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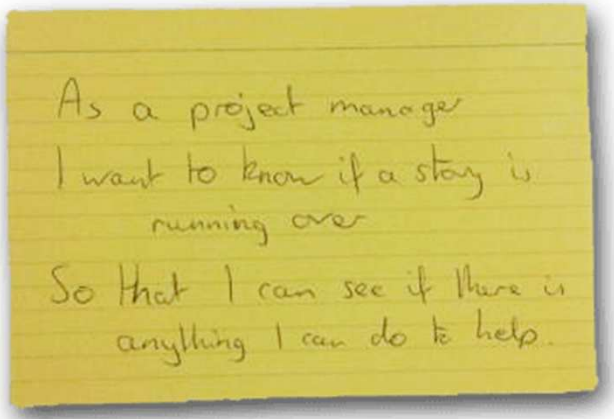
As a new presenter at the REFSQ, **I want** to have a guideline for the presentation format, **so that** I can manage the contents and time to meet the quality of the conference.

As a participant at the REFSQ, **I want** to get updated about the program, **so that** I can better plan my participation.

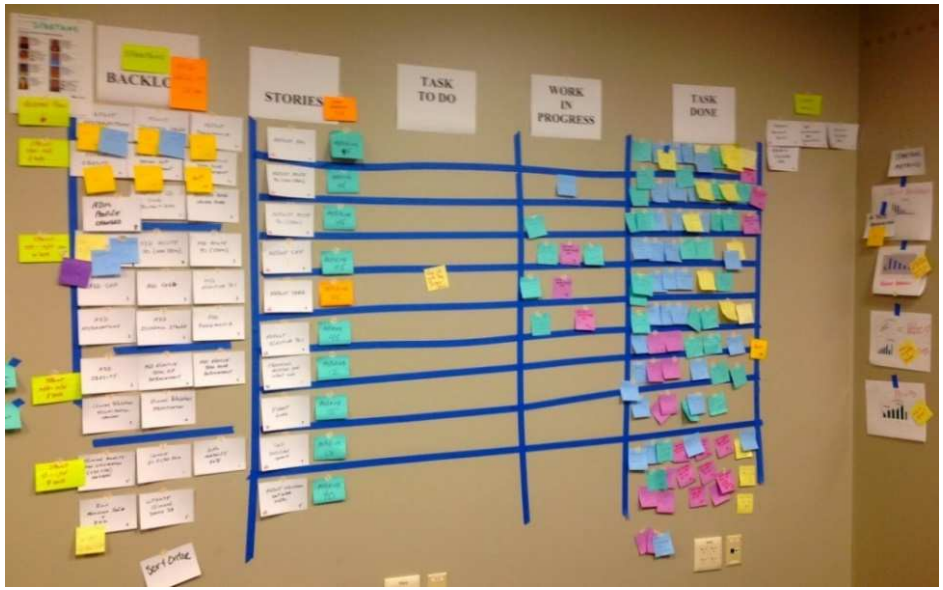
Context and Motivation

User Story



https://www.thoughtworks.com/insights/blog/how-user-centered-design-can-put-user-stories-proper-context

- Proposed by Kent Beck in eXtreme Programming (XP).
- 3Cs: Card, Conversation, and Confirmation.
- A text of maximum of two lines written from point of view of end-users.
- The most used requirements artifacts in Agile Methods.

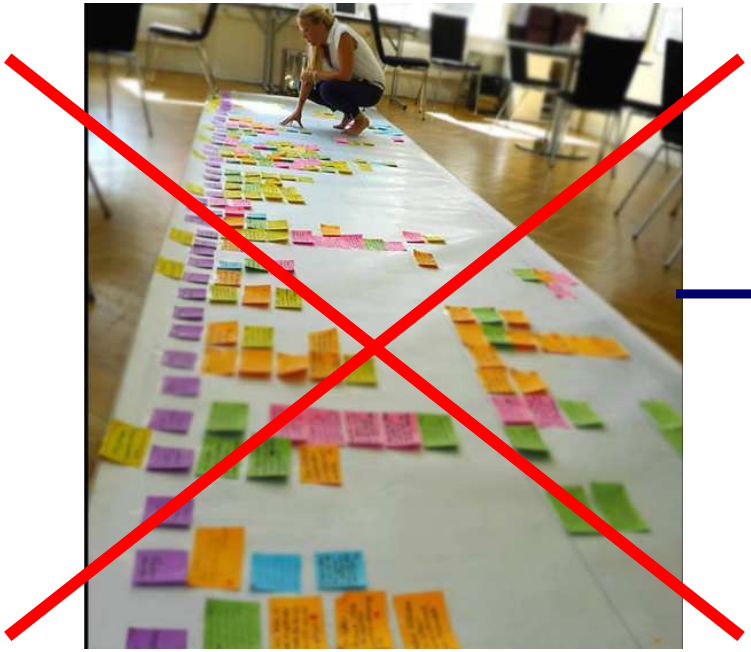


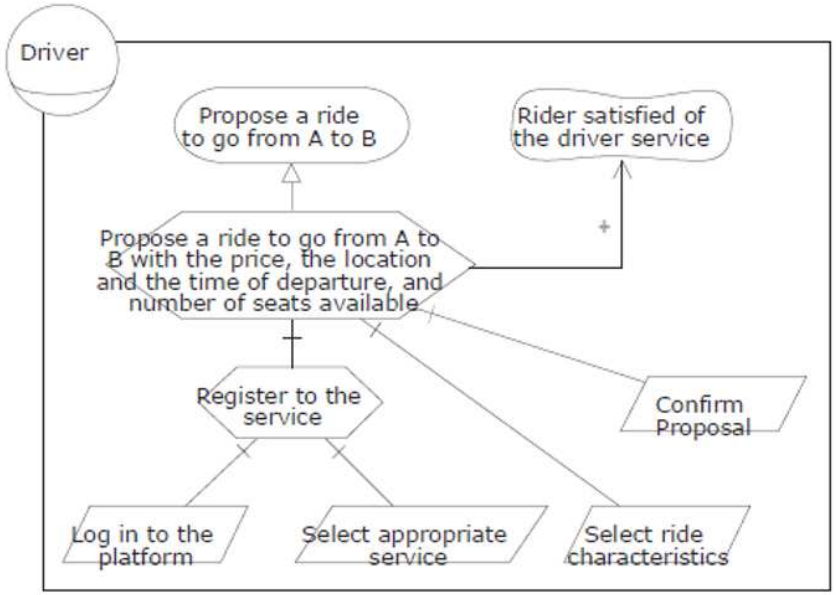
http://agilecomplexificationinverter.blogspot.be/2013/11/elements-of-effective-scrum-task-board.html

Context and Motivation

Rationale Tree: a Visual Representation of User Stories Set

- Graphically model user stories set, so that we can *visualize* and *analyze* user stories *(inter)dependencies*.



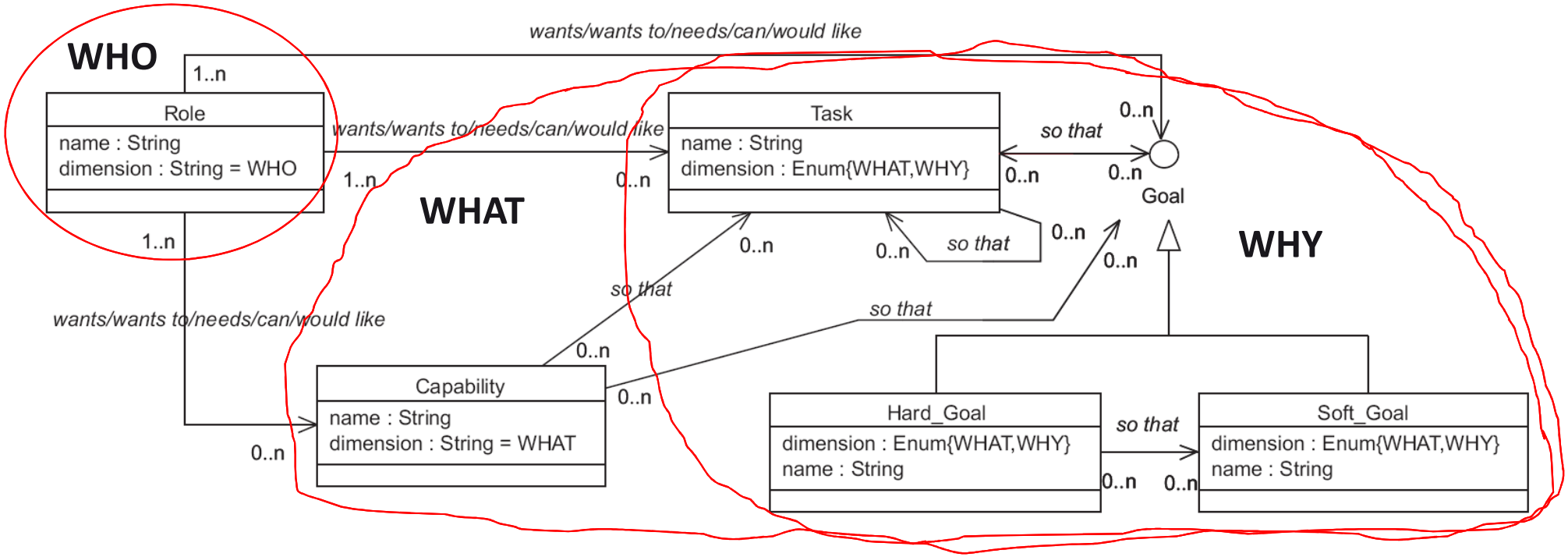


Rationale Tree

Context and Motivation

Unified User Story Template: The meta-model

- User Stories are written by following a template:
  - *But, too many templates have been proposed*
  - *And, lack of well-defined definition*
- As ***[WHO]***, I want ***[WHAT]***, [so that ***[WHY]***]



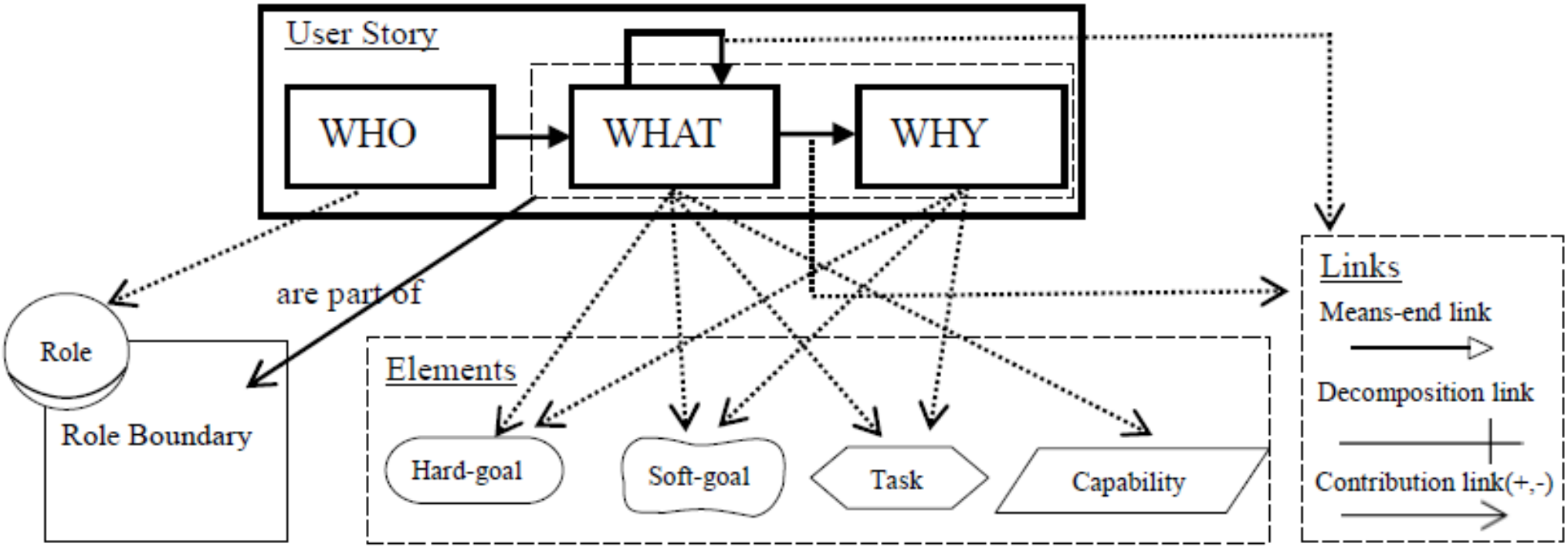
Context and Motivation

Unified User Story Template: Adopted semantics

- A **role** is an abstract characterization of the behavior of a social actor within some specialized context or domain of endeavor.
- A **hard-goal** is a condition or state of affairs in the world that the stakeholders would like to achieve.
- A **soft-goal** is a condition or state of affairs in the world that the actor would like to achieve. But unlike a hard-goal, there are no clear-cut criteria for whether the condition is achieved, and it is up to the developer to judge whether a particular state of affairs in fact achieves sufficiently the stated soft-goal.
- A **task** species a particular way of attaining a goal.
- A **capability** represents the ability of an actor to define, choose, and execute a plan for the fulfillment of a goal, given certain world conditions and in the presence of a specific event.

Context and Motivation

Rationale Tree: i* framework graphical notation

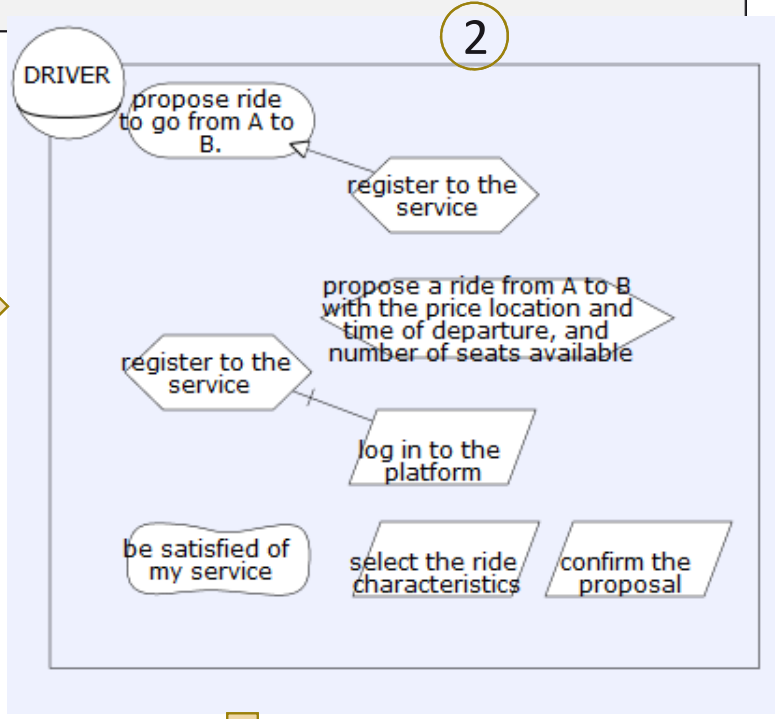


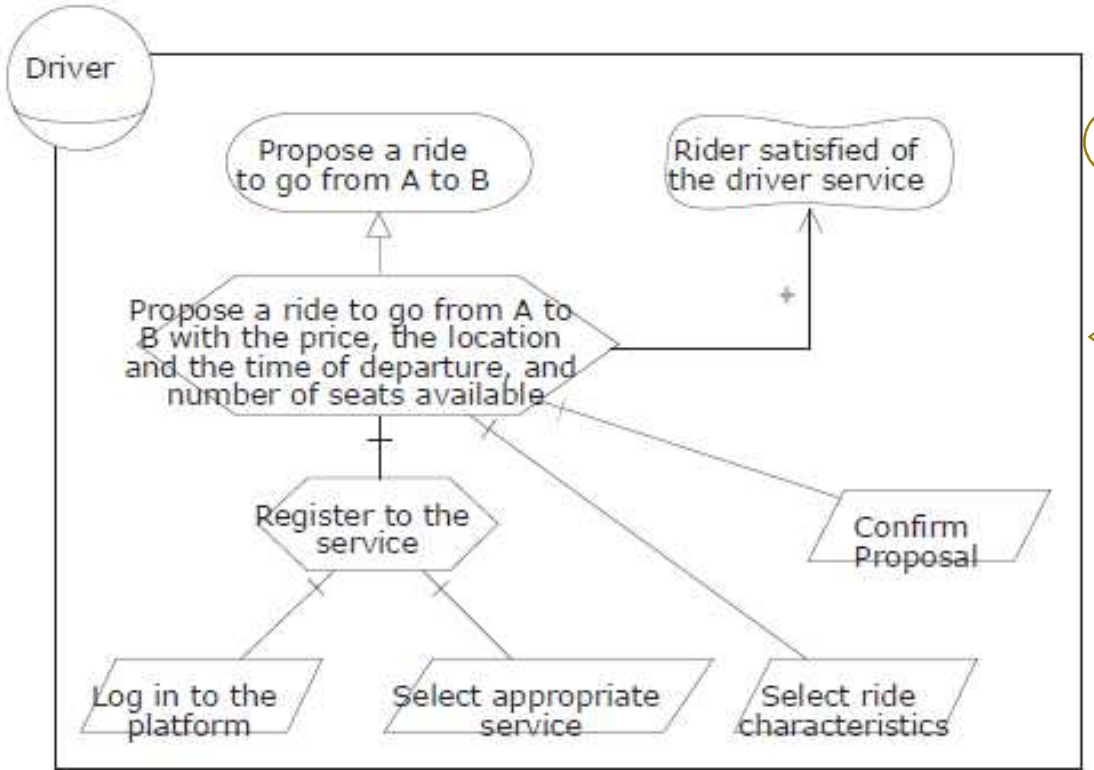
Context and Motivation

Rationale Tree: Building Process

Dimension	*Element*	*D_C Type*
WHO	*As a DRIVER*	Role
WHAT	*I want to register to the service*	Task
WHY	*so that I can propose ride to go from A to B*	Hard-goal
WHO	*As a DRIVER*	Role
WHAT	*I want to propose a ride from A to B with the price location and time of departure, and number of seats available*	Task
WHO	*As a DRIVER*	Role
WHAT	*I want to log in to the platform*	Capability
WHY	*so that I can register to the service*	Task
WHO	*As a DRIVER*	Role
WHAT	*I want to select the ride characteristics*	Capability
WHO	*As a DRIVER*	Role
WHAT	*I want to confirm the proposal*	Capability
WHO	*As a DRIVER*	Role
WHAT	*I want the RIDER to be satisfied of my service*	Soft-goal

1





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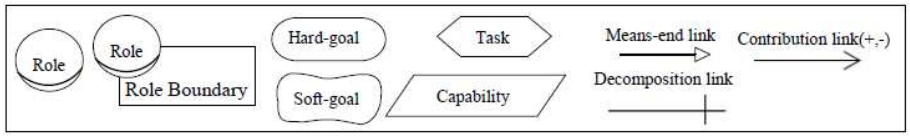


Research Questions

RQ1: How easy a lambda modeler is able to build a consistent Rational Tree?

RQ2: What are the necessary conditions to provide a lambda modeler the ability to build a consistent Rationale Tree?

UCL Université catholique de Louvain

LOURIM Louvain Research Institute in Management and Organizations

KU LEUVEN

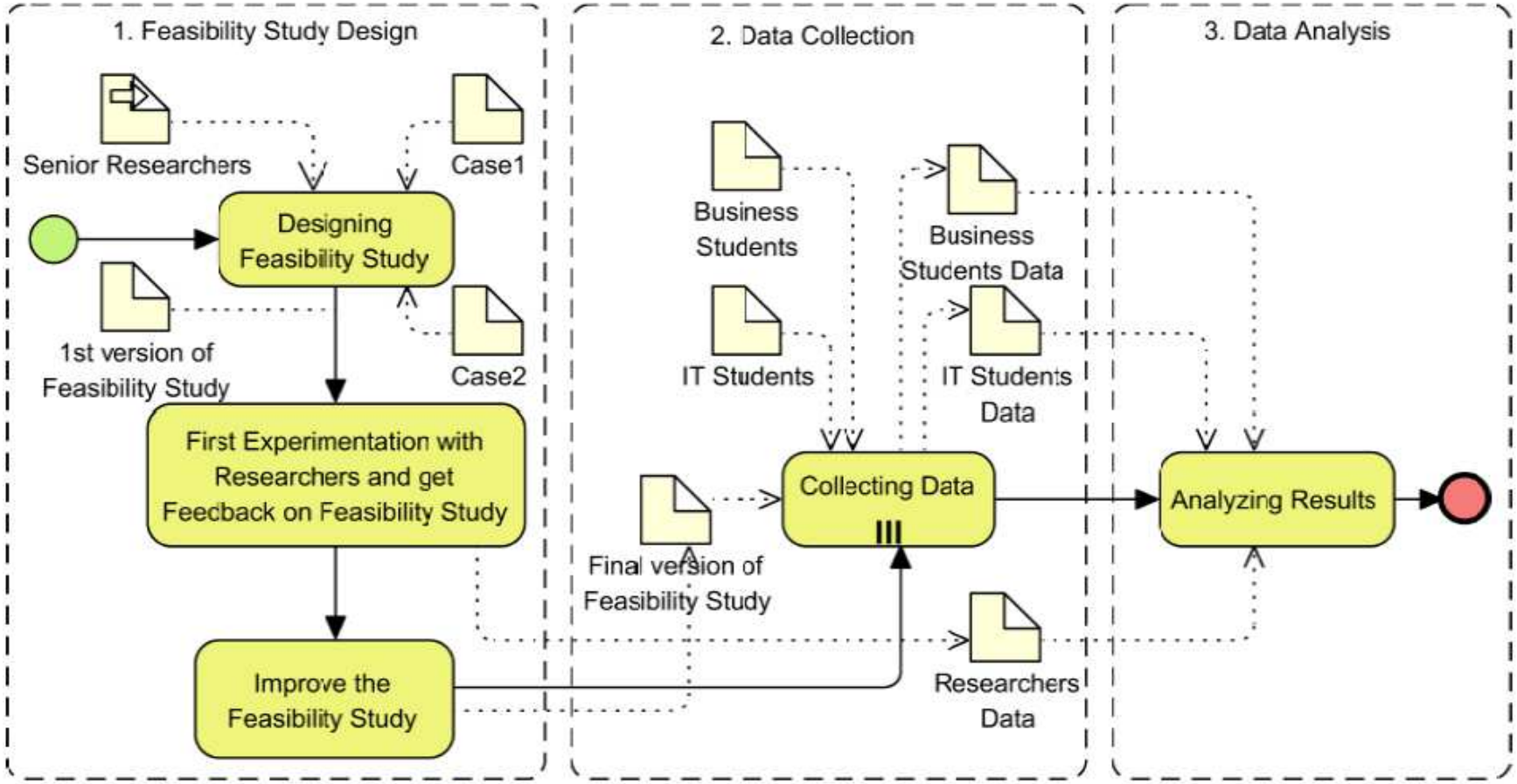
On Modelers Ability to Build a Visual Diagram from A User Story Set: A Goal-Oriented Approach

Yves Wautelet, Mattijs Velghe, ***Samedi Heng,*** *Stphan Poelmans, and Manuel Kolp*

Utrecht, Mars 22, 2018.

On the Ability of Building a Rationale Tree

Feasibility study process



- Two case studies: Carpooling and Book Factory
- Data collection: 21 Business Students, 35 IT Students, 13 Researchers

On the Ability of Building a Rationale Tree

Assignment and Measured Variable of the Feasibility Study

- Background
- Theoretical understanding
- 5-step experimentation:
  1. Identification of all elements within the WHO dimension of the US;
  2. Identification of all elements within the WHAT and WHY dimension of the US;
  3. Identification of the appropriate concept or tag for each element within the WHAT and WHY dimension of the US;
  4. Graphical representation (and linking) of the US' WHAT and WHY elements;
  5. Identification and representation of other links between the US elements.
- Difficulty in performing each step

On the Ability of Building a Rationale Tree

Assignment and Measured Variable of the Feasibility Study

- Step 1

US 1	As an owner, I want my clients to be able to place orders online so that the customer-friendliness of our services increases.
US 2	As a client, I have to complete an order so that I can place it online.
US 3	As a client, I need to fill my 'online cart' with products.
US 4	As a client, I need to pay my invoice, so that I can complete an online order.
US 5	As system component, I need to calculate the total amount of the order, so that the invoice can be paid.
US 6	As a client, I want to pay my order online, so that my invoice is paid.
US 7	As a system component, I need to process payments on the Ogone-payment platform so that the payment is secured.

Step 1: Identify all elements from the WHO-dimension (i.e. swimlanes in the model) from the different US.

Owner : US 1

Client : US 2, US 3, US 4, US 6.

System : US 5, US 7

On the Ability of Building a Rationale Tree

Assignment and Measured Variable of the Feasibility Study

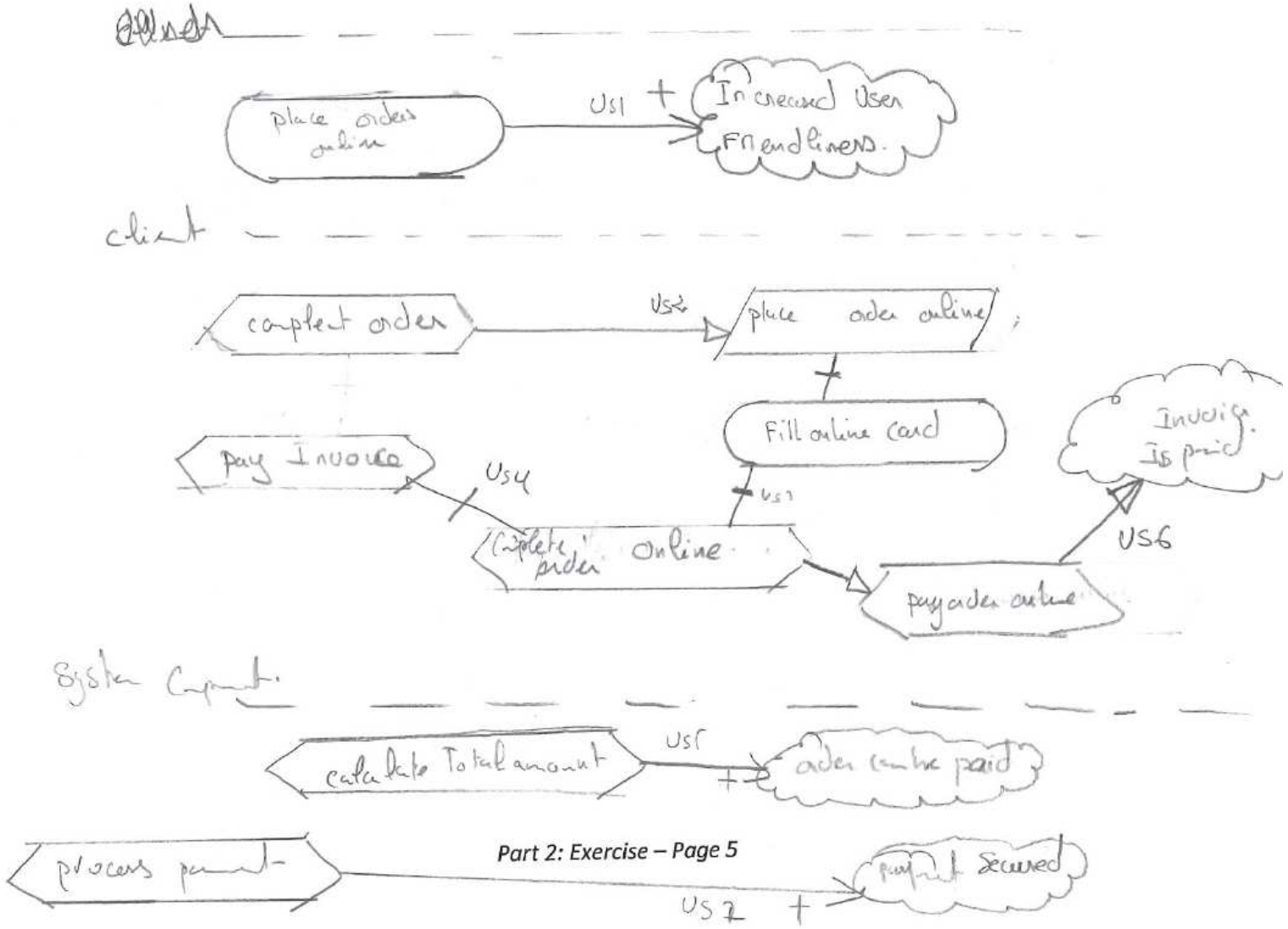
- Steps 2 and 3

		Step 2 *(Element)*	**Step 3** *(Modeling construct)*
US 1	WHAT	*Place orders online*	*Hard_Goal*
	WHY	*Increased user friendliness*	*Soft_Goal*
US 2	WHAT	Complete an order	Task
	WHY	Place orders online	Capability
US 3	WHAT	Fill online confirm products	Hard_Goal
	WHY	—	
US 4	WHAT	Pay invoice	Task
	WHY	Complete an online order	Task
US 5	WHAT	Calculate Total amount	Task
	WHY	invoice can be paid	Soft Goal
US 6	WHAT	pay order online	Task
	WHY	invoice is paid	Soft Goal
US 7	WHAT	provide payment on the vague project plan	Task

On the Ability of Building a Rationale Tree

Assignment and Measured Variable of the Feasibility Study

- Steps 4 and 5



On the Ability of Building a Rationale Tree

Results: Participants' Background

Table 7.3 Expertise of participants with i* framework.

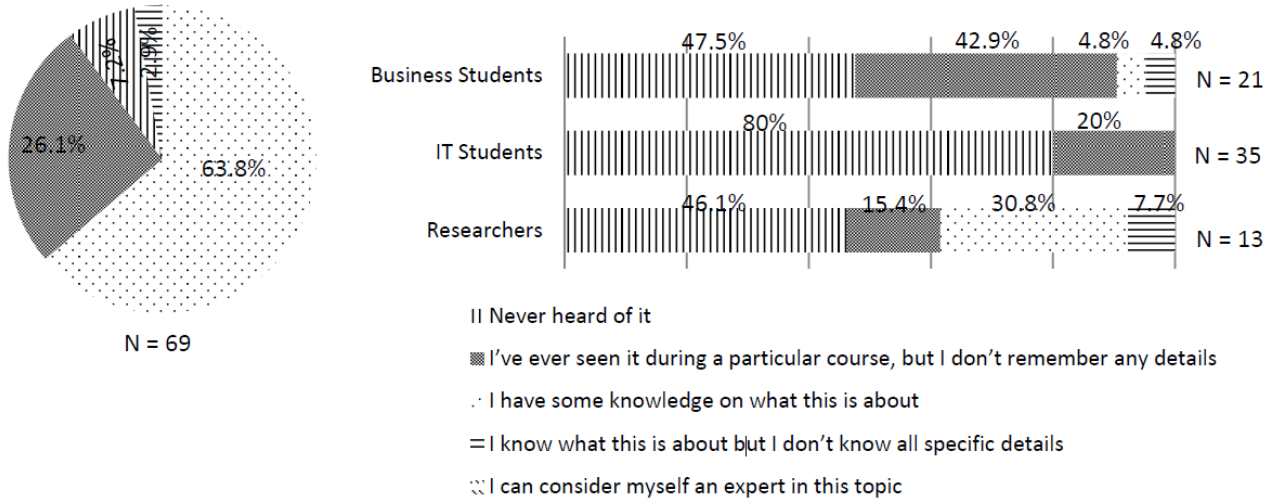
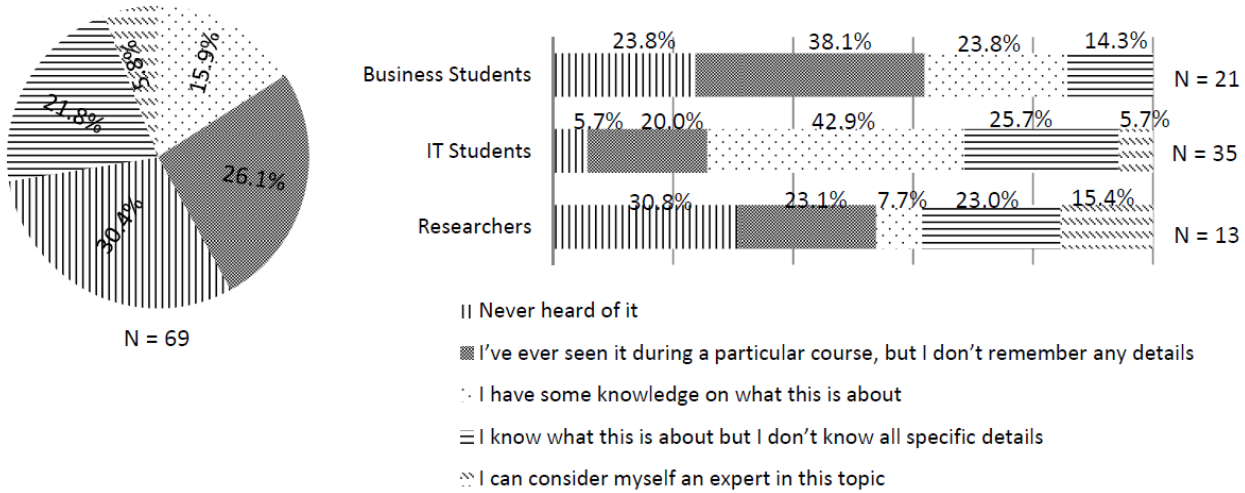


Table 7.4 Expertise of participants with user story.



On the Ability of Building a Rationale Tree

Feasibility study: Exercises

- As a **presenter at the REFSQ**,
  I want to **know about the hotel information as soon as possible**,
  so that **I can book for my hotel**.

- As a **presenter at the REFSQ**,
  I want to **ask for research fund from my university**,
  so that I can **book for my trip**.

On the Ability of Building a Rationale Tree

Feasibility study: Results of Case 1

Case1		Business students					IT students					Researchers				
		Task	Capability	Hard-goal	Soft-goal	Not present	Task	Capability	Hard-goal	Soft-goal	Not present	Task	Capability	Hard-goal	Soft-goal	Not present
US2																
	WHAT	42,9%	33,3%	23,8%			31,4%	51,5%	11,4%	5,7%		53,8%	30,8%	15,4%		
	WHY				9,5%	90,5%			2,9%		97,1%			30,8%	7,7%	51,5%
US3																
	WHAT	85,7%	14,3%				94,3%	5,7%				84,5%	15,4%			
	WHY	9,5%	4,8%	75,2%	9,5%		2,8%	8,5%	71,4%	14,3%	2,9%			76,9%	23,1%	
US4																
	WHAT	23,8%	76,2%				34,3%	62,8%	2,9%			30,8%	69,2%			
	WHY	38,1%	4,8%	47,6%	9,5%		48,6%	2,9%	37,1%	11,4%		46,2%	15,3%	15,4%	23,1%	

legend: Highest occurrence within the sample in question

Elements in the WHAT- and WHY-demension of the US in Case1:

US2 WHAT Propose a ride from A to B with the price, location and time of departure, and number of seats available

WHY -

US3 WHAT Book a ride

WHY Get ride from A to B

US4 WHAT Login

WHY Book a ride from A to B

On the Ability of Building a Rationale Tree

Feasibility study: Results of Case 2

Case2		Business students					IT students					Researchers				
		Task	Capability	Hard-goal	Soft-goal	Not present	Task	Capability	Hard-goal	Soft-goal	Not present	Task	Capability	Hard-goal	Soft-goal	Not present
US2																
	WHAT	85,7%	14,3%				66,7%	27,2%	6,1%			75,0%	8,3%	16,7%		
	WHY	4,8%	4,7%	81,0%		9,5%	9,0%	3,0%	66,7%	6,1%	15,2%		9,1%	90,9%		
US3																
	WHAT	52,4%	42,8%		4,8%		42,4%	36,4%	9,1%	12,1%		58,3%	25,0%	16,7%		
	WHY	4,7%		4,8%		90,5%					100%	8,4%		8,3%		83,3%
US4																
	WHAT	66,7%	28,5%	4,6%			75,0%	18,8%	6,2%			91,7%	8,3%			
	WHY	52,4%	4,7%	42,9%			25,0%	18,8%	50,0%	6,2%		50,0%	16,7%	33,3%		
US5																
	WHAT	52,4%	47,6%				71,9%	25,0%	3,1%			41,7%	50,0%		6,3%	
	WHY	23,8%		76,2%			19,4%	29,0%	41,9%	6,5%	3,2%	27,3%	9,1%	36,4%	27,3%	
US6																
	WHAT	47,6%	42,9%	9,5%			57,6%	36,3%	6,1%			63,6%	27,3%	9,1%		
	WHY	14,2%	9,5%	66,7%	4,8%	4,8%	15,6%	12,5%	65,6%	6,3%		18,2%	9,1%	36,4%	36,4%	
US7																
	WHAT	47,6%	42,9%	9,5%			50,0%	37,5%	9,4%		3,1%	45,5%	54,5%			
	WHY				100%					100%					100%	

legend: Highest occurrence within the sample in question

Elements in the WHAT- and WHY-demension of the US in Case2:

US2	WHAT	Complete an order	**US5**	WHAT	Calculate the total amount of the order
	WHY	Place an order online		WHY	The invoice can be paid
US3	WHAT	Fill my 'online' cart with products	**US6**	WHAT	Pay my order online
	WHY	-		WHY	The invoice is paid
US4	WHAT	Pay my invoice	**US7**	WHAT	Process payments on the Ogone-payment platform
	WHY	Complete an online order		WHY	The payment is secured

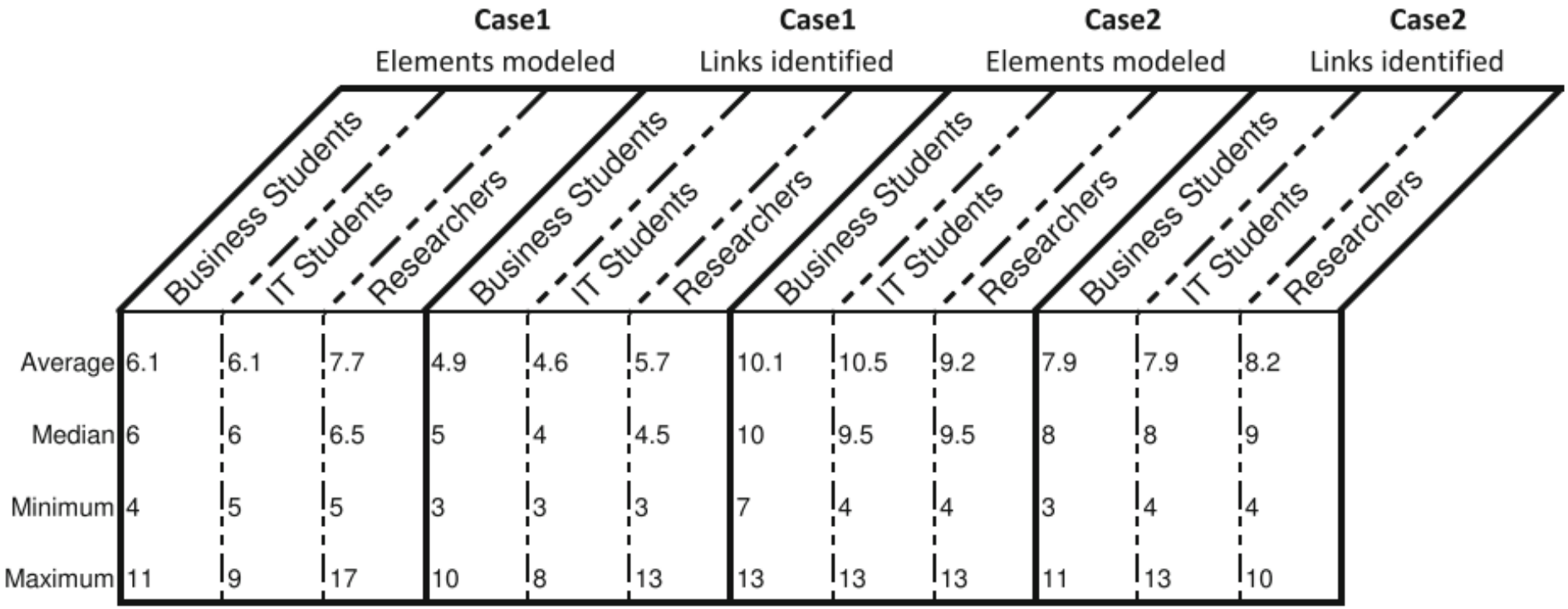
On the Ability of Building a Rationale Tree

Global performance of the model: Qualitative approach

- Business Students: Rather Success
  - Model user stories separately
  - Fail in identifying elements in user stories set
  - Having knowledge in user story can produce a better model
  - ➢ Require more theoretical understanding
  - ➢ Process-Oriented
- IT Students: Fail in overviewing the 'global model'
  - Isolate elements without any link
  - No dependency
  - ➢ Technical background influence their model
- Researchers: Produce a higher quality model
  - Model more elements
  - Decompose element in to sub-element
  - ➢ Try to identify and modeling new link out side the scope
- Modeling Errors
  - Decompose Capability in to Task
  - Links are not use properly (e.g., means-end)

On the Ability of Building a Rationale Tree

Global performance of the model: Qualitative approach

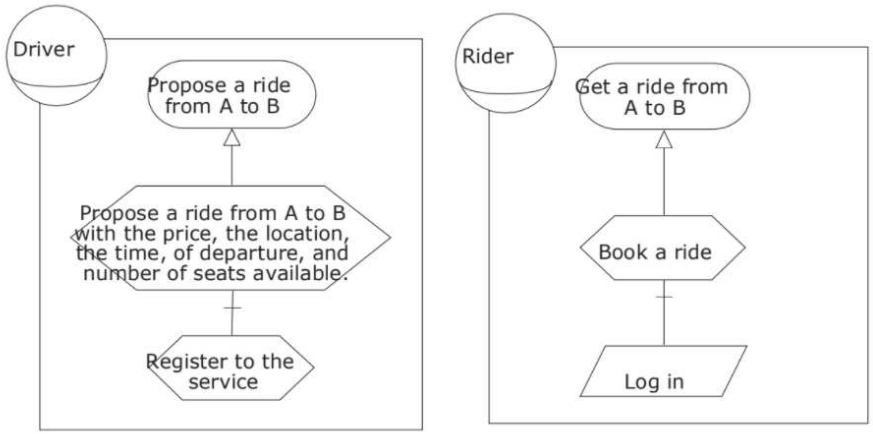


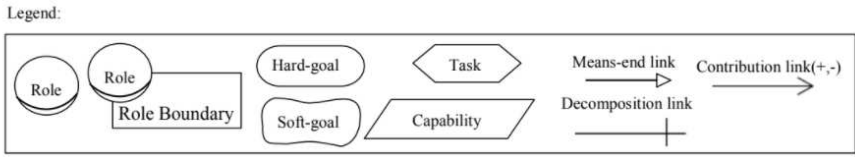
	Case1 Elements modeled			Case1 Links identified			Case2 Elements modeled			Case2 Links identified		
	Business Students	IT Students	Researchers	Business Students	IT Students	Researchers	Business Students	IT Students	Researchers	Business Students	IT Students	Researchers
Average	6.1	6.1	7.7	4.9	4.6	5.7	10.1	10.5	9.2	7.9	7.9	8.2
Median	6	6	6.5	5	4	4.5	10	9.5	9.5	8	8	9
Minimum	4	5	5	3	3	3	7	4	4	3	4	4
Maximum	11	9	17	10	8	13	13	13	13	11	13	10

Number of Elements and Links Models in Cases 1 and 2

On the Ability of Building a Rationale Tree

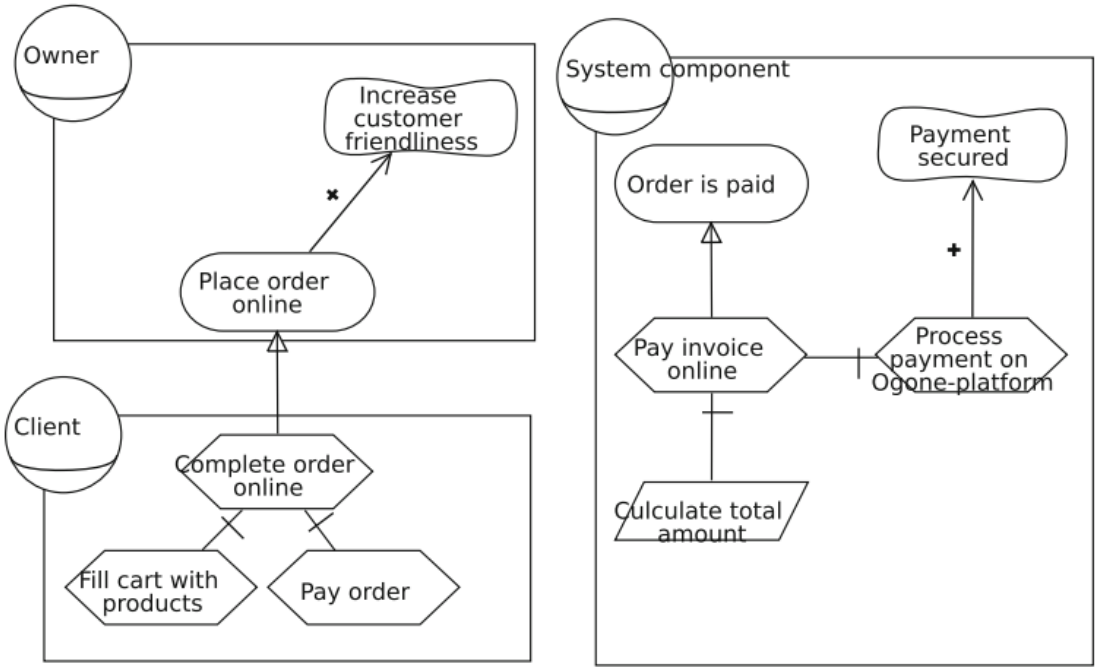
Global performance of the model: Quantitative approach





Type solution for Case 1

Type solution for Case 2



On the Ability of Building a Rationale Tree

Global performance of the model: Quantitative approach

Evaluation criterion	Allocated scores	Maximum score	
		Case 1 (4 US)	Case 2 (7 US)
Completeness	1 point per modeled element	8 points	14 points
Consistency	0.5 points per consistently modeled element	4 points	7 points
Accuracy	4 points per correct link (only 1 point if the wrong type of link is used)	16 points	32 points
Global quality	–	10 points	20 points

Global Score = ((Case1/3.8) * 0.3 + (Case2/7.3)*0.7) (a 10-based score)

(a) Descriptive statistics of the global score.

	Business Students	IT Students	Researchers
Average	6.20	5.50	6.60
Median	6.60	5.30	6.50
Minimum	2.90	3.60	4.40
Maximum	8.30	7.40	8.60

(b) Averages Scores on Case 1 and 2.

Sample Groupe	Case 1	Case 2
Business Students	6.30	6.20
IT Students	5.60	5.40
Researchers	7.20	6.30

On the Ability of Building a Rationale Tree

Improvement for Building a consistent Rationale Tree with CASE Tool

- Rationale Tree Validity: Model checker;
- Completeness Aspect:
  - Provide the ability to add missing elements;
  - Provide a process view (Task → sub-process and capability → activities).
- Constraint Checking: use the clustering algorithms.

Conclusion

- There are discord in interpreting WHAT and WHY dimension:
  - Element can be interpreted in several ways;
  - Lack of understanding (e.g., task vs. capability).
- Participants were able to produce an acceptable model;
- Participants focused on process oriented;
- We are trying to apply our approach in large US set in professional IT context.

References

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