



Universiteit Utrecht

[Faculty of Science  
Information and Computing Sciences]

# Visual Business Modeling Techniques for the Software Industry

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# Overview

- Problem and Research questions
- Business Modeling Techniques
- Comparison
  - Conceptual
  - Process
  - Expert experiences
- Quality of Capturing and Communication
- Conclusions



# Problem statement

- Several business modeling techniques
- No research has been done into how efficient and effective business modeling techniques document and communicate business models
- No research has been done into how these techniques compare to one another



# Research question

- What **business modeling technique** documents and communicates the business model of a software startup most **effectively** and **efficiently**?
- What **changes** can be made in order **to improve** the efficiency and effectiveness of the business modeling techniques?



# Identification of core concepts

- The definition of a business model
- Business model literature
- Conduct interviews with nine industry experts
- Bellman, Clark et al. (1957) identify 5 core concepts of business models:
  - Logic of earning money
  - Customer value proposition
  - Architecture of the firm
  - Partnerships
  - Revenue streams



# Key concepts in business modeling

- 42 different business model concepts identified by Shafer et al. (2005)
- 9 concepts were mentioned most frequently
- Reduced to 7 by expert interviews; Business channels and capabilities removed
- Final list of 7 key concepts

Concepts	Description
Customer	Which customer segments are targeted? (Weill, Vitale)
Value proposition	What bundle of products and services creates value for a specific customer segment? (Osterwalder, 2004)
Revenue	How much money can be made by price x volume? (Johnson, et. al.)
Partners	Who are the partners that provide the key resources to the company? (Osterwalder, 2010)
Activities	What makes the profitable delivery of the value proposition repeatable and scalable? (Johnson, et. al.)
Resources	What are the most important assets required to make the business model work? (Osterwalder, 2010)
Costs	How are costs allocated? (Johnson, et. al.)

# Business Modeling Techniques (BMT)

Selected 3 visual BMTs

- visually distinguishable elements
- easy and fast communication of the business model
- **Business Model Canvas (BMC)** of Osterwalder and Pigneur (2010)
- **Software Ecosystem Model (SEM)** of Jansen and Brinkkemper (2009)
- **Board of Innovation (BoI)** of de Mey and de Ridder (2011)



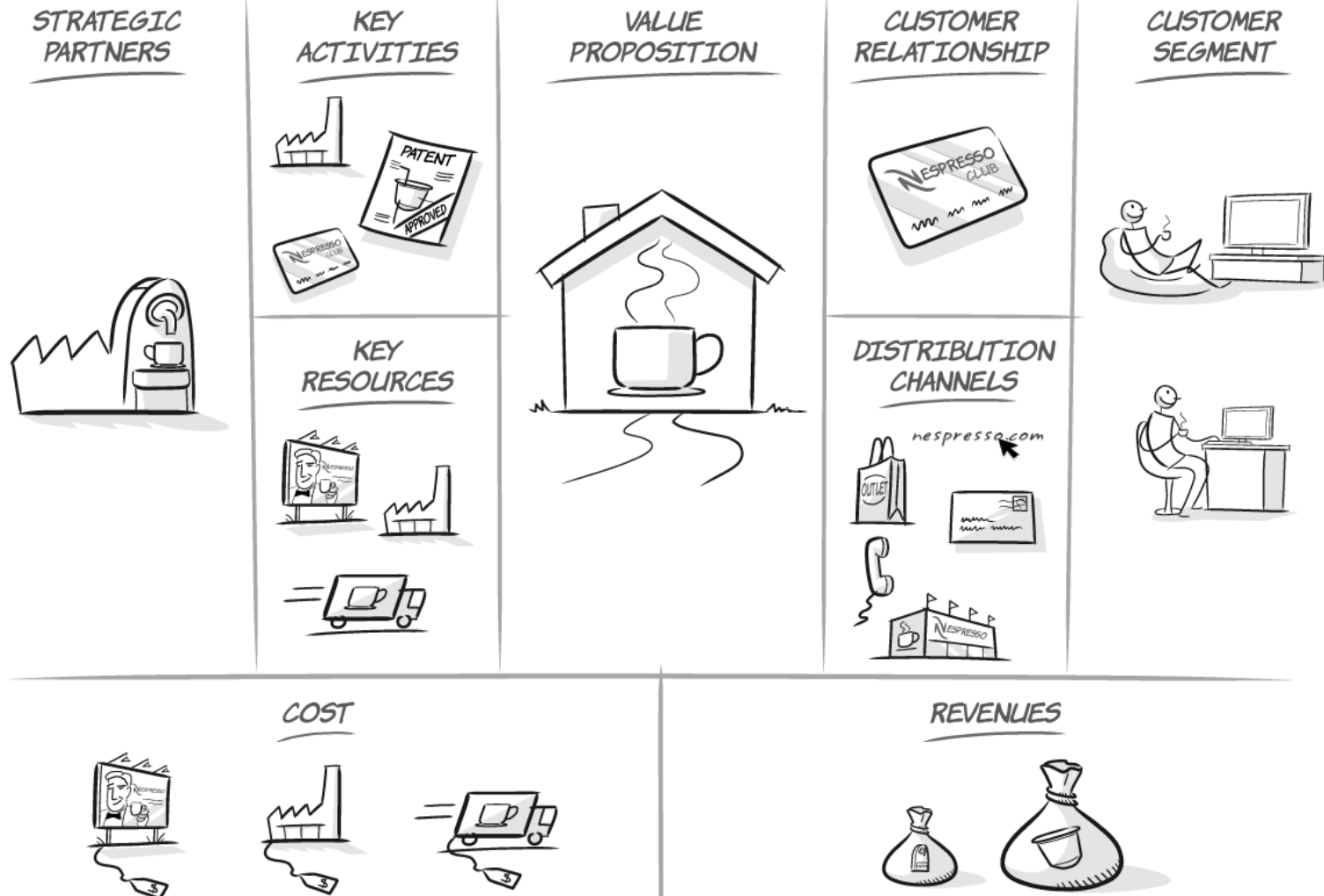
# Business model canvas

- Created by Alexander Osterwalder and Ives Pigneur
  - See: Business Model Generation, A. Osterwalder, Yves Pigneur, Alan Smith, and 470 practitioners from 45 countries, Wiley, 2010.
- Very popular in business schools for analysis of business models
- Widespread acceptance
- Does it work for the software business?

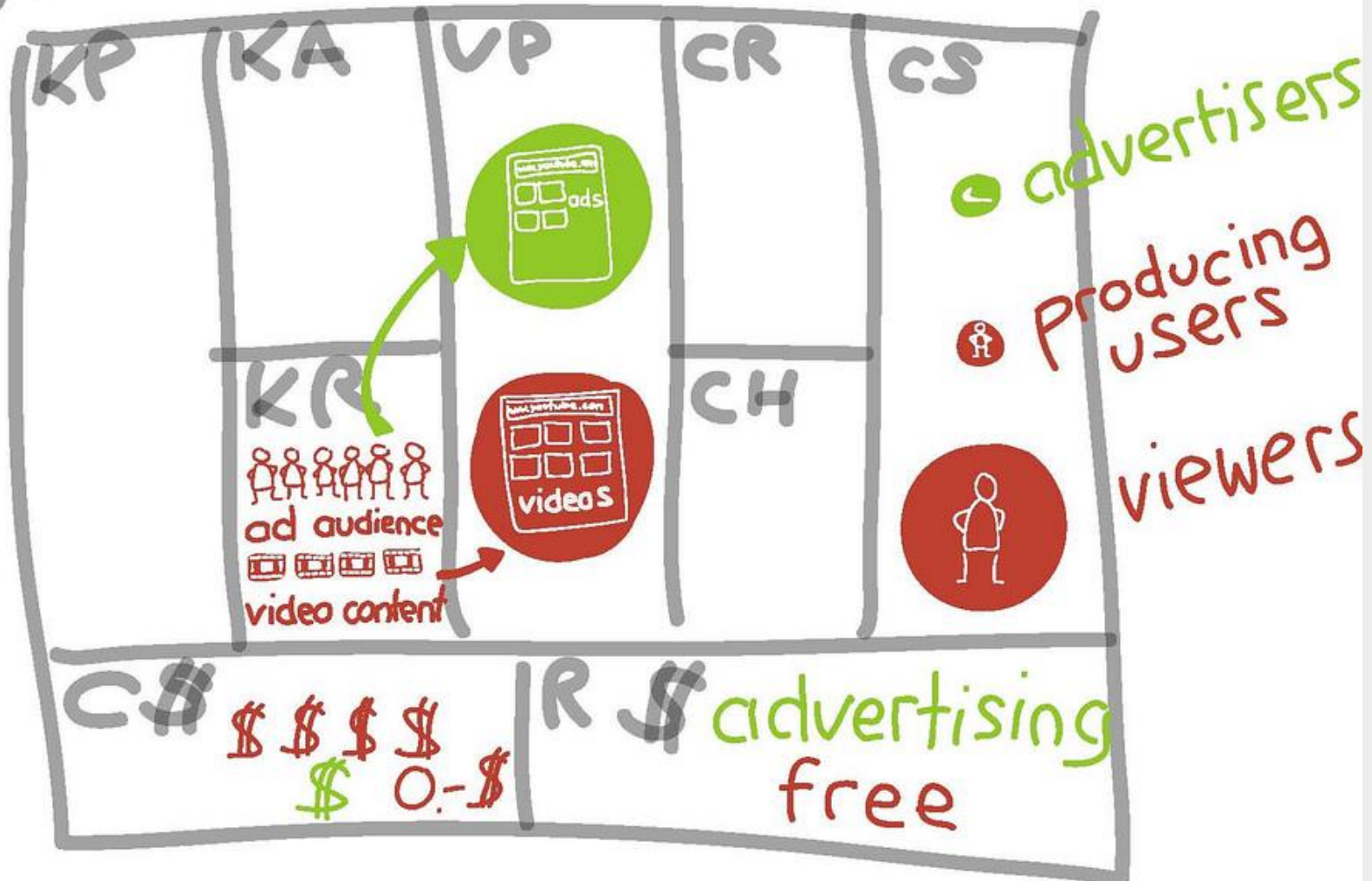




# Business model canvas



# Youtube



# Software Ecosystem Modeling

■ Developed at Utrecht University for software start-ups

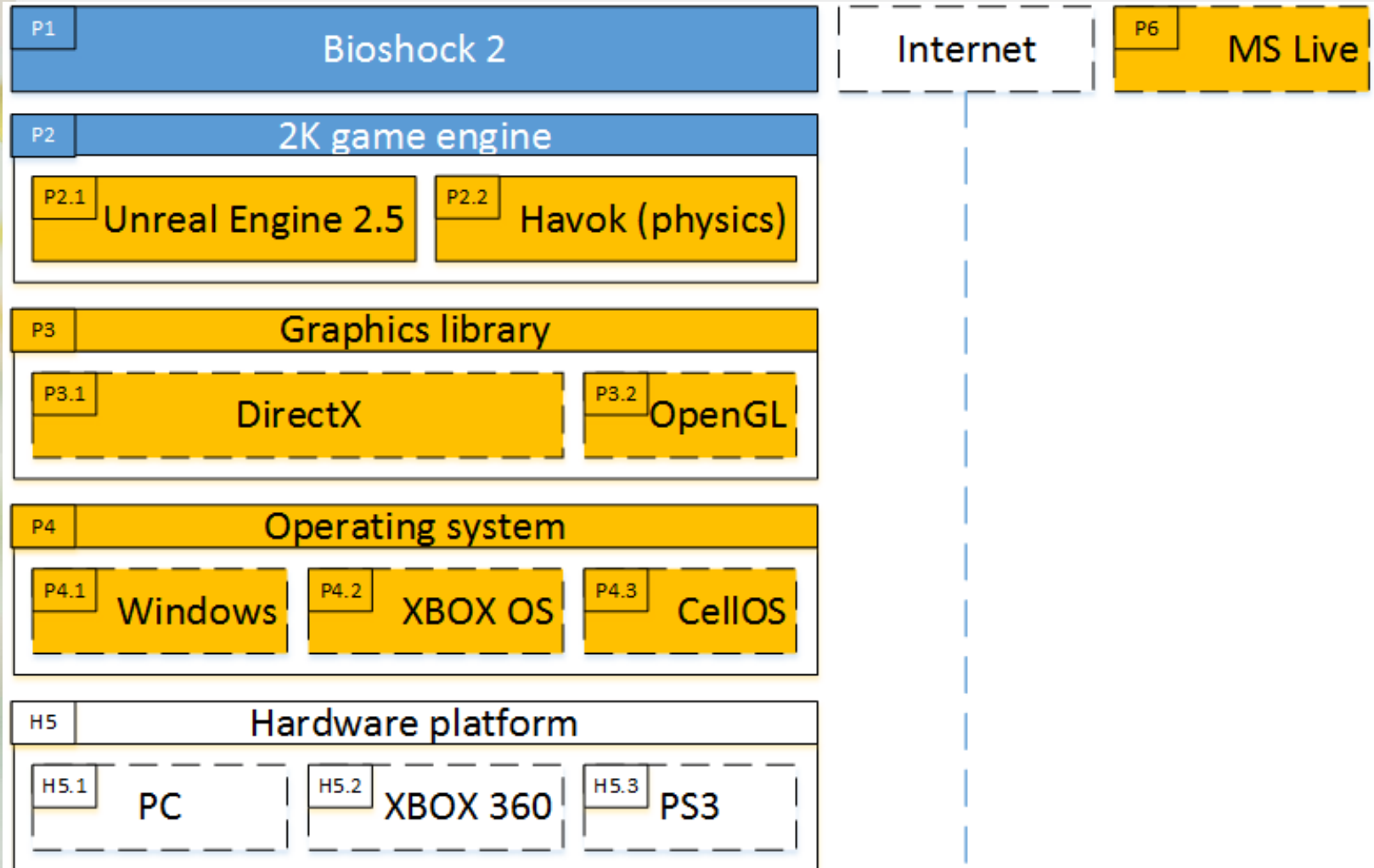
- Software Supply Network (SSN)
- Product Deployment Context (PDC)

P.1 Product of Interest	<b>Product of Interest (PoI):</b> The main software PoI in the business model. The color of the PoI is blue and its border line is solid.
P.2 Product	<b>Product:</b> A required software product for the PoI delivery to the customer. Its color is orange and its border line is solid. Examples: Web server, Database, Operating System. Platform Product
P.3 Platform Product	<b>Platform Product (Open):</b> A platform software product that includes other products of immediate interest. Its color is orange and its border line is solid. A white box attached to the bottom part is used for the placement of included products.
Medium Slide A ----- Slide B	<b>Medium:</b> The communication medium between two or more products. Its color is white and its border line is solid. Below and attached, a dashed line separates the two sides (stacks) that the medium connects with a description (stack title) for each.
H.1 Hardware	<b>Hardware Product:</b> A hardware product that is required for the PoI to function. Its color is white and its border line is solid.

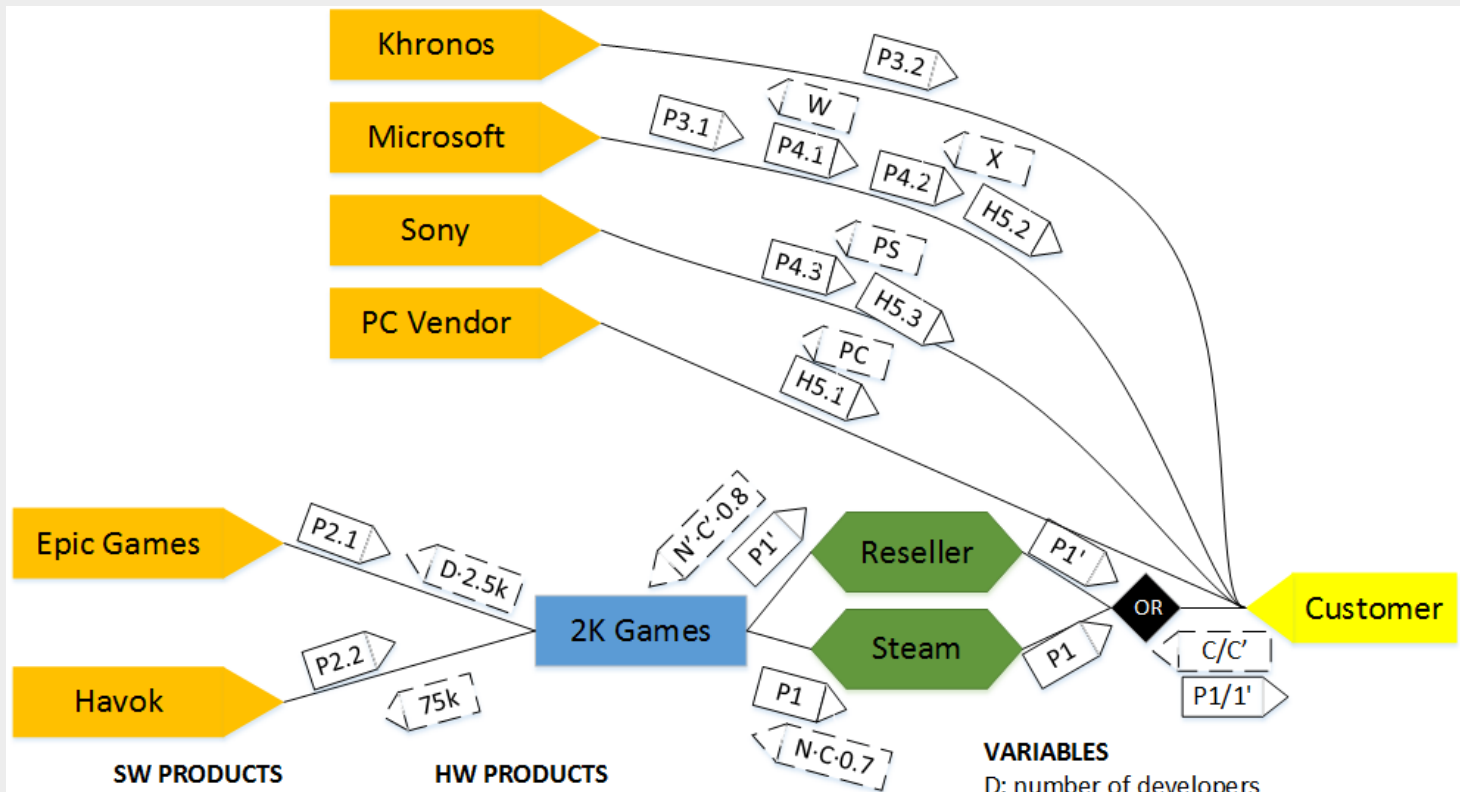
Company of Interest	<b>Company of Interest (CoI):</b> The CoI delivers the PoI in the business model under investigation. Its color is blue and its border line solid.
Supplier	<b>Supplier:</b> An actor that supplies one or more required products or services is a Supplier. Its color is orange and its border line solid.
Customer	<b>Customer:</b> An actor that directly or indirectly acquires or makes use of the PoI. Its color is yellow and its border line solid.
Intermediary	<b>Intermediary:</b> Actors like Distributors, Resellers, etc. act as intermediaries between two parties. Their color is green and its border line is solid.
Customer's Customer	<b>Customer's Customer:</b> A Customer might have his own customers being provided with a product or service directly or indirectly from the CoI. Examples: Product Support, Updates, etc. Its color is gray and its border line is solid.
S.1	<b>Trade Relationship:</b> Connects two actors. A relationship might be complex, constituting of many Flows of arbitrary directions. Drawn as a black solid line.
—	<b>Flow:</b> Represents an artifact or service flow from one actor to another. One or more characters substitute X, denoting the nature of the transferred artifact (Flow Type). Y is substituted by a number, denoting different artifacts of the same nature. Its color is white and its border line is solid.
OR	<b>OR Gateway:</b> Enables one or more or all Trade Relationships and their Flows between the input Trade Relationships and the output Trade Relationship. Its is black; the color of the text is white.
XOR	<b>XOR Gateway:</b> Enables only one Trade Relationship and its Flows between the Input Trade Relationships and the Output Trade Relationship. Its color is black; the color of the text is white.



# Product Deployment context: Bioshock 2



# Software Supply Network: Bioshock 2



## SW PRODUCTS

P1: Bioshock 2 (digital)  
 P1': Bioshock 2 (packaged)  
 P2.1: Unreal Engine  
 P2.2: Havok Engine  
 P3.1: DirectX  
 P3.2: OpenGL  
 P4.1: Windows  
 P4.2: XBOX OS  
 P4.3: Cell OS

## HW PRODUCTS

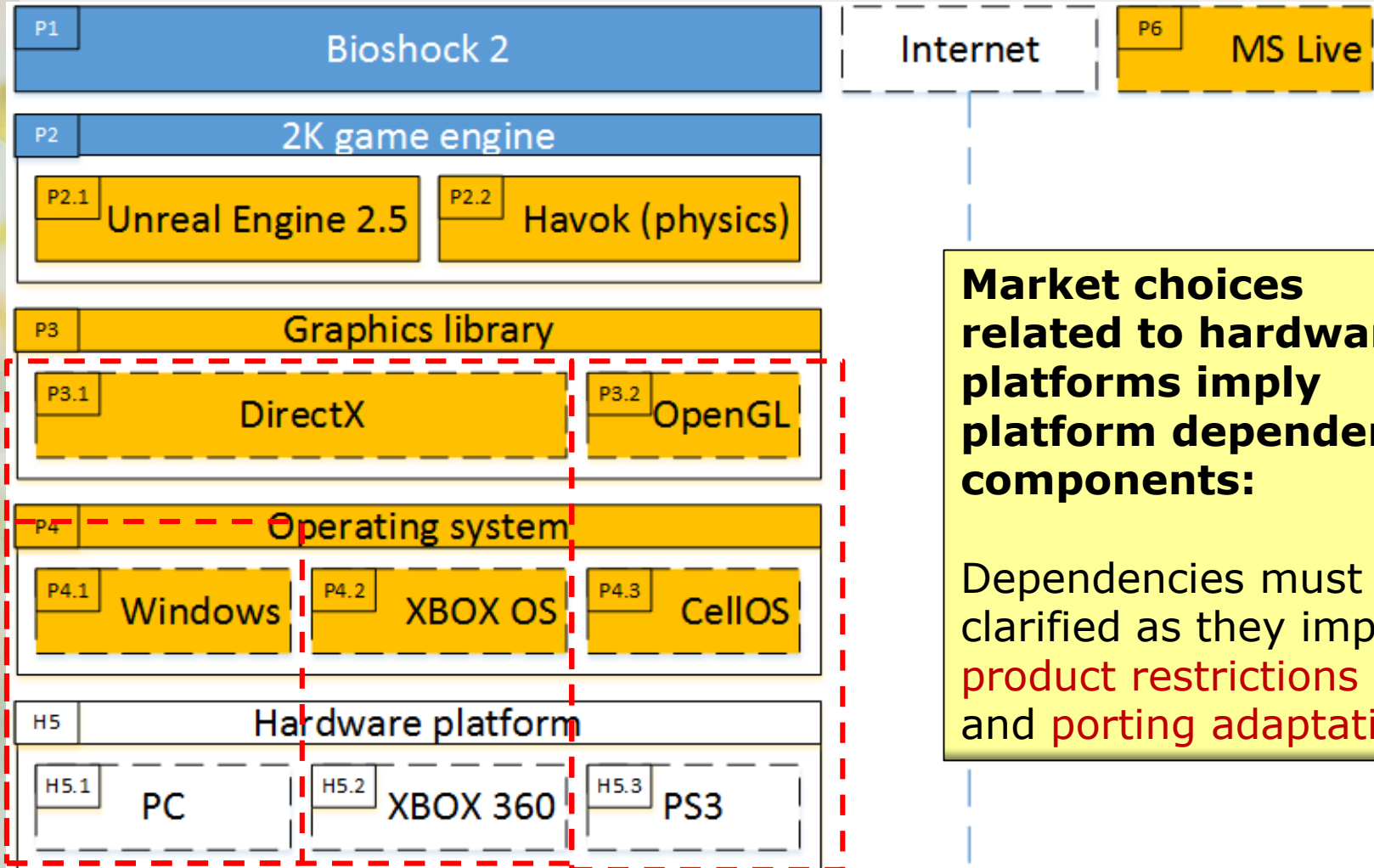
H5.1: PC  
 H5.2: XBOX 360  
 H5.3: PS3

## VARIABLES

D: number of developers  
 C: price per digital copy  
 C': price per packaged copy  
 N: number of digital copies sold  
 N': number of packaged copies sold  
 W: price of Windows  
 X: XBOX 360 price  
 PS: PS3 price  
 PC: PC price



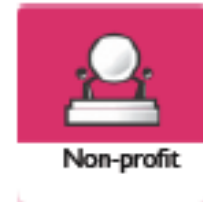
# Product Deployment context: Bioshock 2



# Board of Innovation

- the latest visual BMT and generating publicity quickly ([www.boardofinnovation.com](http://www.boardofinnovation.com))

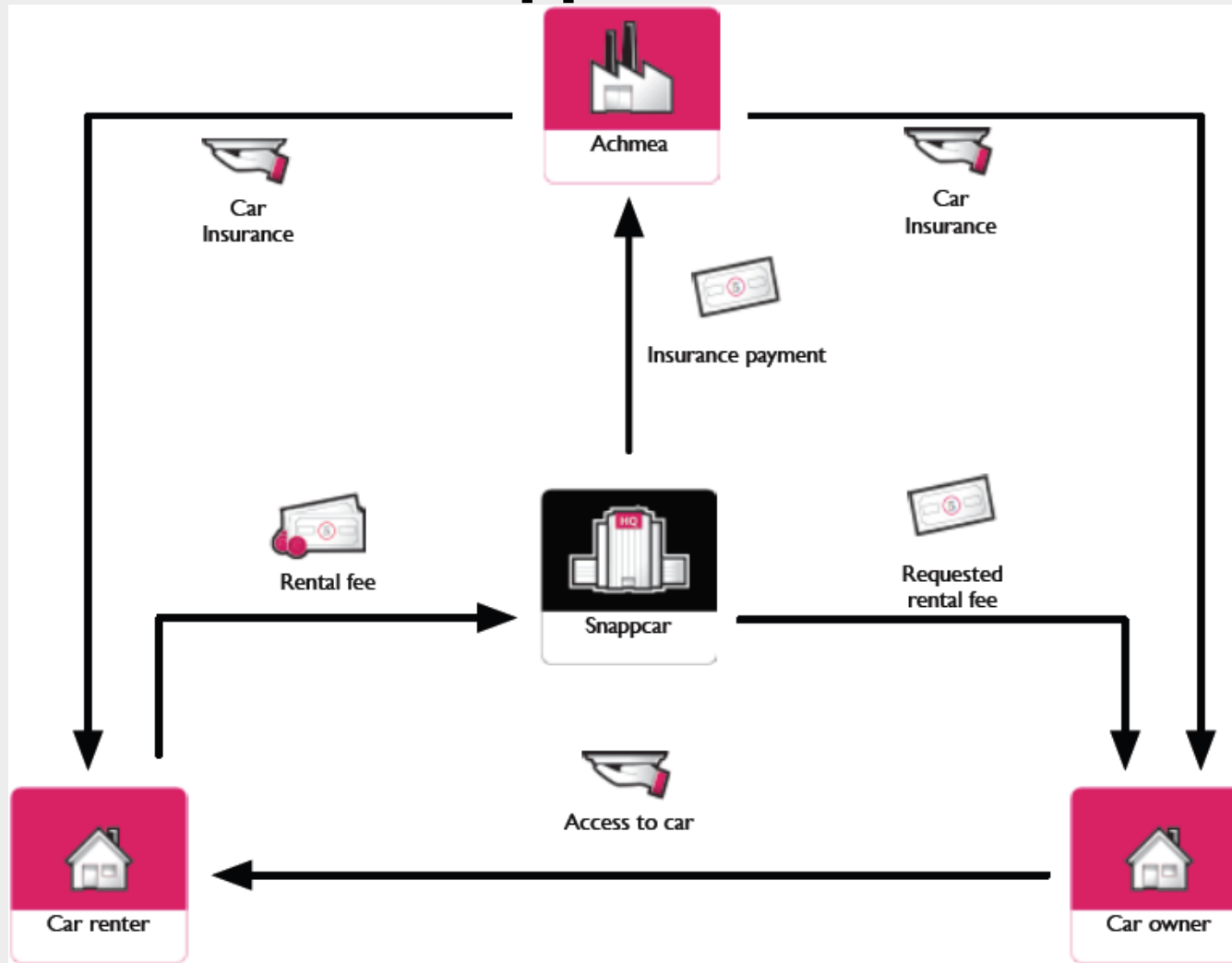
6 players



10 objects  
to exchange



# Snapp Car in BoI





# Conceptual comparison BMC

## ■ BMC

- **Required concepts** explicitly represented compartments
- **Flexibility**: the modeler is free to take any approach
- **Redundant concepts** can easily be **left out**.
- **Enhancements** afterwards by translating some textual elements into images for a communicable visual representation



# Conceptual comparison SEM

## ■ SEM

- The PDC maps the **product** by modeling the **architectural elements**
- **Stacking order** represents the hierarchy between different products and components
- **Transaction flows** in SSN map the value proposition, cost and revenue
- **No internal processes** of the business



# Conceptual comparison BoI

## ■ BoI

- **Distinct named icons** to identify types of customers and suppliers
- **Transactions** model the value proposition, processes, activities and revenue flows. Costs are left out.
- BoI does **not** include **channels**



# Comparison of the process

## BMC

- Collaborative, iterative and segmented style of the modeling process appears to be easy
- Provides simple discussion questions for each segment

## SEM

- Demands modeling software
- Including all of the tiniest suppliers will inevitably lead to a confusing SSN, cluttered by dozens of suppliers

## BoI

- The constraints concretely define what information is expected to be incorporated in the model
- Simple to work with and effectively communicates the core of the business model



# Experiences from interviews with experts - BMC

## ■ BMC

- Great tool but thought the technique still has a lot of **room for improvement**, mainly when it comes to explicitly specifying what is expected of the modeler
- One said that when he read the accompanying book all examples felt natural and obvious, but actually **filling the model** in for his advisory case was challenging and confusing
- Another one experienced with using BMC in project groups remarked that many people **incorrectly apply** the technique by resorting to strictly filling in the provided discussion questions



# Experiences from interviews with experts - SEM

## ■ SEM

- **Practically unusable** to use as a communication tool towards non technical third parties, although they praised the extensive inclusion of detailed information regarding suppliers
- **Inaccessible, unattractive design** of the model and unnecessary inclusion of technical details
- Just focused on **software applications**



# Experiences from interviews with experts - BoI

## ■ BoI

- Half of them appreciate the **clear, simple approach** whereas the other half claim the resulting model is **too simple** while still requiring extensive studying to completely understand the business model
- Although some experts said that it is difficult to discover what parts of the model are essential, others argue that this **model only includes the essential** parts
- However, most experts stated information on the **core internal activities is missing**; which they found essential during the identification of essential requirements



# Quality of Capturing and Communication

- Communicating effectiveness
  - **Acceptance** of the technique in business and academics
  - **Internal cohesion**, the elements of the model are related to one another
  - **Quantitative concreteness**, concrete numbers are shown in the model
- Capturing effectiveness
  - **Explicit modeling method**, instructions explicitly defining the approach are provided
  - **Method efficacy**, instructions are easily translated into practice
  - **Absence of redundancy**, the resulting models contain no redundant information
- Communicating efficiency
  - **Accessibility and Understandability**, accessible and understandable at first encounter of a model resulting from the modeling technique
  - **Explicit representation of elements in the model**: Value proposition, External process, Internal process, Transaction and Partner explicitness,
- Capturing efficiency
  - **Evolvability**, modeling approach can be changed without redesigning the entire approach
  - **Flexibility**, inclusion of concepts can be adapted to the modeler's needs





# Overall perceived quality

			Business Modeling Techniques			
			BMC	SEM	BoI	
<b>Effectiveness</b>	Communicating	Acceptance	++	--	0	
		Internal Cohesion	+	-	-	
		Number Concreteness	-	--	-	
	Capturing	Explicit Modeling Method	-	++	++	
		Method Efficacy	--	--	++	
		Absence of Redundancy	-	++	++	
<b>Efficiency</b>	Communicating	Accessibility and Understandability	+	-	++	
		Value Proposition Explicitness	++	+	++	
		External Process Explicitness	-	++	++	
		Internal Process Explicitness	--	--	--	
		Transaction Explicitness	+	+	+	
		Partner Explicitness	-	++	++	
	Capturing	Evolvability	++	--	++	
		Flexibility	++	--	-	
		<b>Legend</b>				
	++	Perfect	0	Neutral	-	Suboptimal
	+	Acceptable			--	Unusable

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# Conclusions

- **BMC is the preferred BMT** because of more effective documentation than SEM and BoI, and efficient communication than the SEM of all essential concepts
- Major improvement suggestions were:
  - **Remove ambiguity** from the BMC by explicitly clarifying certain aspects,
  - Improve the accessibility of the SEM by **redesigning the appearance**
  - Add **internal logic** to BoI



# Further research

- Validate results with quantitative research
- Modeling internal logic in SEM
- Validation of improvement suggestions



# Questions and Discussion

