

Strategic Business Modeling with *i**

Eric Yu
University of Toronto

Presented at CASCON Workshop on
**Requirements-Driven Business Process
Modelling and Performance Management**
Markham, Ontario, Canada
October 29, 2008

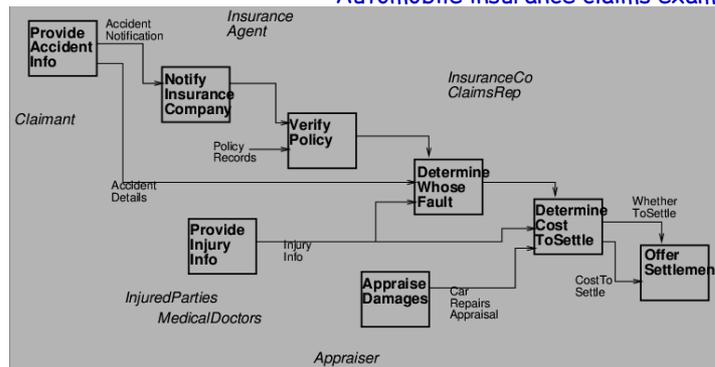


Outline

1. Goal-Oriented and Agent-Oriented Requirements Engineering
2. *i** modelling
3. Business modelling for services
4. Strategic business modelling
5. References, *i** wiki

We need deeper understanding than in traditional modelling

Automobile insurance claims example

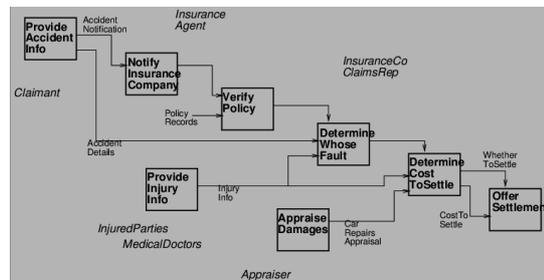


3

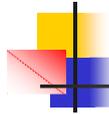
© Eric Yu 2008

... a deeper understanding about processes

- Car owner wants car to be repaired
- Insurance company wants to minimize claims payout
- Car owner wants fair appraisal of repairs
- Insurance agent wants to maintain good customer relations



4



Why is Early RE important?

- Before defining the system to be built
- Complex relationships among stakeholders
 - what they want
 - E.g., security, privacy, trust, profitability, market positioning, strategic alliances, intellectual property, ...
 - How they can achieve what they want
- Need systematic method, bring into RE process
 - modelling and reasoning support, tools, traceability, ...
- Consider:
 - E-business; E-learning; E-health; E-government
 - Energy, environment, transportation

5

© Eric Yu 2008

Modelling Strategic Actor Relationships and Rationales

- the *i** modelling framework

• Strategic Actors

- have goals, beliefs, abilities, commitments
- are semi-autonomous
 - freedom of action, constrained by relationships with others
 - not fully knowable or controllable
 - has knowledge to guide action, but only partially explicit
- **depend** on each other
 - for goals to be achieved, tasks to be performed, resources to be furnished

© Eric Yu 2005

6

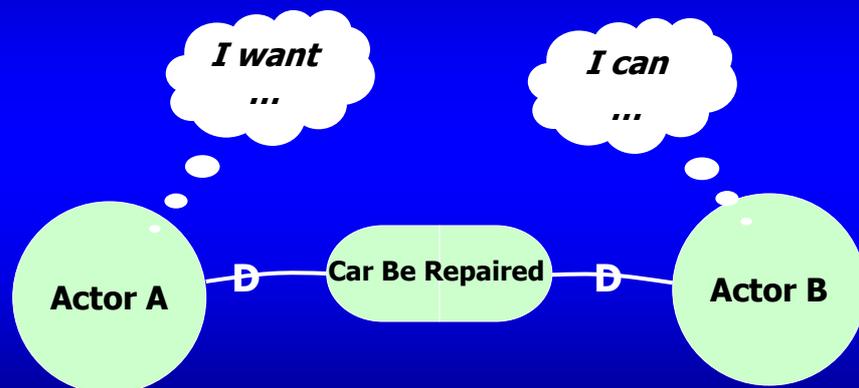
Approach: model social relationships for analysis and design

- Strategic actors
 - What do I want?
 - How can I achieve what I want?
 - Who do I depend on to achieve what I want?

7

© Eric Yu 2008

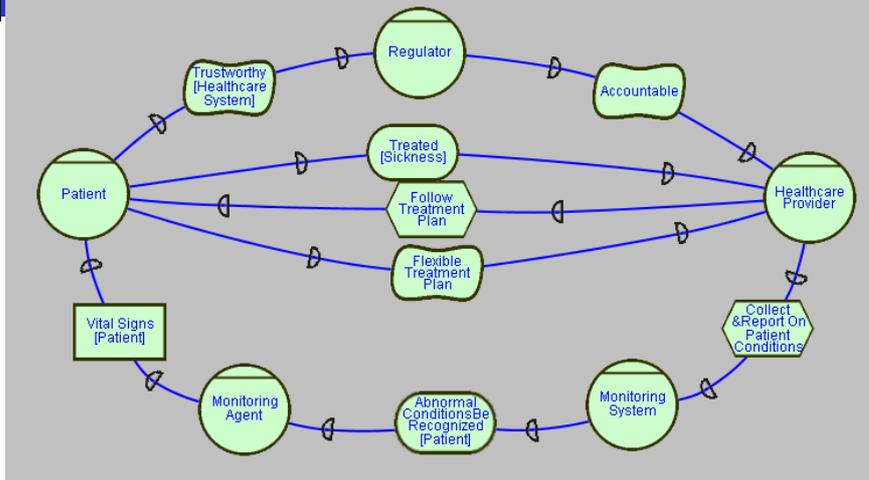
Strategic Dependency Relationship



© Eric Yu 2005

8

let's model systems and organizations in terms of **Strategic Dependencies** among actors

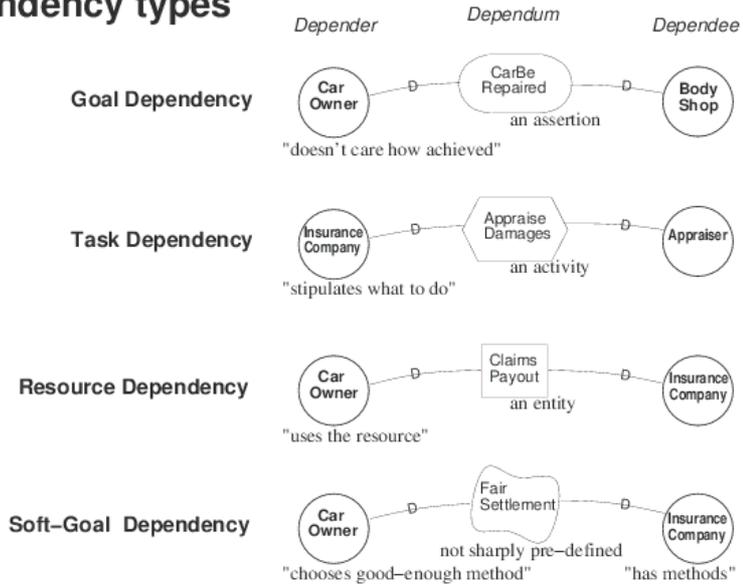


9

© Eric Yu 2008

Strategic Dependency Model

dependency types

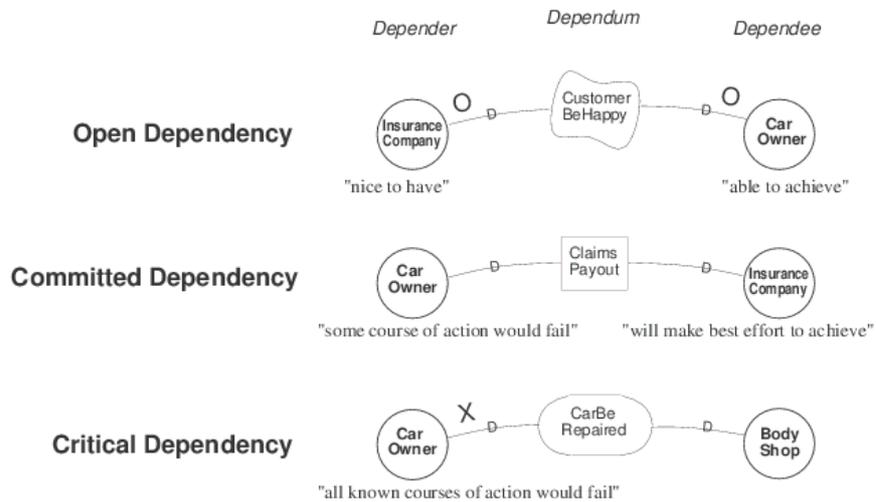


© Eric Yu 2005

10

Strategic Dependency Model

dependency strengths

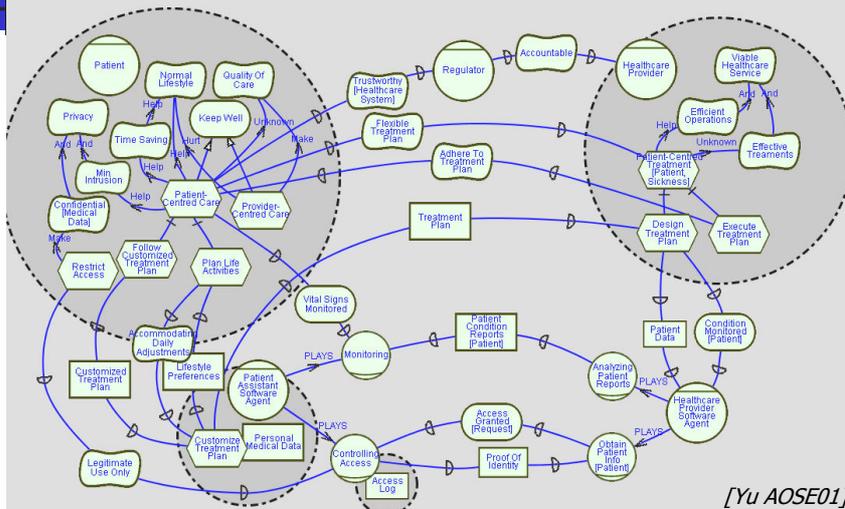


© Eric Yu 2005

11

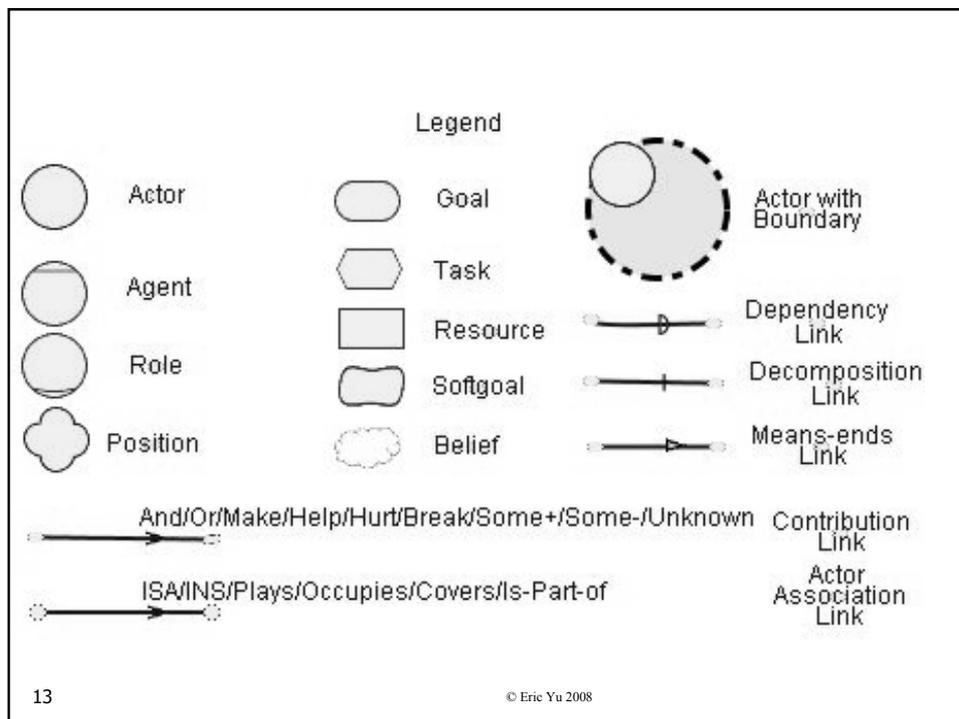
Strategic Rationales about alternative configurations of relationships with other actors

– Why? How? How else?



[Yu AOSE01]

12

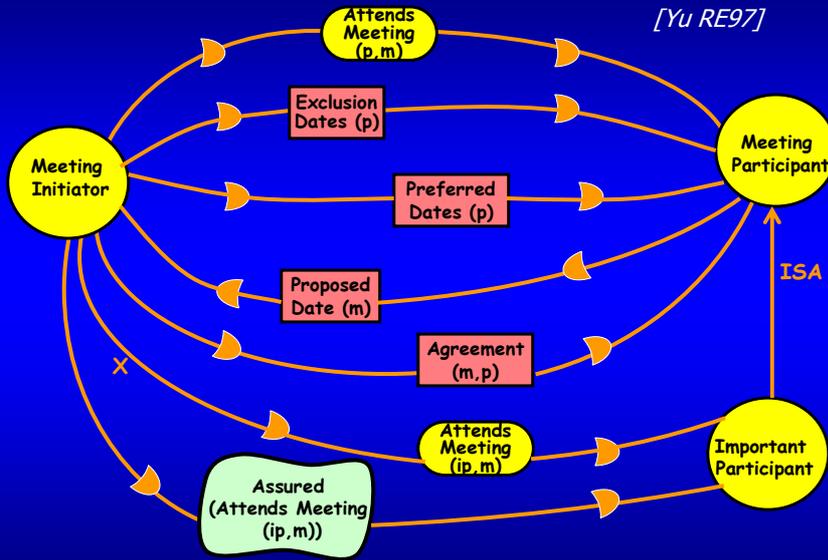


An Example *Meeting Scheduler*

From: E. Yu. Towards Modelling and Reasoning Support for Early-Phase Requirements Engineering
 3rd IEEE Int. Symp. on Requirements Engineering (RE'97) Jan. 6-8, 1997, Washington D.C., USA. pp. 226-235.

Strategic Dependency (SD) model

[Yu RE97]



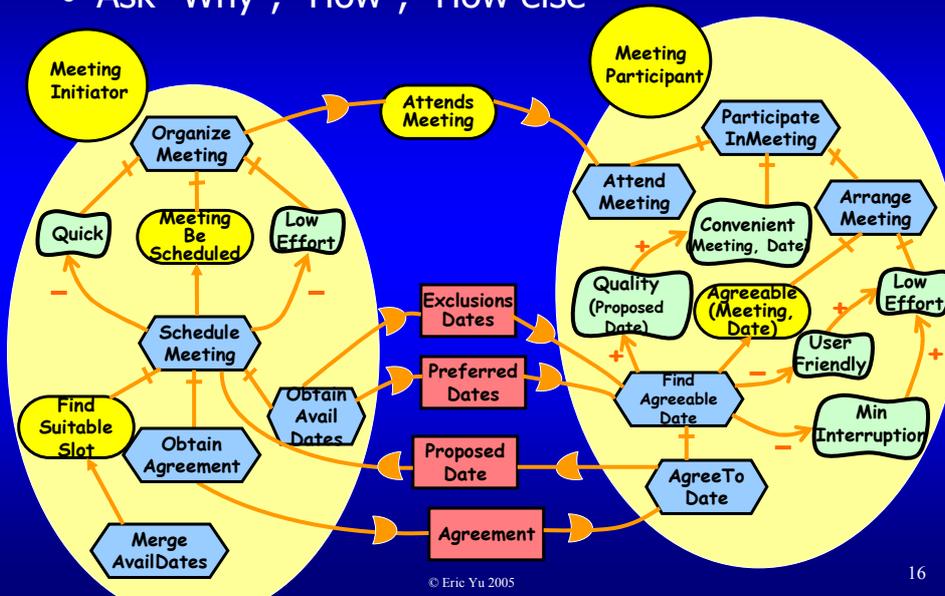
Meeting Scheduling Example

© Eric Yu 2005

15

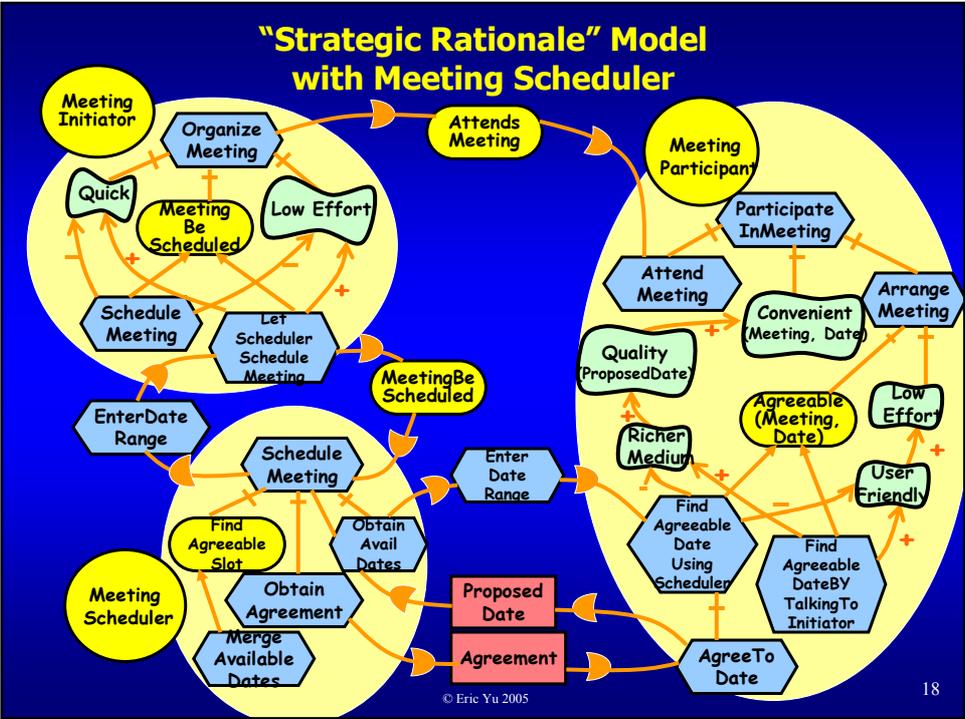
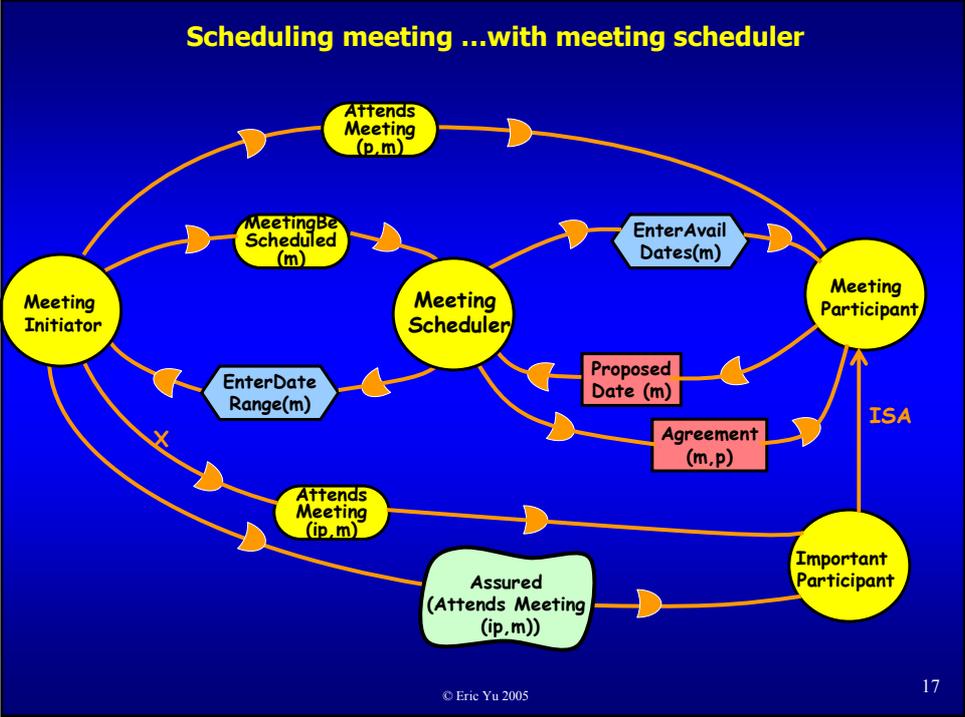
Strategic Rationale (SR) model

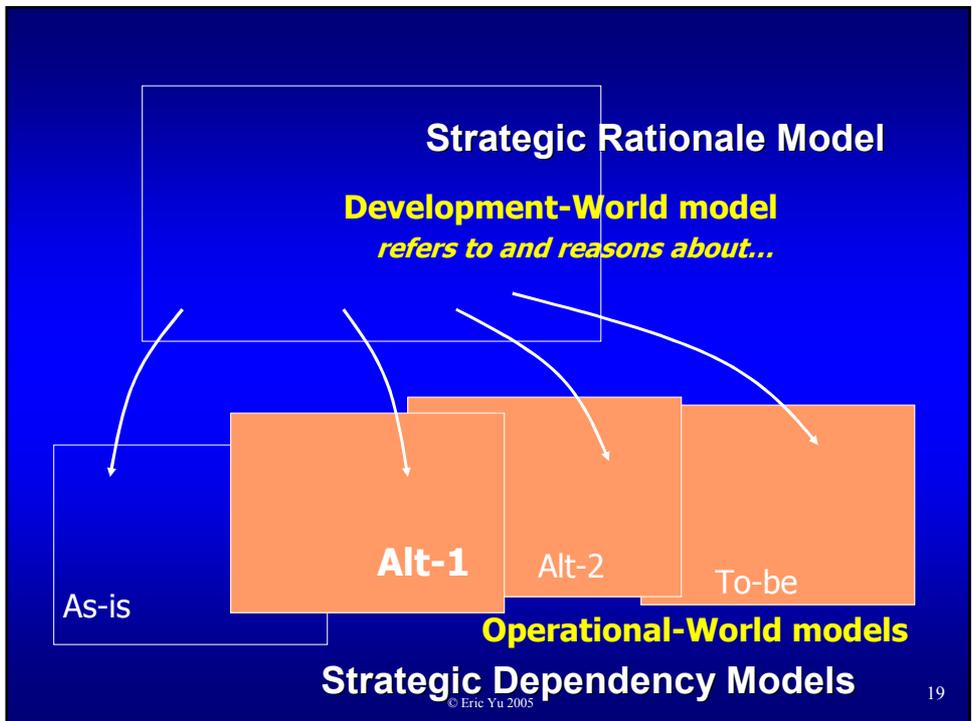
- Ask "Why", "How", "How else"



© Eric Yu 2005

16





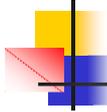
Analysis and Design Support

- opportunities and vulnerabilities
 - ability, workability, viability, believability
 - insurance, assurance, enforceability
 - node and loop analysis

- design support
 - raising issues
 - exploring alternatives
 - evaluating, making tradeoffs
 - justifying, settling
 - based on qualitative reasoning

20

Analysis/Evaluation of i^* Models [Jennifer Horkoff]



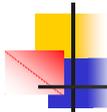
- To what extent are stakeholder goals satisfied or denied, given a particular situation or design option?



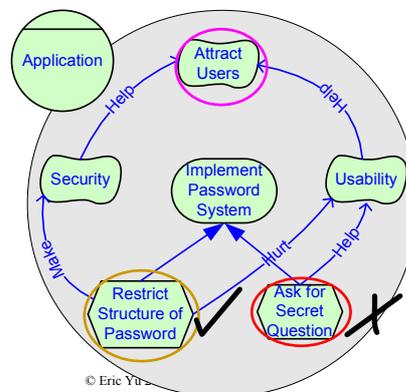
21

© Eric Yu 2008

Example:



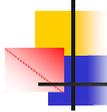
- Evaluation based on an analysis question:
 - If the Application implements **Restrict Structure of Password**, but not **Ask for Secret Question**, what effect will this have on **Attract Users**?
- Place Initial Labels reflecting Analysis Question



22

© Eric Yu 2008

Example:



- Propagate labels
- Resolve labels
- Iterate on the above steps until all labels have been propagated

Human Intervention

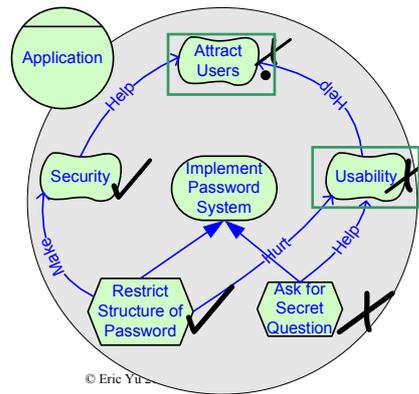
Usability Receives the following Labels:

Partially denied from Restrict Structure of Password

Partially denied from Ask for Secret Question

Select Label...

Select denied



23

© Eric Yu



From Business Models to Service-Oriented Design: a Reference Catalog Approach

Amy Lo
Department of Computer Science
University of Toronto

Eric Yu
Faculty of Information Studies
University of Toronto

Lo, A. and Yu, E., "From Business Models to Service-Oriented Design: A Reference Catalog Approach", ER 2007: Int. Conf. on Conceptual Modeling, LNCS 4801, Springer, 87-101, 2008.

Lo, A., "From Business Models to Service-Oriented Design: A Reference Catalog Approach", M.Sc. thesis, Dept. of Comp. Sci., Univ. of Toronto, 2006.

Services at the Business level.....



25

Motivations

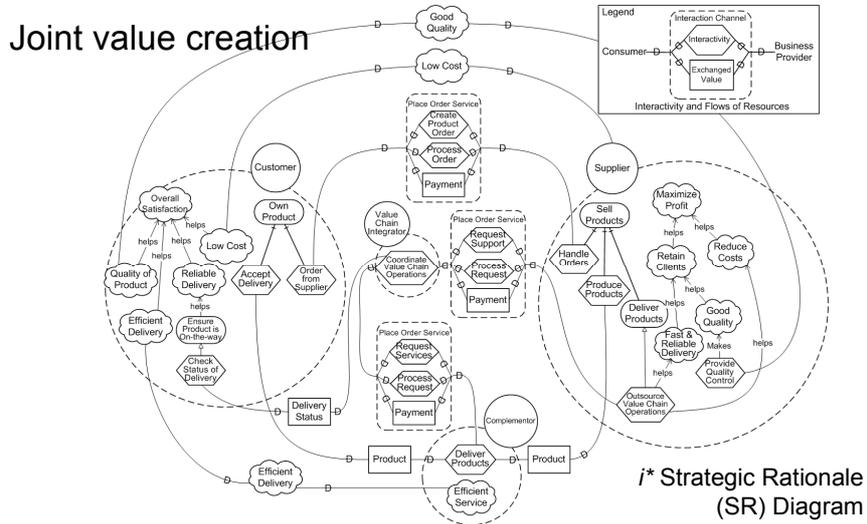
Service-Oriented Architecture (SOA)

- Better business/IT alignment
→ Are business needs properly captured?
- Rapid increase of design options
→ How to choose among them?
- Open architecture
→ Why? What are the motivations and rationales behind the design?

26

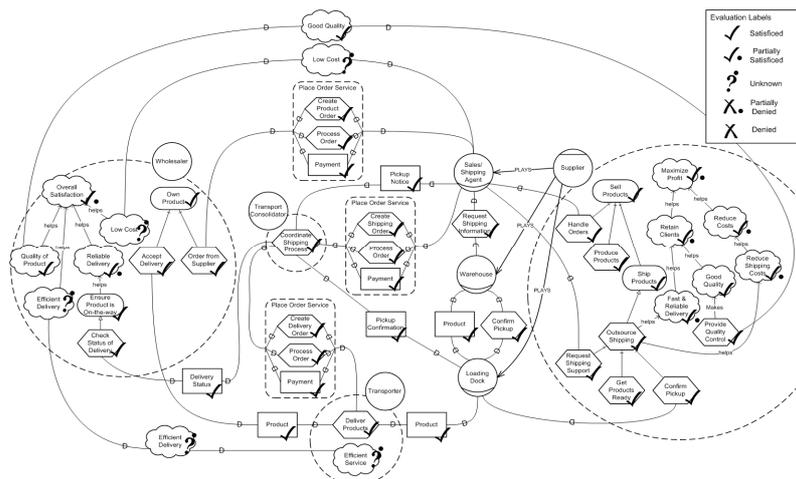
i^* as a Business Modeling Technique

Joint value creation



Are all stakeholders goals' achieved?

Evaluation of goal model [Horkoff06]



SR model refined from business model pattern

*i**'s Analytical and Reasoning Capabilities

- Goal analysis
- Task decomposition
- Means-ends reasoning
- Alternatives exploration and evaluation
- Feasibility analysis

29

Strategic Reasoning About Business Models: A Conceptual Modeling Approach

Reza Samavi
Eric Yu
Thodoros Topaloglou

Samavi, R., Yu, E., and Topaloglou, T., "Strategic reasoning about business models: a conceptual modeling approach", Information Systems and E-Business Management, Springer, 2008. DOI:10.1007/s10257-008-0079-z
Samavi, R., Yu, E., and Topaloglou, T., "Applying Strategic Business Modeling to Understand Disruptive Innovation", Proc. Int. Conf. on E-Commerce, Innsbruck, Austria, August, 2008.
Samavi, R., "Strategic reasoning about business models: a conceptual modeling approach", M.Eng. Project, Dept of Mech. & Ind. Eng., Univ. of Toronto, 2006.

What is missing in this business model representation?

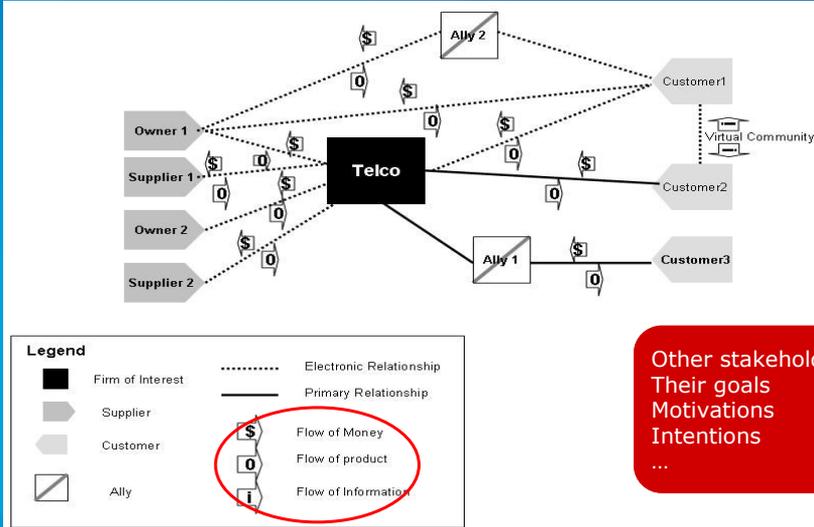
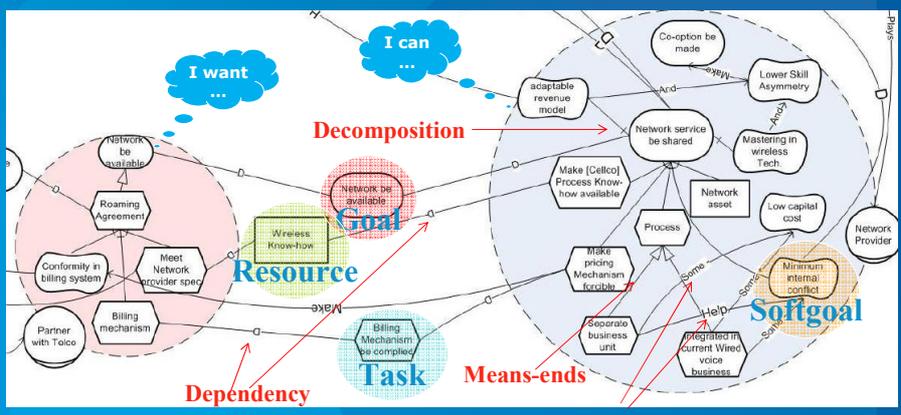
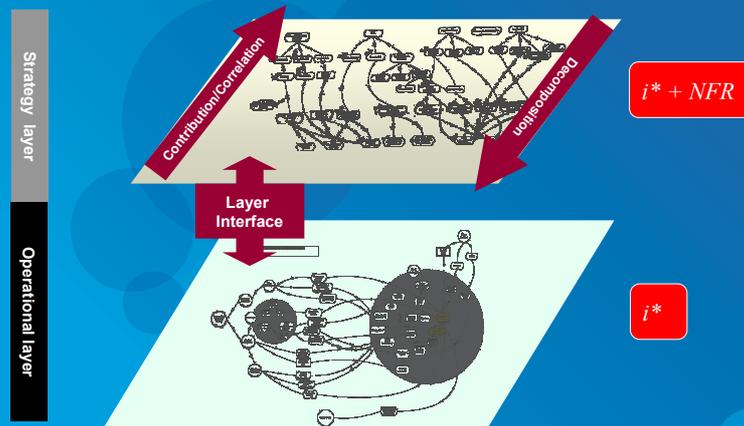


Image taken from: Weill, P. and M. R. Vitale (2001), *Place to space: Migrating to eBusiness Models*. Boston: Harvard Business School Press

Use *i** to model strategic relationships

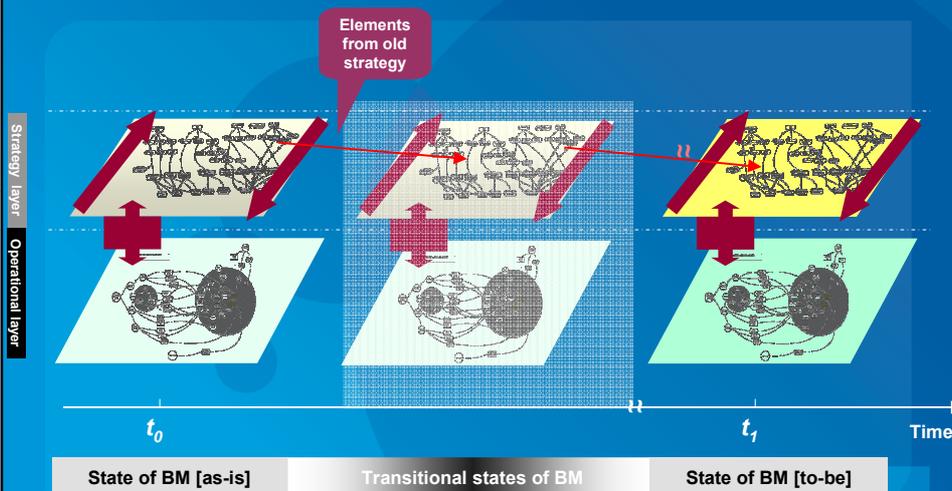


Strategic Business Model Ontology



33

An Integrated Framework



34

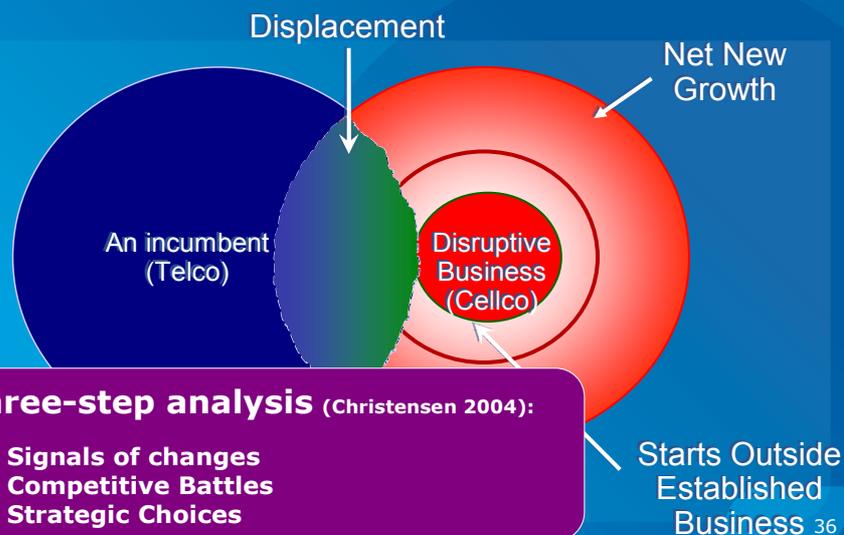
Case Study

- Telco is a telecommunication company
- Arriving cellular voice services has been a technological disruptive innovation for wired voice provider
- Despite the mobility of cellular phones,
 - the quality of early wireless voice services was relatively poor,
 - battery life for cellular units was inadequate,
 - phones were relatively expensive
- what circumstances caused co-option in wireless and wired technology
- what other strategic moves either incumbents or new entrants could have been made in the wireless case.

35

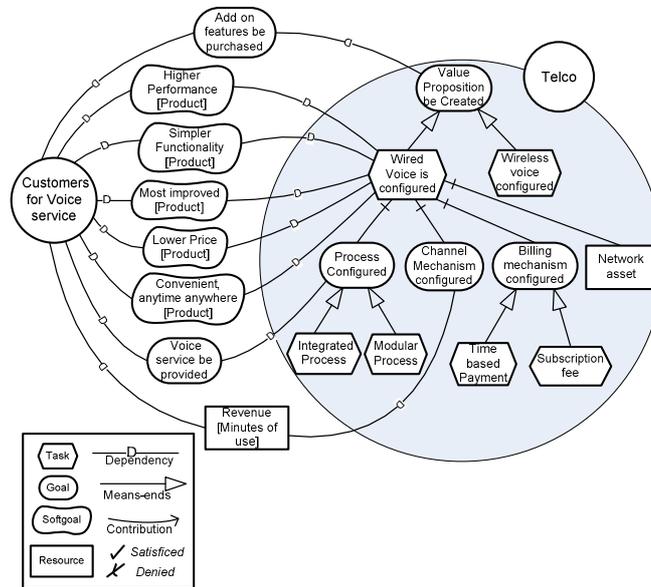
Case study from: Christensen, C. (2004), Seeing What's Next: Using the theories of innovation to predict industry change. HBS Press Book.

Disruptive Innovation

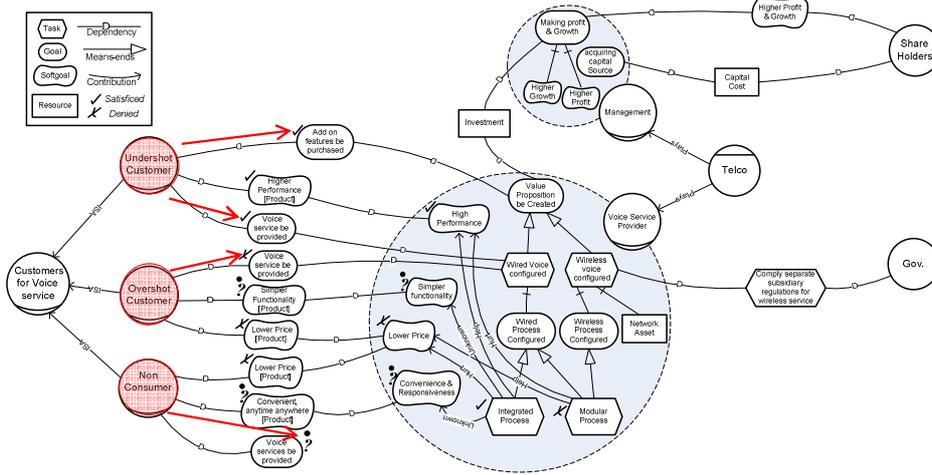


This slide comes from Prof. Clark Gilbert presentation on DI, Harvard Business School, 2004

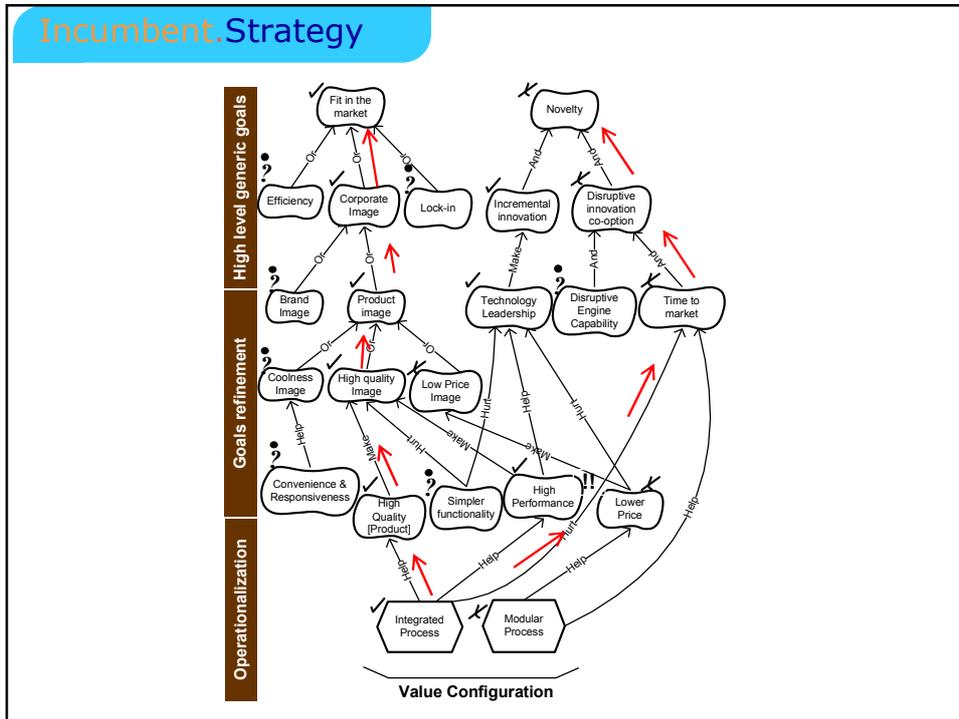
Incumbent.as-is Business Model



Incumbent.Signals of change



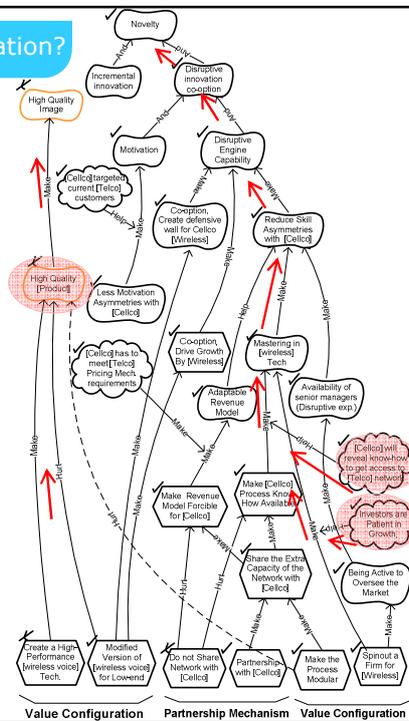
Incumbent Strategy



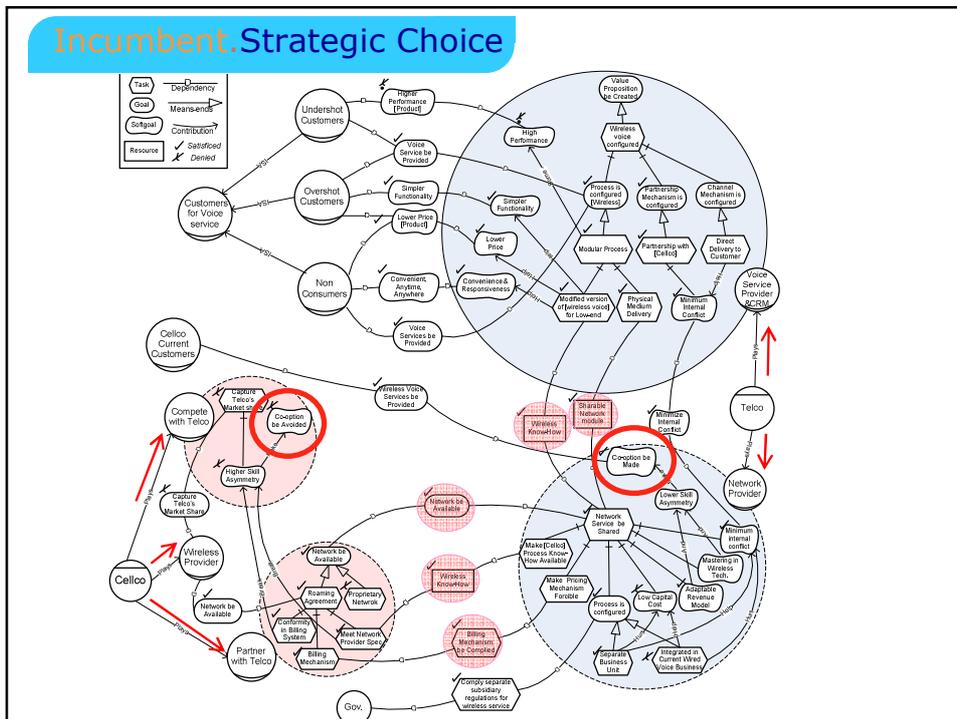
Is Incumbent capable for Disruptive Innovation?

Requirements to build Disruptive Innovation capacity:

- In its new strategy, Telco can convince its investors to be patient in growth;
- Despite that Cellco is Telco's rival, Telco cooperates with Cellco on sharing its network.
- A low quality image for Telco is assumed acceptable in its new strategy;



Incumbent Strategic Choice



How does *i** modeling help?

- To systematically analyze the business model
- Investigate multi-stakeholders role in business model (e.g. *Rivals, Non-Market Players, etc.*)
- Bring into account intentional dimensions, motivations and goals of participants in a business model
- Make a firm's strategy explicit
- Demonstrate the implication of an strategy

the *i** Wiki

Fostering Investigation, Collaboration, and Evaluation

<http://istar.rwth-aachen.de/>

- The *i** Quick Guide
- i** Usage Guidelines
- An Overview and a Comparison of *i** Tools
- Publications listings
- Who is Who
- Events

*i** Wiki Team

Gemma Grau,
Jennifer Horkoff,
Dominik Schmitz,
Samer Abdulhadi,
Eric Yu



References

See

<http://istar.rwth-aachen.de>

<http://www.ischool.utoronto.ca/~yu>