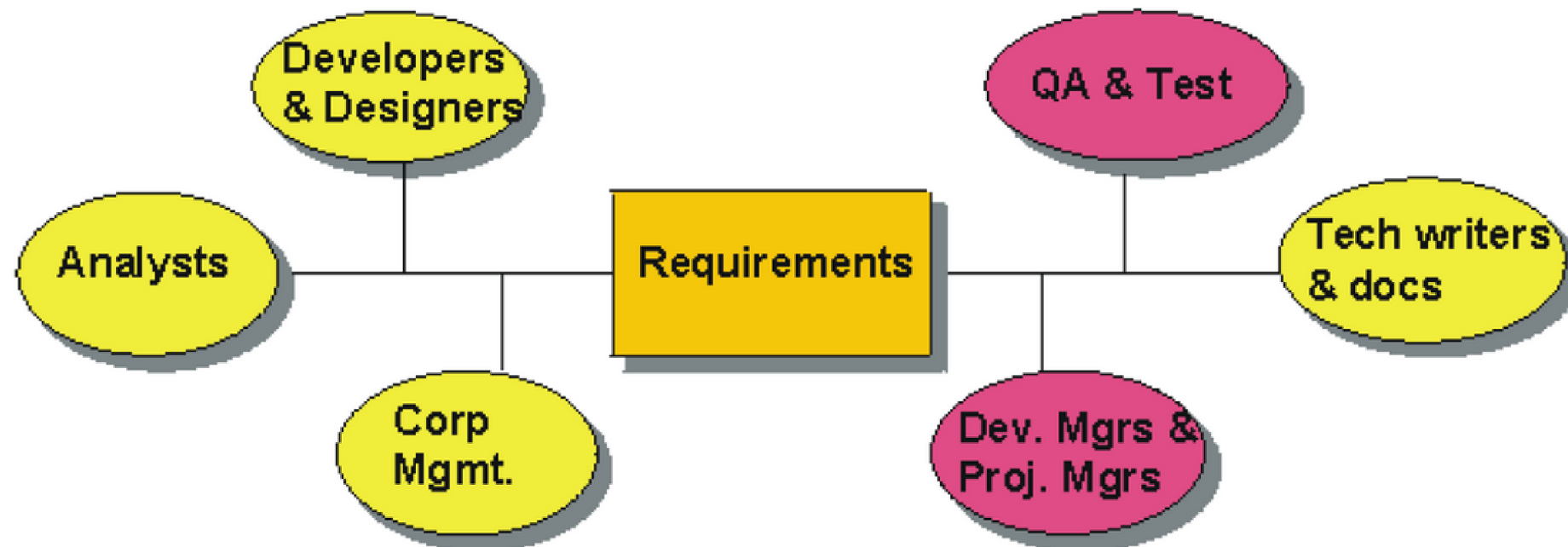**3** Discussion

Determining Requirements

Figure 4—Cross-functional Requirements Team

Applying Requirements Management with Use
Cases BY Oberg et al.

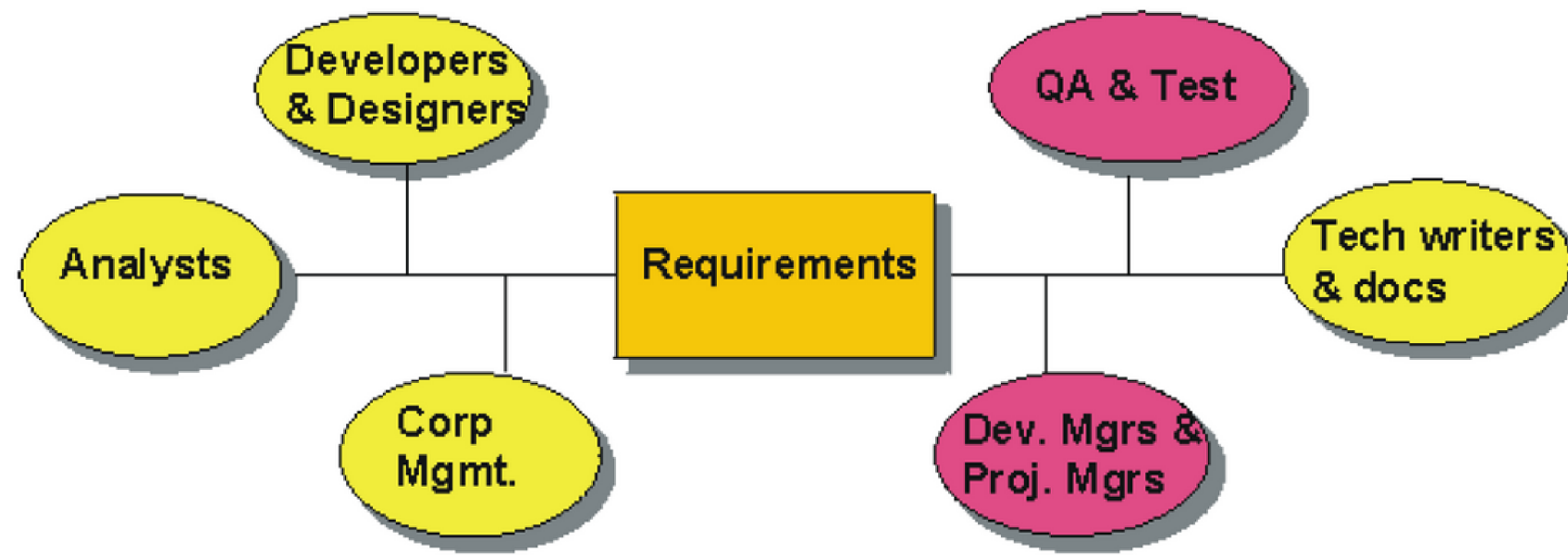# Determining Requirements ~ Requirements Documentation

Figure 4—Cross-functional Requirements Team

- No proper requirements spec doc // could have helped
- Reduce unnecessary re-interpretation or change of requirements ~ establishes a ground truth
- R.E enforces Q.A and reduces technical debt

Applying Requirements Management with Use Cases BY Oberg et al.

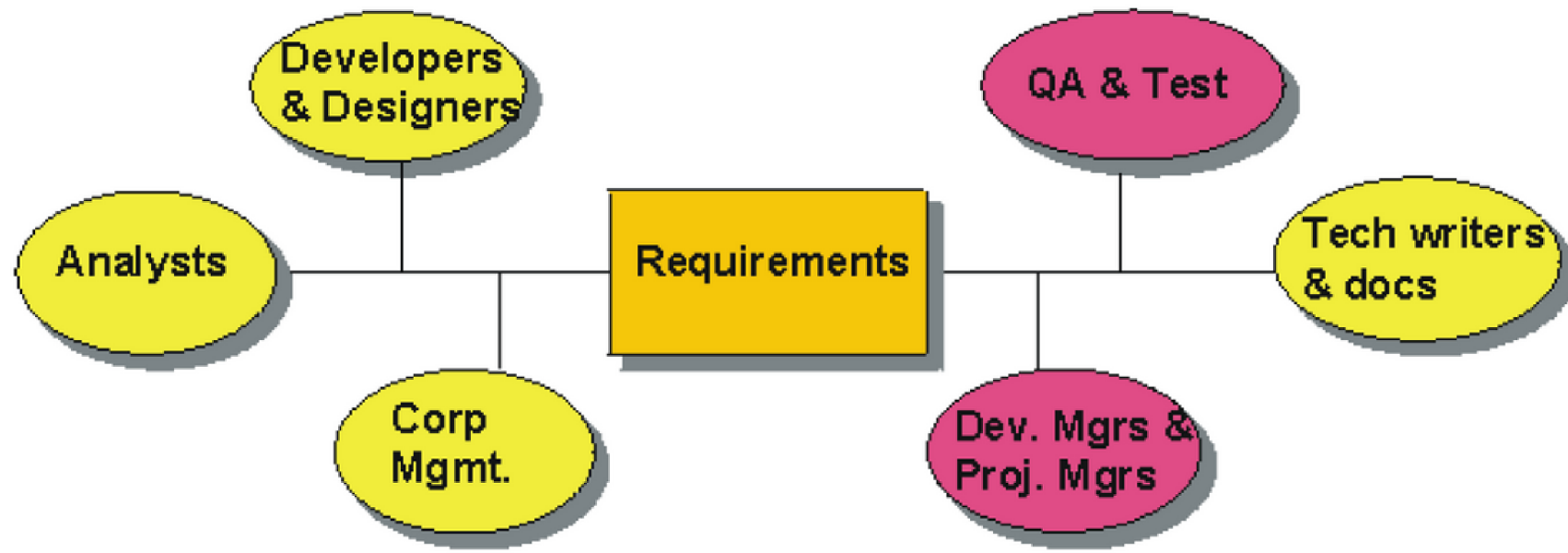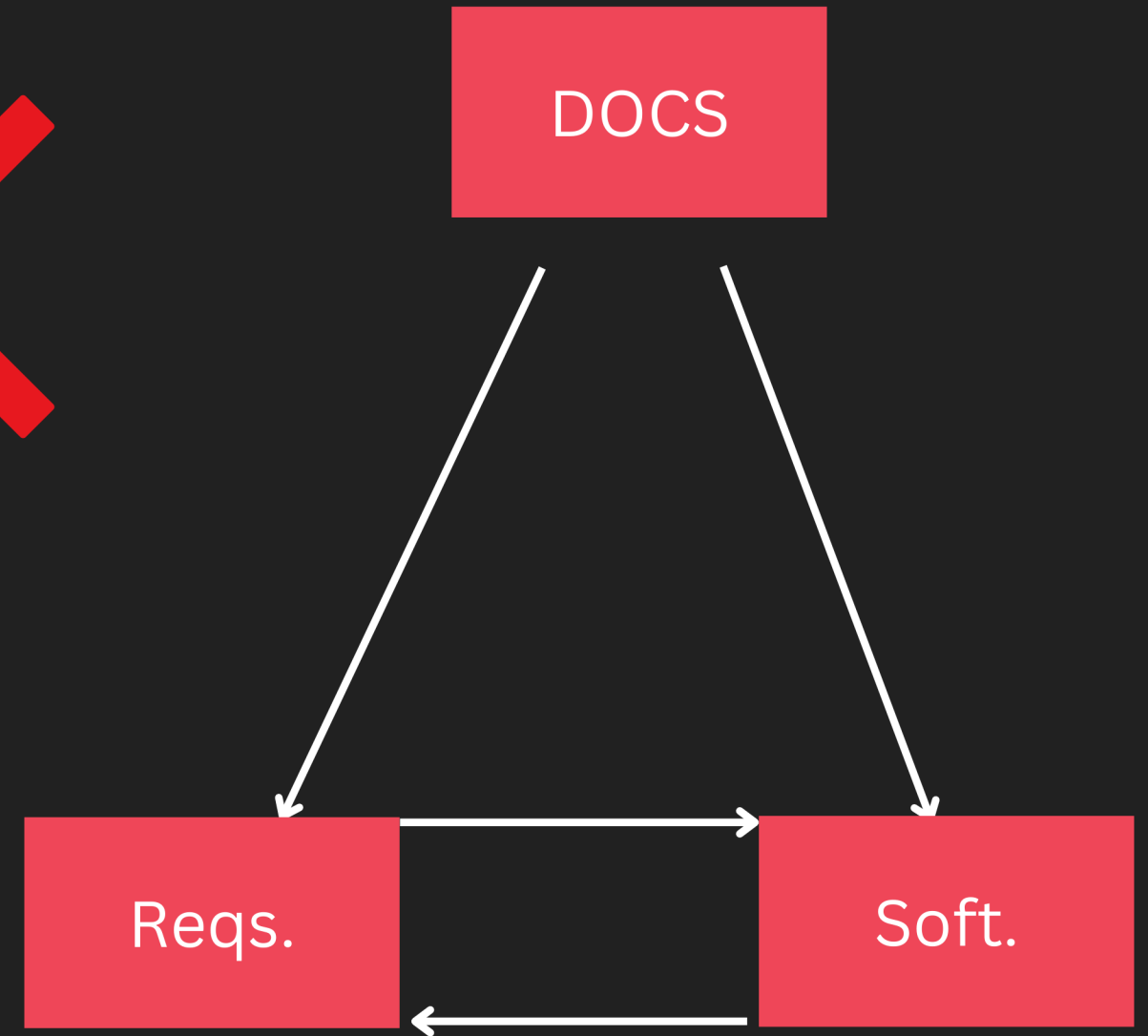# Determining Requirements ~ Requirements Documentation

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Requirements Management Tools?

Requirements management tools form an **integral part** of most requirements management solutions.

HOW TO SELECT A REQUIREMENTS MANAGEMENT TOOL: INITIAL STEPS BY GOTEL ET AL.

- But what about RM Tools?
- Helps in requirements validation.
- Expensive? lack of knowledge?

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- Do you guys know who Kent Beck is?
- TDD, 1990s

Requirements Driven Development

- Requirement Driven Development (RDD) focuses on the attributes of a product the dev team needs to keep top-of-mind as they work.
- Clients and key stakeholders propose the requirements and the contractor refines them, talking with the client back and forth throughout development. 2 GOALS - verification & validation
- Verification tests whether you built the **thing right**
- Validation tests whether you built the **right thing**

REQUIREMENT DRIVEN DEVELOPMENT OR: BUILDING THE RIGHT THING BY ISAAC HILDEBRANDT (BLOG POST)
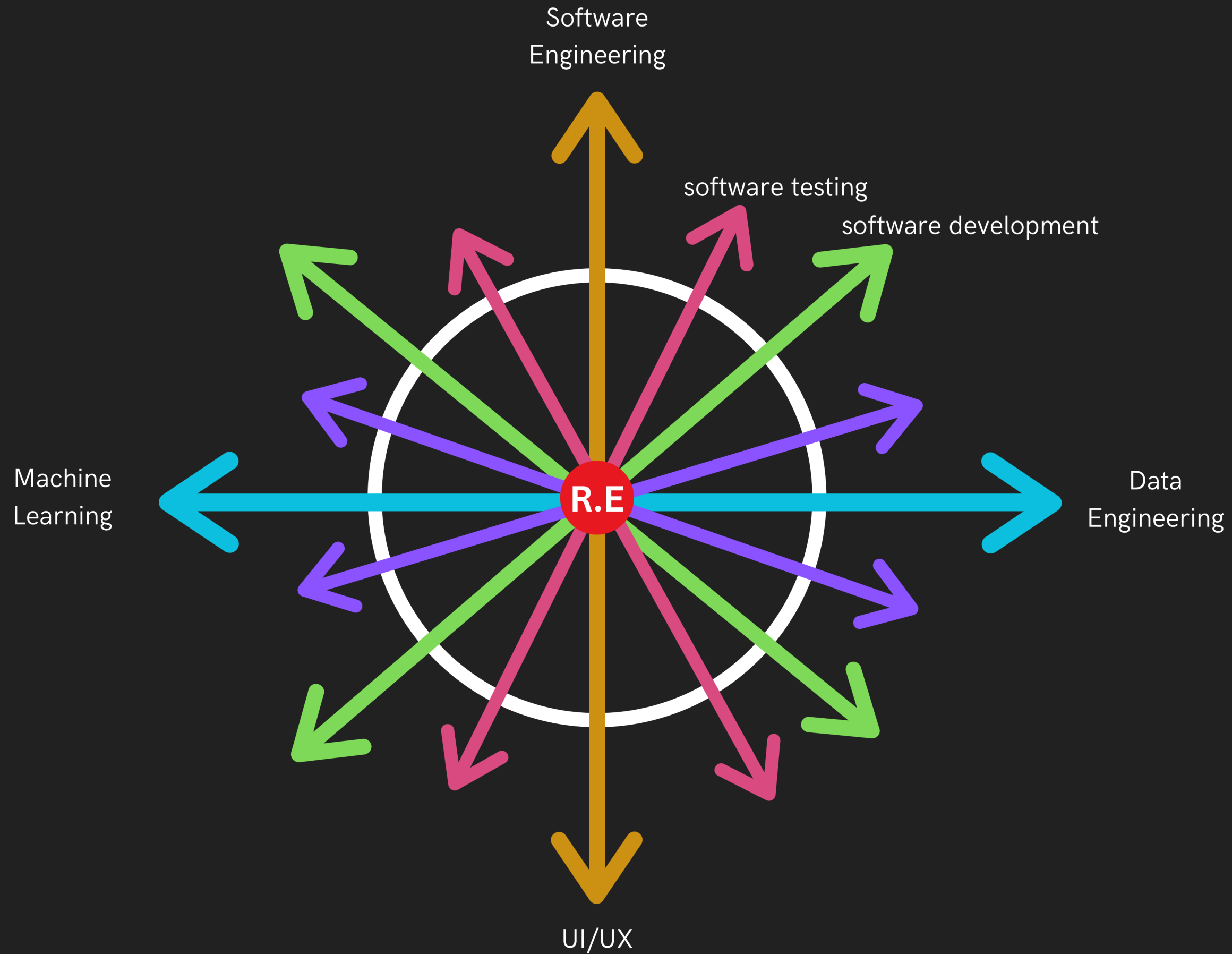
- Confirms what we have
- Enforces good S.E practices
- Could have gone to the market with what we had!

4 KEY TAKE-AWAYS

R.E Compass

Software Engineering

software testing

software development

Machine Learning

R.E

Data Engineering

UI/UX

- The Requirements engineering lifecycle is important, you SKIP it, you FAIL.
- R.E requires one to have good S.E practices.
- Do not skip a Q & A person! *They are the unaware wannabe RA guys.*
- For start-ups, we get it, but if on a budget, give designated roles.
- Managers can make or break a software product.

A word of advise:

- Just the way GOOD actors cannot save a bad movie (plot, etc), GOOD engineers cannot save bad software & requirement management practices.

Thank You