



Degree of Agility in Pre- Implementation Process Phases

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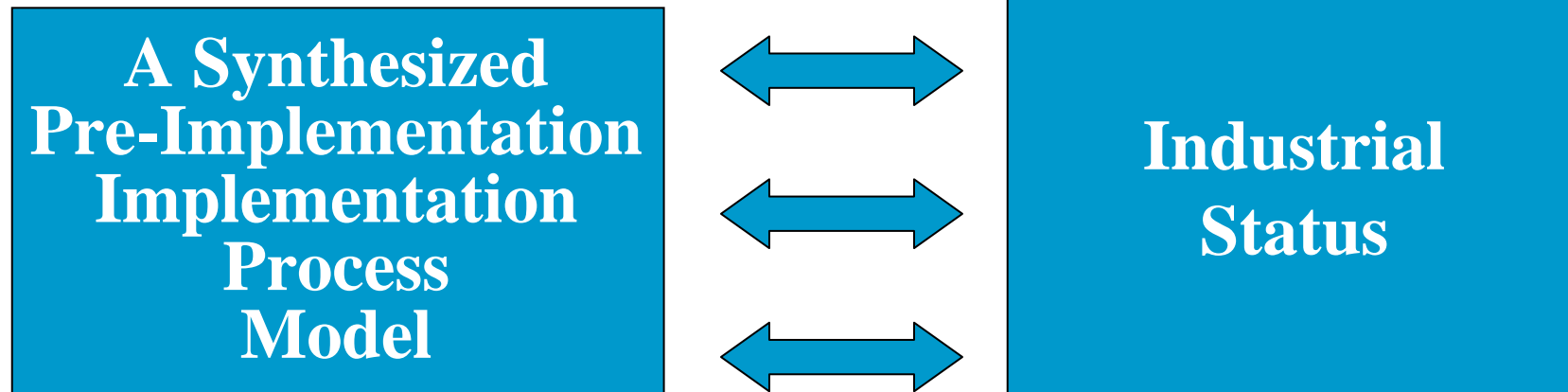
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Contribution



- Based on Scrum, eXtreme Programming, and complemented with some activities taken from standard process models
- Evaluated within three Canadian organizations.
 - Five industrial representatives were involved (process owner, project manager, and chief architect, a method owner , agile coach)
- The organizations used a mix of Scrum and XP practices.

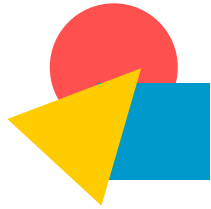
Why XP with SCRUM?

In order to combine the engineering and management flavours of these models

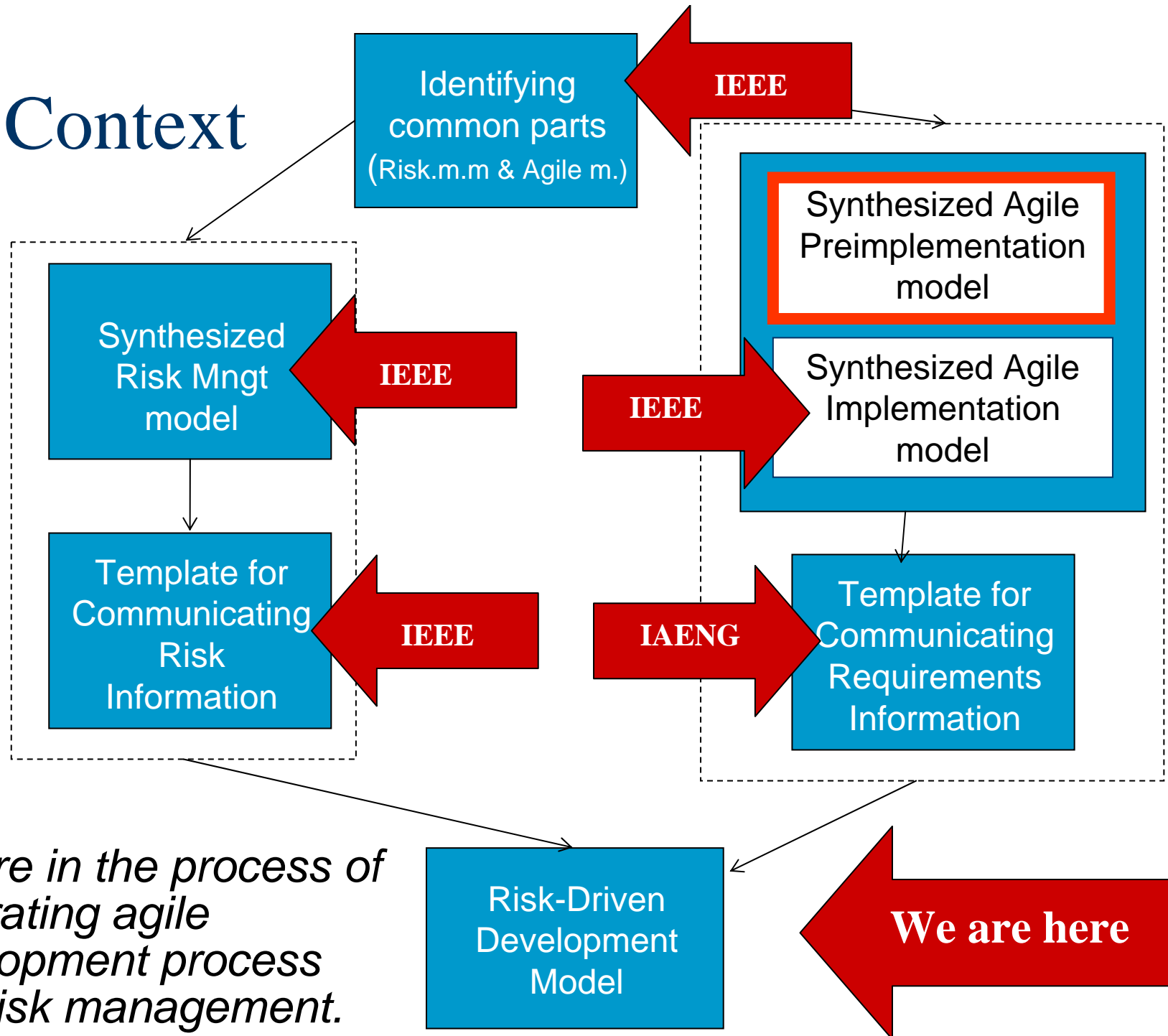


Presentation Outline

- *Context of our work*
- *Research method*
- *Status within the organizations studied*
- *Observed differences*
- *Future work*



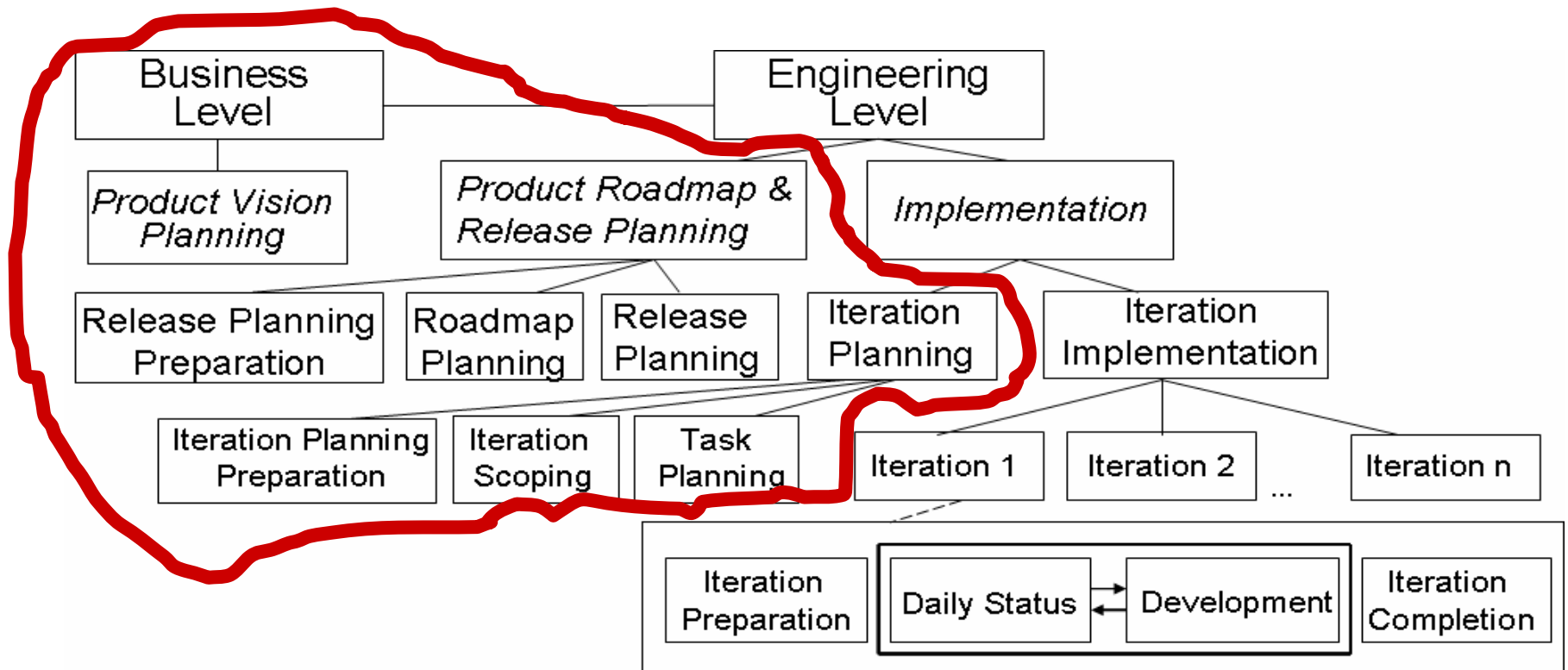
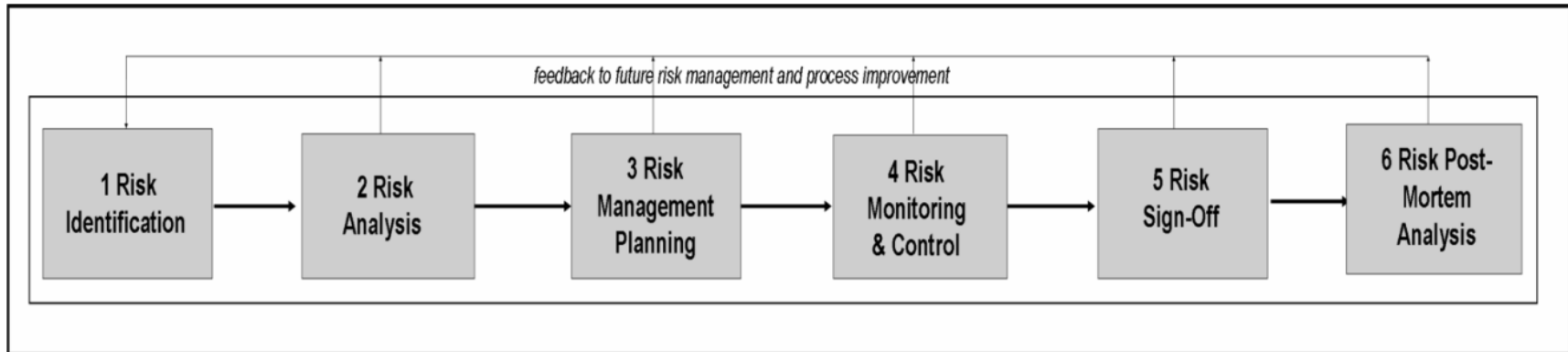
Context



- *We are in the process of integrating agile development process with risk management.*



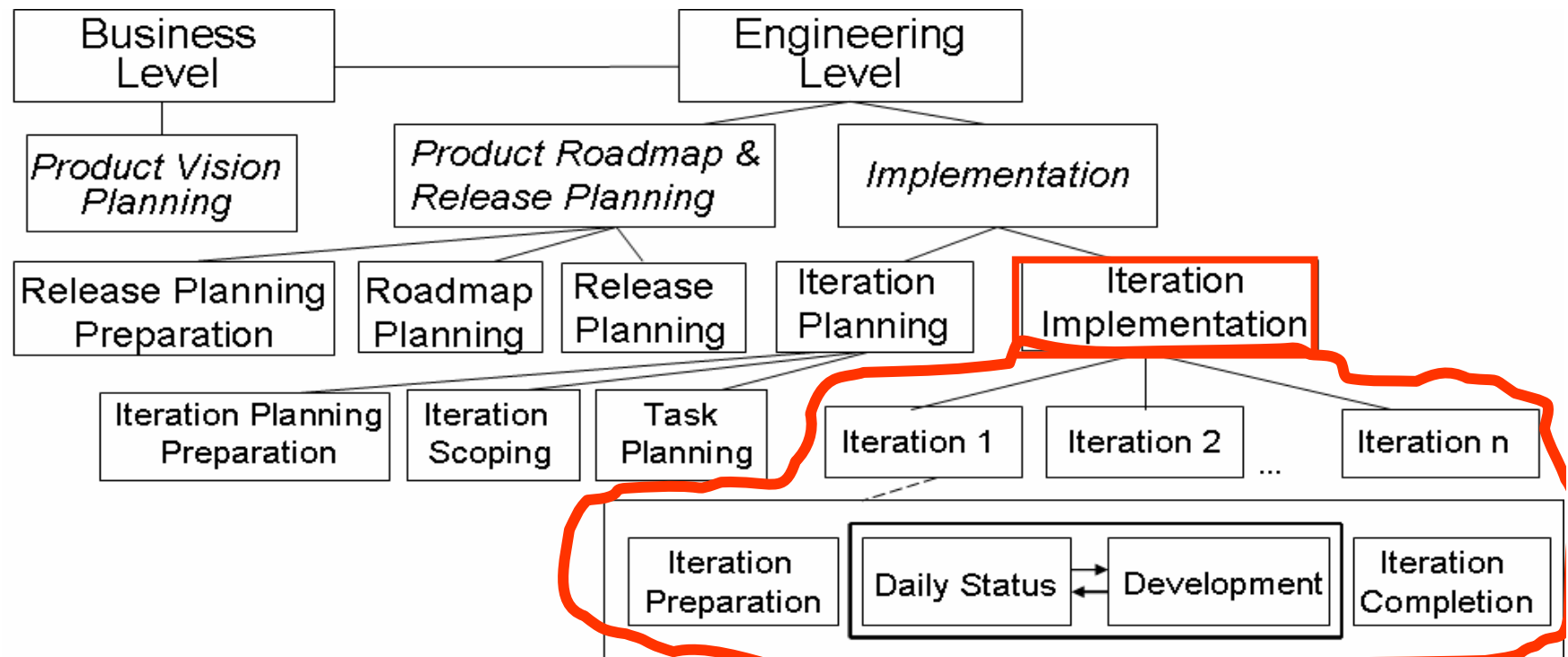
Context





It is not this context

- Nyfjord, J., Kajko-Mattsson M., Agile Implementation Phase in Two Canadian Organizations, In Proceedings, IEEE Australian Software Engineering Conference, IEEE Computer Society Press: Los Alamitos, CA, 2008.





Our main steps

Question pattern

- Do you have this activity?
- Does it differ from the activity that we describe here?
 - If yes/no, please describe how?
- Who is responsible for/involved in this activity?
 - Please, state all the roles and their responsibilities
- In what form is this activity conducted? (a)
 - By individual? (b)
 - Meeting? (c)
 - Other form(s)?
- Is this activity important?
 - If yes/no, please motivate why?
- **Are there any additional activities in this phase? Could you please describe them?**

- *Creation of a Synthesized Pre-Implementation Process Model*
- *Study of Agile Pre-Implementation Practice*
 - Questionnaire consisting of more than 100 questions
 - Convenience sampling used when choosing the organizations studied.
- *Improvement of the Model.*

Process phases and activities



Product Vision Planning	
A-1.1: Determine product vision (S)	A-1.9.2: Study the system architecture model (S)
A-1.2: Determine expected return on investment (ROI) (S)	A-1.9.3: Identify overall system functionality requirements (S)
A-1.3: Create business case (S)	A-1.9.4: Prioritize identified functionality according to ROI (S)
A-1.4: Conduct business analysis (S)	A-1.9.5: Group the requirements according to product parts, components, other relevant groupings (S)
A-1.5: Create/revise business architecture model (S)	A-1.9.6: Outline future releases (S)
A-1.6: Outline/revise the system architecture model (S)	A-1.9.7: Map prioritized and/or grouped functionality to the releases (S)
A-1.7: Identify quality goals (S)	A-1.9.8: Plan resource allocation (S)
A-1.8: Identify needs for development environment (S)	A-1.10: Record/update high-level requirements specification (HW)
A-1.9: Develop product vision plan (S)	A-1.11: Record product vision plan (HW)
A-1.9.1: Study the business analysis model (S)	● A-1.12: Write contract (I)
Product Roadmap and Release Planning	
Release Preparation	
A-2.1: Schedule product/release planning meeting (S)	A-2.12: Identify new/revise old requirements (HW)
A-2.2: Collect all necessary input to product/release planning (S)	A-2.13: For each requirement:
	A-2.13.1: Assign business value (S) (XP)
	A-2.13.2: Identify risks (S) (XP)
	A-2.13.3: Estimate development effort (e.g. man-days, man-hours) (S) (XP)
	A-2.13.4: Assign priority value (S) (XP)
	A-2.13.5: Record estimates, risks and priority values (HW)
Product Roadmap Planning	
A-2.3: Study product vision plan (S)	● A-2.14: Create/update requirements specification (I)
A-2.4: Identify new/revise old high-level requirements (HW)	A-2.15: Prioritize/re-prioritize requirements according to the selected prioritization criteria (S) (XP)
A-2.5: Create requirement list (S) (XP)	A-2.16: Re-organize requirement list according to priority value (S) (XP)
A-2.6: Write/update requirement specification (HW)	A-2.17: Group requirement list items according to the chosen criteria (S) (XP)
A-2.7: Create product roadmap (S) (XP)	A-2.18: Scope and outline iterations within release (S) (XP)
A-2.7.1: Designate/revise product releases and their contents (S)	A-2.18.1: Determine number and length of iterations (S) (XP)
A-2.7.2: Determine product release dates (S)	A-2.18.2: Map requirements/requirement groups against identified capacity for iterations (S) (XP)
A-2.7.3: Determine product release budget (S)	A-2.18.3: Determine development feasibility for the iterations and the release (S) (XP)
A-2.8: Record product roadmap (HW)	A-2.18.4: Calculate development costs (S) (XP)
Release Planning	
A-2.9: Study product roadmap (S)	A-2.19: Confirm release plan (S)
A-2.10: Study requirement list (S)	A-2.20: Record release plan (HW)
A-2.11: Study current version of the requirements specification (HW)	● A-2.21: Create/update backlog, if needed (I)
Iteration Planning	
Iteration Preparation	
● A-3.1: Create Work Definition (I)	A-3.18.5: Identify traceability among the requirements (HW)
A-3.2: Schedule iteration planning meeting (S)	A-3.18.5.1: Identify traceability among the selected iteration requirements (HW)
A-3.3: Collect all necessary input to plan the iteration (S)	A-3.18.5.2: Identify traceability to the already implemented requirements (HW)
Iteration Scoping (Day 1 Planning Part 1)	
● A-3.4: Study Work Definition (I)	A-3.19: Update the requirement specification (HW)
A-3.5: Present current state of business conditions (S)	A-3.20: For each requirement and its analysis model (functional/nonfunctional) (HW)
A-3.6: Present pending features/requirements (S)	A-3.20.1: Identify/revise design goals (HW)
A-3.7: Clarify the meaning and details of the features/requirements (S)	A-3.20.2: Study architecture (HW)
A-3.8: Identify new requirements, if need arises (S)	A-3.20.3: Identify architectural changes, if any (HW)
A-3.9: Identify/revise nonfunctional requirements (HW)	A-3.20.4: Create/modify a design model, if required (HW)
A-3.10: Identify/revise the grouping of the related requirements (HW)	A-3.21: For the requirements planned for the iteration (functional/nonfunctional) (HW)
A-3.11: Identify/revise the prioritization of the requirements (S)	A-3.21.1: Combine their design models (HW)
A-3.12: Select the requirements to be implemented in iteration (S) (XP)	A-3.21.2: Identify quality problems (HW)
A-3.13: Suggest alternative requirements (S) (XP)	A-3.21.3: Attend to the quality problems (HW)
A-3.14: Plan the iteration (S) (XP)	A-3.21.4: Identify traceability among requirements and designs (HW)
A-3.14.1: Define the iteration objective (S)	A-3.22: Agree upon the analysis and design model for the requirements (HW) (XP)
A-3.14.2: For each requirement (S) (XP)	A-3.23: For each requirement, plan its implementation (XP)
A-3.14.2.1: Ensure that the requirement is understood (S) (XP)	A-3.23.1: Identify tasks required for implementing the design model (XP)
A-3.14.2.2: Ensure that the requirement is feasible (S) (XP)	A-3.23.2: Identify dependencies among the tasks (XP)
A-3.14.2.3: Estimate/re-estimate the effort (S) (XP)	A-3.23.3: Sign up for tasks (XP)
A-3.14.2.4: Record the estimated effort for each requirement (S) (XP)	A-3.23.4: Estimate resources required for implementing the task (XP)
A-3.15: Agree upon the iteration plan (S) (XP)	A-3.23.5: Estimate combined resources for the requirement using the resource estimation for each task (XP)
A-3.16: Record the iteration plan (HW)	A-3.24: Record task assignments, including engineers name, estimated effort, other relevant data (XP)
● Task Planning (Day 1 Planning Part 2) → Day 1-3 (I)	A-3.25: Revise the implementation plan (XP)
A-3.17: For each requirement create/modify analysis model(s), e.g. use cases, class diagrams (HW)	A-3.25.1: Revise the task assignments (XP)
A-3.18: For all requirements planned for the iteration (functional/nonfunctional) (HW)	A-3.25.2: Revise dependencies among the tasks and assignments (XP)
A-3.18.1: Combine their analysis models (HW)	A-3.25.3: Revise the estimates (XP)
A-3.18.2: Identify quality problems (inconsistencies, incorrectness/incompleteness) (HW)	A-3.25.4: Ensure that task dependencies and estimates are clear (XP)
A-3.18.3: Attend to the quality problems (Goto activity Create/modify analysis model) (HW)	A-3.25.5: Revise the traceability (HW)
A-3.18.4: Identify/revise non-functional requirements (HW)	A-3.26: Identify criteria for accept/reject each requirement implementation (XP)
	A-3.27: Confirm the implementation plan (XP)
	● A-3.28: Write personal/team service level agreement (I)
	A-3.29: Record/update the iteration plan (XP) (HW)

Product Vision Planning

- A-1.1: Determine product vision (S)
- A-1.2: Determine expected return on investment (ROI) (S)
- A-1.3: Create business case (S)
- A-1.4: Conduct business analysis (S)
- A-1.5: Create/revise business architecture model (S)
- A-1.6: Outline/revise the system architecture model (S)
- A-1.7: Identify quality goals (S)
- A-1.8: Identify needs for development environment (S)
- A-1.9: Develop product vision plan (S)
- A-1.9.1: Study the business analysis model (S)
- A-1.9.2: Study the system architecture model (S)
- A-1.9.3: Identify overall system functionality requirements (S)
- A-1.9.4: Prioritize identified functionality according to ROI (S)
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- A-1.9.6: Outline future releases (S)
- A-1.9.7: Map prioritized and/or grouped functionality to the releases (S)
- A-1.9.8: Plan resource allocation (S)
- A-1.10: Record/update high-level requirements specification (HW)
- A-1.11: Record product vision plan (HW)
- **A-1.12: Write contract (I)**

Product Roadmap and Release Planning

Release Preparation

- A-2.1: Schedule product/release planning meeting (S)
- A-2.2: Collect all necessary input to product/release planning (S)

Product Roadmap Planning

- A-2.3: Study product vision plan (S)
- A-2.4: Identify new/revise old high-level requirements (HW)
- A-2.5: Create requirement list (S) (XP)
- A-2.6: Write/update requirement specification (HW)
- A-2.7: Create product roadmap (S) (XP)
- A-2.7.1: Designate/revise product releases and their contents (S)
- A-2.7.2: Determine product release dates (S)
- A-2.7.3: Determine product release budget (S)
- A-2.8: Record product roadmap (HW)

Release Planning

- A-2.9: Study product roadmap (S)
- A-2.10: Study requirement list (S)
- A-2.11: Study current version of the requirements specification (HW)

- A-2.12: Identify new/revise old requirements (HW)
- A-2.13: For each requirement:
 - A-2.13.1: Assign business value (S) (XP)
 - A-2.13.2: Identify risks (S) (XP)
 - A-2.13.3: Estimate development effort (e.g. man-days, man-hours) (S) (XP)
 - A-2.13.4: Assign priority value (S) (XP)
 - A-2.13.5: Record estimates, risks and priority values (HW)
- **A-2.14: Create/update requirements specification (I)**
- A-2.15: Prioritize/re-prioritize requirements according to the selected prioritization criteria (S) (XP)
- A-2.16: Re-organize requirement list according to priority value (S) (XP)
- A-2.17: Group requirement list items according to the chosen criteria (S) (XP)
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- A-2.18.4: Calculate development costs (S) (XP)
- A-2.19: Confirm release plan (S)
- A-2.20: Record release plan (HW)
- **A-2.21: Create/update backlog, if needed (I)**

Iteration Planning

Iteration Preparation

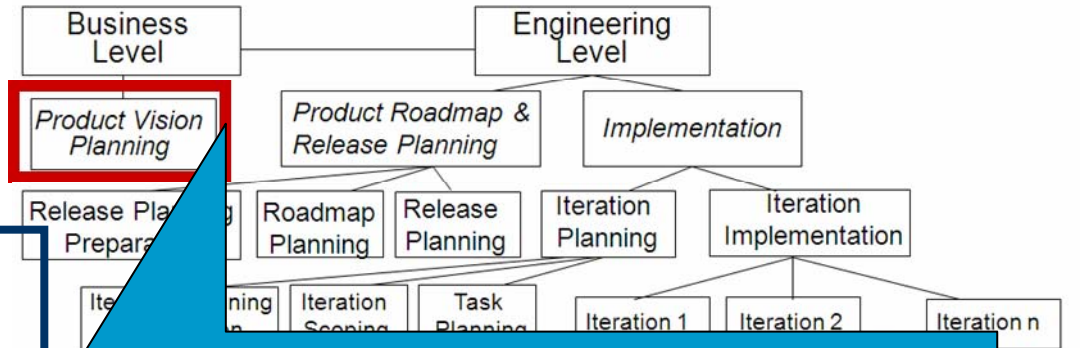
- **A-3.1: Create Work Definition (I)**
- A-3.2: Schedule iteration planning meeting (S)

- A-3.18.5: Identify traceability among the requirements (HW)
- A-3.18.5.1: Identify traceability among the selected iteration requirements (HW)
- A-3.18.5.2: Identify traceability to the already implemented



Product Vision Planning

- Determine product vision (S)
- Determine expected ROI (S)
- Create business case (S)
- Conduct business analysis (S)
- Create/revise business architecture model (S)
- Identify quality goals (S)
- Identify needs for development environment (S)
- Develop product vision plan (S)
- Record/update high-level requirements specification (HW)
- Record *product vision plan* (HW)
- Write contract (I)

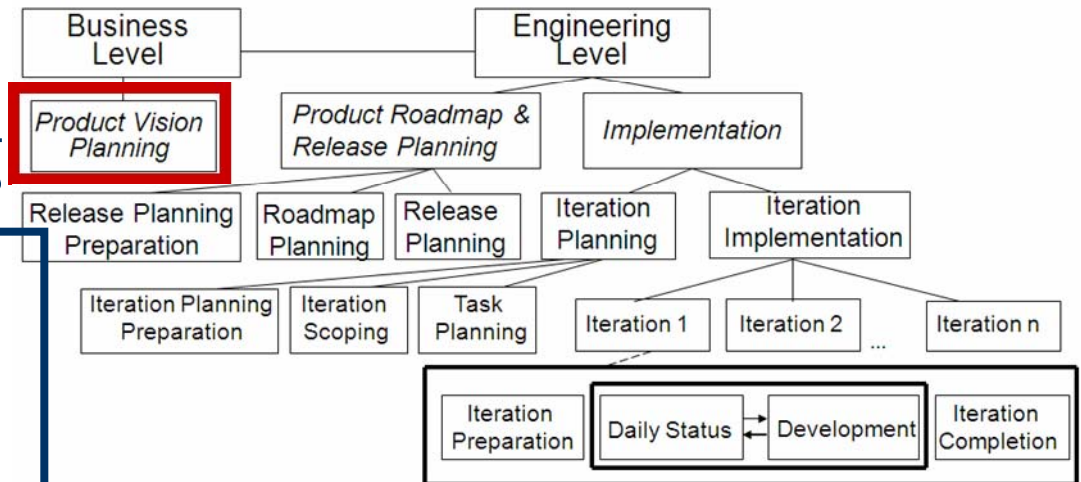


The overall picture of **businesses**, core values, strategic goals, mission and product portfolios evolves into a **product** vision focusing on product goals, overall business and product structure and ROI



Product Vision Planning

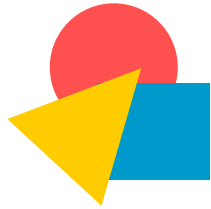
- Determine product vision (S)
- Determine expected ROI (S)
- Create business case (S)
- Conduct business analysis (S)
- Create/revise business architecture model (S)
- Identify quality goals (S)
- Identify needs for development environment (S)
- Develop product vision plan (S)
- Record/update high-level requirements specification (HW)
- Record product vision plan (HW)
- **Write contract (I)**



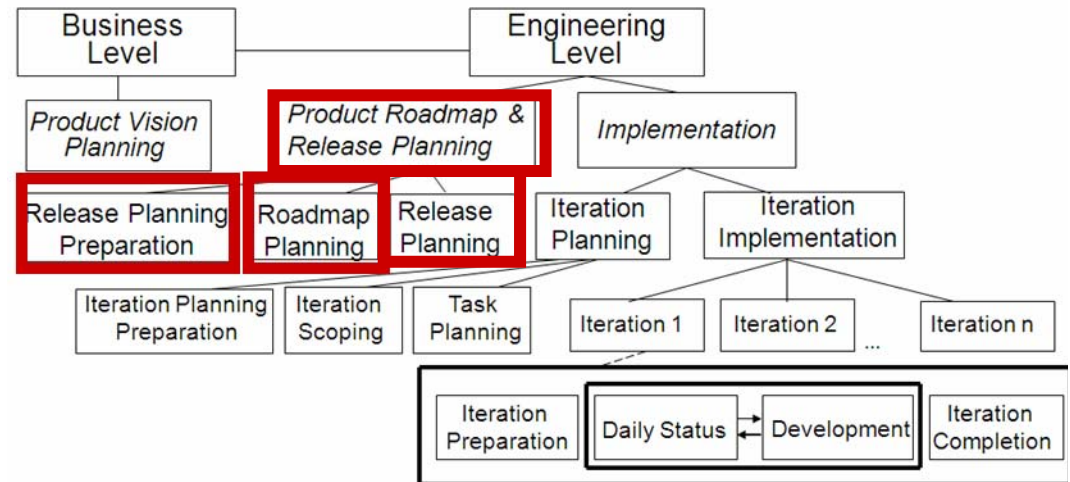
- The overall business picture is materialized in a **product vision plan (Operational Concept OC)**.
 - High level view of system needs, context and operational characteristics.

Observed Differences

- **Use of ROI** due to lack of appropriate tools for doing it at this high abstraction level.
- **Requirements Spec** corresponds to OC
- **Backlog** does not drive the release planning, iteration planning and implementation.
 - **OC** and **Work Definition** do that.
 - Backlog is only complementary.
- **Contracts** are written at the end of this phase.



Product Roadmap & Release Planning



- Three sub-phases:
 1. *Release Preparation*
 2. *Product Roadmap Planning*
 3. *Release Planning.*



Product Roadmap and Release Planning

Release Preparation

- Schedule product/release planning meeting (**S**)
- Collect all necessary input to product/release planning (**S**)

Product Roadmap Planning

- Study product vision plan (**S**)
- Identify new/revise old high-level requirements (**HW**)
- Write/update requirements specification (**HW**)
- Create product roadmap (**S/XP**)
 - Designate product releases
 - Determine release dates
 - Determine release budget
- Record product roadmap (**HW**)

Release Planning

- Study product roadmap (**S**)
- Study requirements list (**S**)
- Study current version of the requirements specification (**HW**)
- For each requirement:
 - Assign business value (**S/XP**)
 - Identify risks (**S/XP**)
 - Estimate effort (**S/XP**)
 - Assign priority value (**S/XP**)
- Create/update requirements specification (**I**)
- Prioritize/reprioritize requirements (**S/XP**)
- Reorganize requirement list according to the priority value (**S/XP**)
- Group requirement list according to the chosen criteria (**S/XP**)
- Scope and outline iterations with release (**S/XP**)
- Confirm release plan
- Record release plan
- Create/update backlog, if needed (**I**)



Product Roadmap and Release Planning

Release Preparation

- Schedule product/release planning meeting (S)
- Collect all necessary input to product/release planning (S)

Product Roadmap Planning

- Study product vision plan (S)
- Identify new/revise old high-level requirements (HW)
- Write/update requirements specification (HW)
- Create product roadmap (S/XP)
 - Designate product releases
 - Determine release dates
 - Determine release budget
- Record product roadmap (HW)

Release Planning

It starts after a decision to initiate a project has been made and a product vision plan has been produced.

- Estimate effort (S/XP)
- Assign priority value (S/XP)
- Create/update requirements specification (I)
- Prioritize/reprioritize requirements (S/XP)
- Reorganize requirement list according to the priority value (S/XP)
- Group requirement list according to the chosen criteria (S/XP)
- Scope and outline iterations with release (S/XP)
- Confirm release plan
- Record release plan
- Create/update backlog, if needed (I)



Product Roadmap and Release Planning

Release Preparation

- Schedule product/release planning meeting (S)
- Collect all necessary input to product/release planning (S)

Product Roadmap Planning

- Study product vision plan (S)
- Identify new/revise old high-level requirements (HW)
- Write/update requirements specification (HW)
- Create product roadmap (S/XP)
 - Designate product releases
 - Determine release dates
 - Determine release budget
- Record product roadmap (HW)

Release Planning

- Study product roadmap (S)
- Study requirements list (S)
- Study current version of the requirements specification (HW)
- For each requirement:
 - Assign business value (S/XP)

Here, one breaks down the product vision plan into an overall high-level product roadmap outlining the releases.

- to the chosen criteria (S/XP)
- Scope and outline iterations with release (S/XP)
- Confirm release plan
- Record release plan
- Create/update backlog, if needed (I)



Product Roadmap and Release Planning

Release Preparation

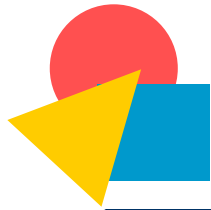
- Schedule product/release planning meeting (S)
- Collect all necessary input to product/release planning (S)

- One plans releases
- One outlines iterations within releases
- One creates backlog

- Record product roadmap (HW)

Release Planning

- Study product roadmap (S)
- Study requirements list (S)
- Study current version of the requirements specification (HW)
- For each requirement:
 - Assign business value (S/XP)
 - Identify risks (S/XP)
 - Estimate effort (S/XP)
 - Assign priority value (S/XP)
- Create/update requirements specification (I)
- Prioritize/reprioritize requirements (S/XP)
- Reorganize requirement list according to the priority value (S/XP)
- Group requirement list according to the chosen criteria (S/XP)
- Scope and outline iterations with release (S/XP)
- Confirm release plan
- Record release plan
- Create/update backlog, if needed (I)



Product Roadmap and Release Planning

Release Preparation

- Schedule product/release planning meeting (S)
- Collect all necessary input to product/release planning (S)

Product Roadmap Planning

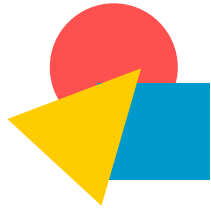
- Study product vision plan (S)
- Identify new/revise old high-level requirements (HW)
- Write/update requirements specification (HW)
- Create product roadmap (S/XP)
 - Designate product releases
 - Determine release dates
 - Determine release budget
- Record product roadmap (HW)

Release Planning

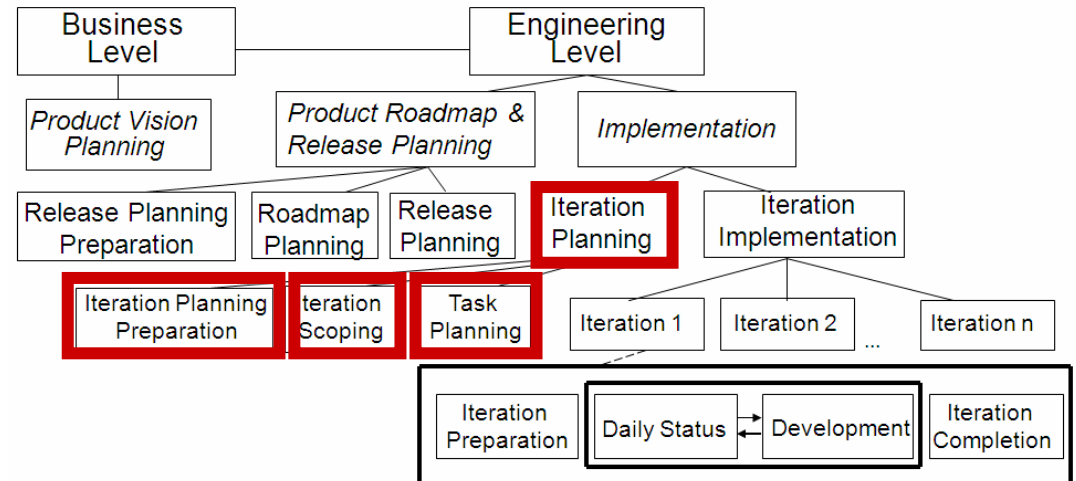
- Study product roadmap (S)
- Study requirements list (S)
- Study current version of the requirements specification (HW)
- For each requirement:
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 - Estimate effort (S/XP)
 - Assign priority value (S/XP)
- Create/update requirements specification (I)
- Prioritize/reprioritize requirements (S/XP)
- Reorganize requirement list according to the priority value (S/XP)
- Group requirement list according to the chosen criteria (S/XP)
- Scope and outline iterations with release (S/XP)
- Confirm release plan
- Record release plan
- Create/update backlog, if needed (I)

Observed Differences

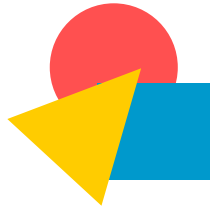
- **Organization 1:**
 - all these activities are always conducted.
- **Organization 1 and 2:**
 - the degree of formality depends on the size and criticality of a project.
 - **Minimum requirement:** an architectural model and process flow diagrams are created.



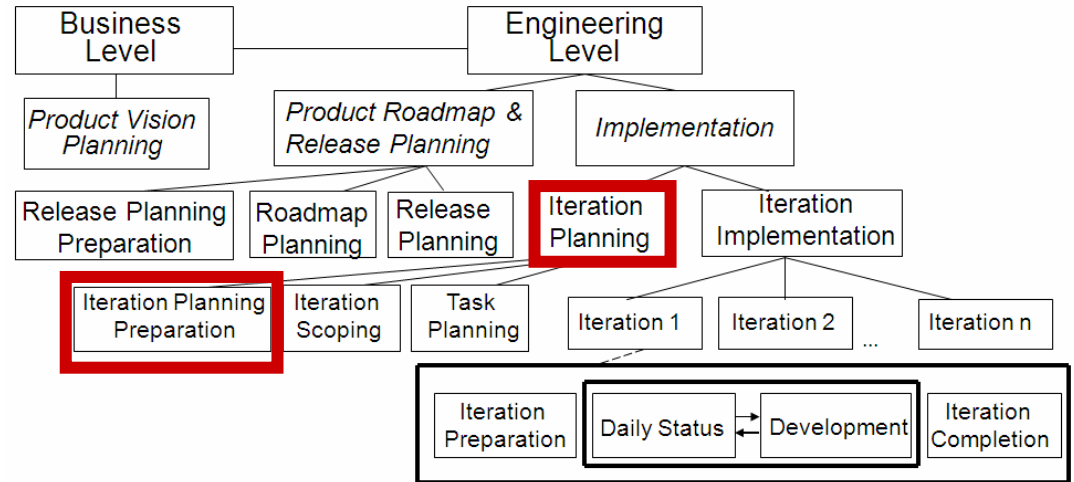
Iteration Planning



- Three sub-phases:
 1. *Iteration Planning Preparation*
 2. *Iteration Scoping*
 3. *Task Planning*

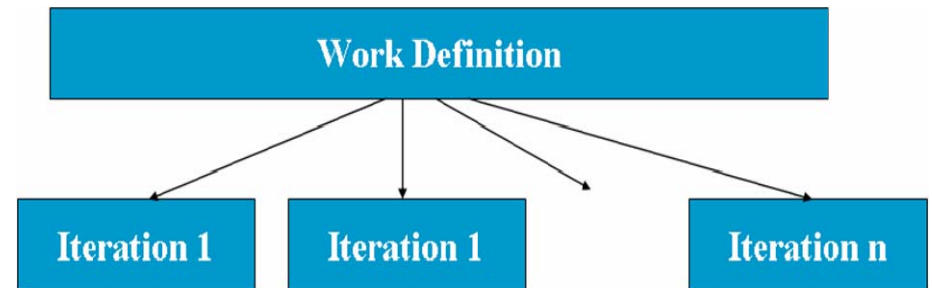


Iteration Planning



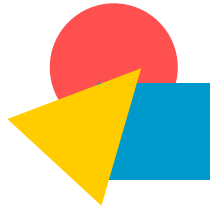
Iteration Preparation

- **Create Work Definition (I)**
- Schedule iteration planning meeting (S)
- Collect all necessary input to plan the iteration (S)

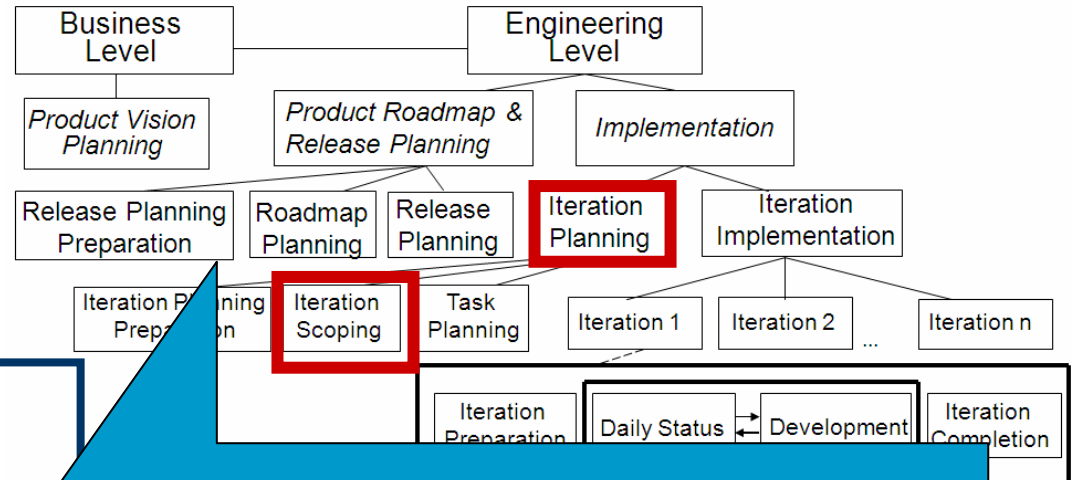


Observed Differences

- **Scrum:**
 - planning of iterations is prepared by scheduling meetings and by gathering the necessary information.
- **Industrial organizations:**
 - A a document, *Work Definition*, is produced prior to the iteration planning. It functions as a driving wheel of the iteration planning sessions.



Iteration Scoping, Day



Iteration Scoping

- **Study Work Definition (I)**
- Present current state of business conditions (S)
- Present pending requirements (S)
- Clarify the meaning and details of the features/requirements (S)
- Identify new requirements, if need arises (S)
- Identify/revise nonfunctional requirements (HW)
- Identify/revise the grouping of the related requirements (HW)
- Identify/revise the prioritization of the requirements (S)
- Select the requirements to be implemented in iteration (S/HW)
- Suggest alternative requirements (S/XP)
- Plan the iteration (S/XP)
- Agree upon the iteration plan (S/XP)
- Record the iteration plan (HW)

- Study requirements that are candidates for the iteration
- Results in an iteration plan

Observed Differences

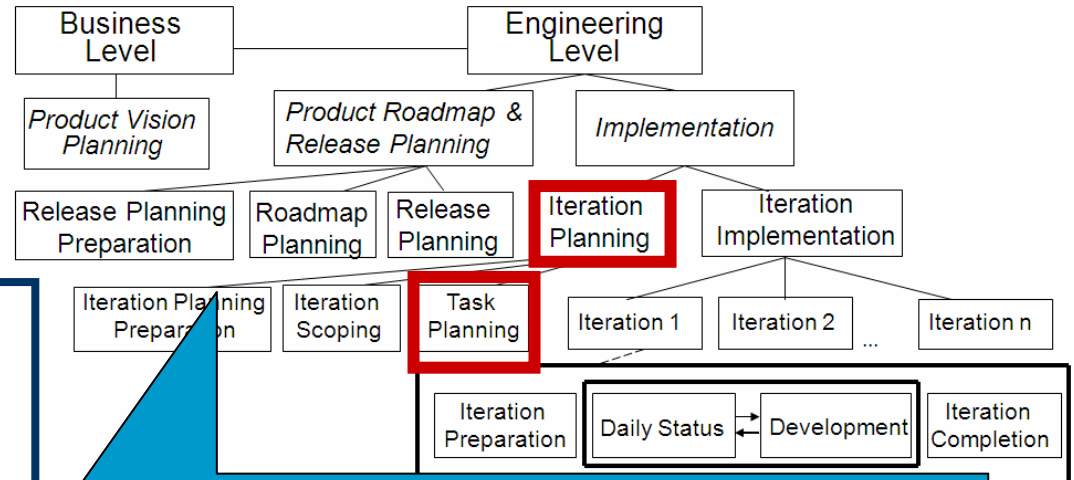
- **Work Definition** is an important driving wheel of this phase



Task Planning

Task Planning

- Analyze requirements
-
- Create analysis and design models
- For each requirement, plan its implementation
 -
 - Sign up for tasks
- Record task assignments,
-
- Identify criteria for each requirement implementation
- Confirm the implementation plan
- **Write personal/team SLA (I)**
- Record/update the iteration plan



- One analyzes requirements and plans its implementation.
- It results in an iteration plan.

■ Duration of Task Planning

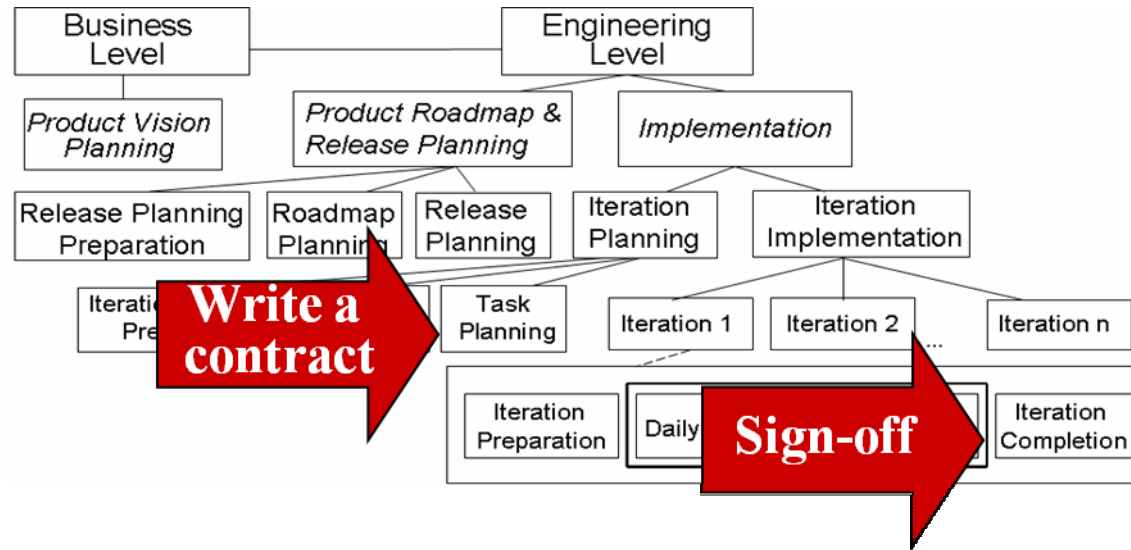
- The agile models studied suggest that it take place on the first day of the iteration
- Within middle-sized projects, planning the tasks could sometimes take up to three days.

■ Personal/Team SLAs:

- The agile models studied do not suggest any contract writing on the developers nor on the team level.
- Developers sign under their work assignment.



Contract writing





The interviewee's point of view

- The degree of agility of the pre-implementation phases varies among projects. It depends on
 - the lifecycle phase,
 - project type and its size,
 - criticality,
 - innovative character,
 - degree of uncertainty,
 - risk taking,
 - permission from stakeholders' side to take risk,
 - budget.
- The majority of their fixed budget projects follow a more traditional pre-implementation approach.
- In small, innovative, creative and totally new projects, one has difficulties to conduct detailed planning in advance.

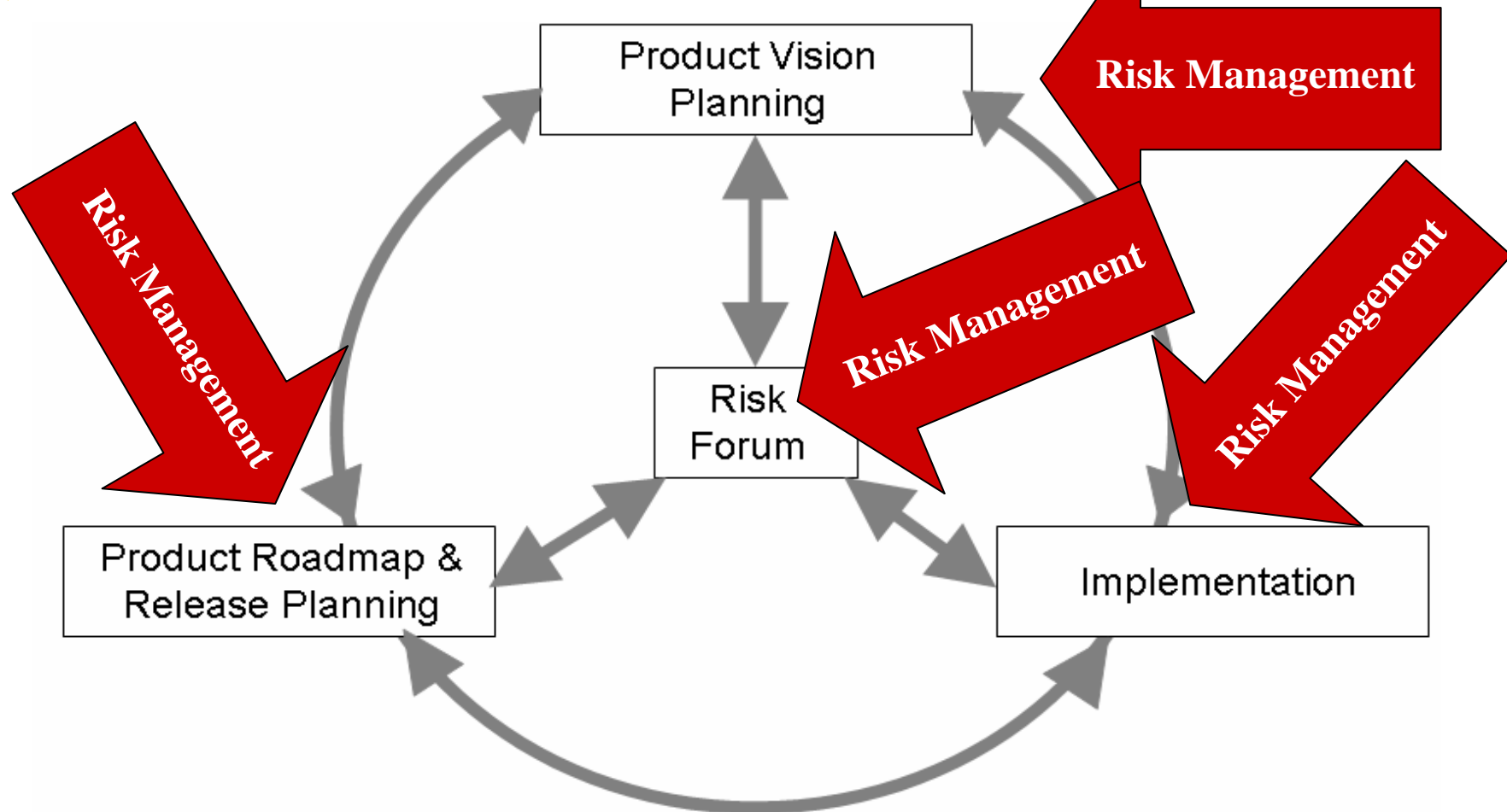


The concluding words of our interviewees

- Good planning upfront in the *Pre-Implementation* phases allows more agility in the *Implementation* phase.
- The key issue is to set up an instructive plan and then let the teams decide on the implementation process approach.
- **With good and thorough plans, any degree of agility works well as long as long as one keeps control of the product vision, goals and fulfillment of these goals.**



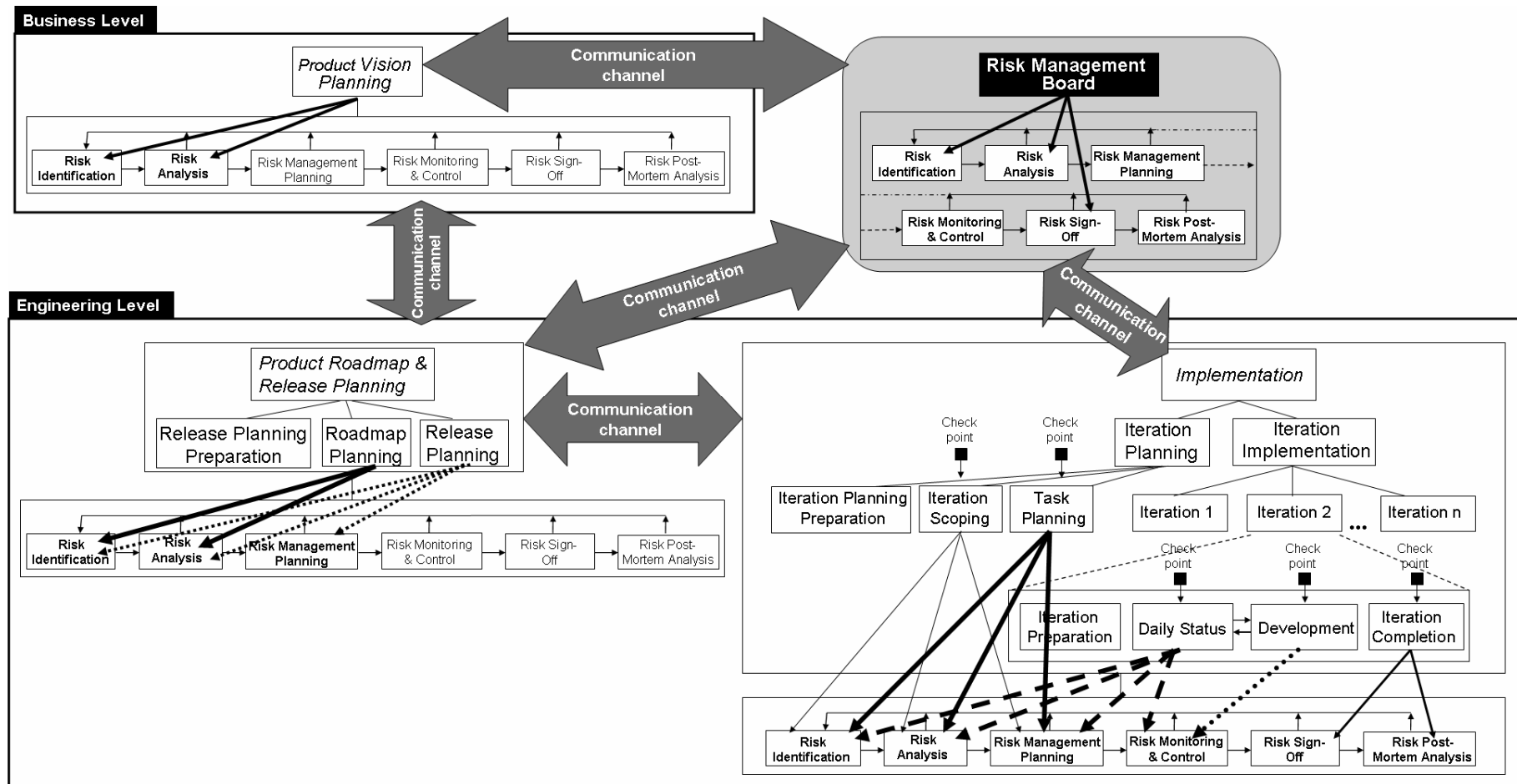
Risk-Driven Development Model



- *We are in the process of integrating agile development process with risk management.*

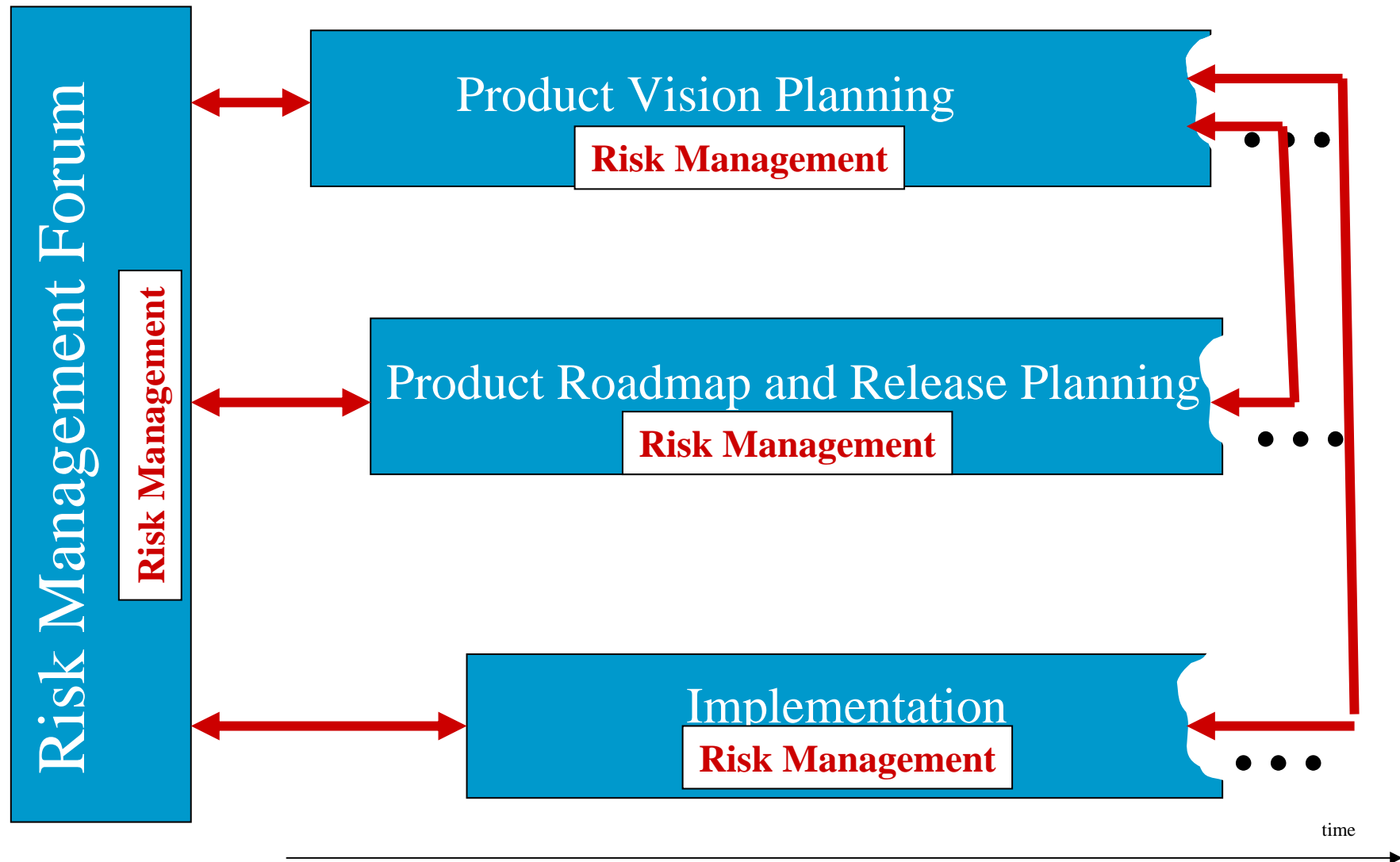


Struggling with visual representation: Risk-Driven Development Model





Maybe this one: Risk-Driven Development Model





**Thank you for
listening to me**

Mira