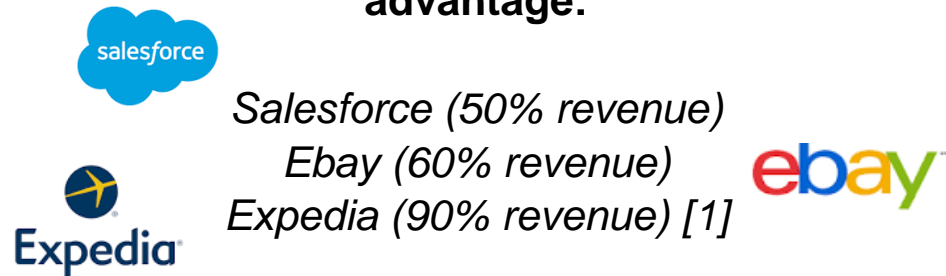# Identification of API-Enabled Value Creation Archetypes and their Implications for Organizations

Benjamin Strobel (B.Sc.), 25.09.2019, Master's Thesis – Final Presentation

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Outline

1. **Motivation**

2. **Goal Model & Research Questions**

3. **Research Approach**

4. **Results**

   a. **Actors**

   b. **Goals**

   c. **Value Creating System Archetypes**

5. **Discussion**

6. **Conclusion / Future Work**

Motivation – Why Value Creation through APIs matters

Well designed APIs that serve the right use cases are a real competitive advantage:

Salesforce (50% revenue)
Ebay (60% revenue)
Expedia (90% revenue) [1]

companies adopting APIs are **more mature** in their digital business strategy and **grow twice as fast** as those with lower adoption rate. [3]

VS

"[…] potential business models are unclear for the OEMs. […] [They] are still in an identification stage regarding potential business models." [2]

- Except a few early movers, most organizations:
  - do **not** have a formal **API strategy or related business model**
  - are **unclear** about the true **value** at stake, **where it comes from, and how to maximizes consumer and business impact**
- A lot of companies are in a "**identification stage**"

Source: [1] Iyer, Bala; Subramaniam, Mohan (2015): The Strategic Value of APIs. In *Harvard Business Review,* checked on 9/20/2019.; [2] Koch, Fridolin Jakob (2019): Opportunities and Barriers for Advancing the API Economy within the Automotive Industry. Master's Thesis. Technische Universität München, Munich.; Frost & Sullivan (2018): What Business Executives are Learning about Software Development and How it is Helping Achieve KPIs.

Motivation – Lack of Research / Related Work

Why is this important field of study still not covered from a API provider's perspective?

- Scientific research has been conducted
- Mainly focus on
  - General overview (Moilanen et al. 2019)
  - technical factors (De 2017)
  - internal (Horkoff, Lindman et al. 2018, Mohagheghzadeh et al. 2018)
  - modeling without analyzing content (Horkhoff, Lindman et al. 2018)

How can Research bring more transparency into those API-enabled Value Creation Systems and its business value?

- Analyze influencing factors within API environment from API providers point of view
  - Actors
  - Goals
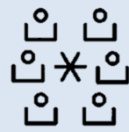 - Value Systems including Value Streams and Connections between Actors

Goal Model & Research Questions

RQ 1 — Who are **relevant actors (stakeholders)** within the API environment?

Actors (Stakeholders)

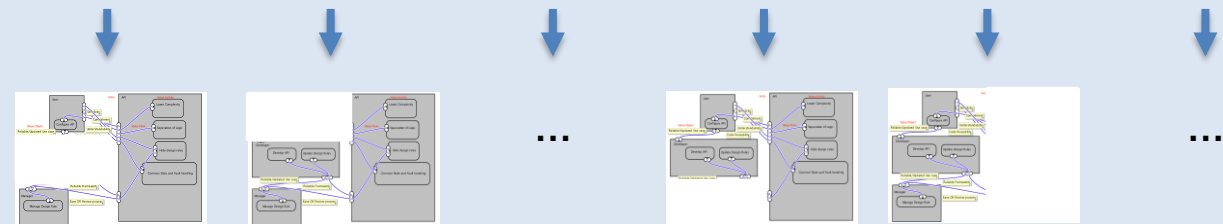**RQ 2** — What are **potential (value creation) goals** through APIs **for API providers**?

Goals for API providers

Core Competencies	Part of several VCS	Connect to others	Integrate & Streamline	Flexibility
Turn-over	Market access	...	Comp-liance	Image	...

(Value Creation) Goals

RQ 3 — What are **typical API-enabled value creation archetypes** used to achieve those goals?

Archetypes

Approach

TLT

|		Extensive literature / online research

RQ 1	Who are relevant **actors** (stakeholders) within the API environment?	• Structured approach via scientific literature [Webster & Watson, 2002]
		• Practical extensive literature research
		  • Research Papers
		  • Existing consultancy case studies
		  • Other literature sources

RQ 2	What are potential (value creation) **goals** through APIs **for API providers**?	**Interview partners**
RQ 3	What are typical **API-enabled value creation archetypes** used to achieve those goals?	• Grounded theory methodology: provide a set of systematic guidelines [Wiesche et al., 2017] • Qualitative data collection via 17 semi structured and recorded interviews (via interview guide, including pre-study) of on average around 47 mins • Interview partners from different industries • Coding: MAXQDA

Approach – Expert Interviews (1/2)

- Qualitative data collection via **17 semi structured and recorded interviews** (via interview guide)
- Total duration: **13 h 34 mins**
- Average duration around **47 mins 52 secs**
- Interview partners from **8 different industries**:
  - Finance, Insurance, (Operational / Strategic) IT Consultancy, Production (Machinery/Chemicals), Retail, SW Publishing, Transportation

- Coding: MAXQDA
  - Starting with 6 seed categories
  - Ended with around **240 categories** for coding snippets
  - Overall **1,603 coding snippets**

Interview ID	Industry Classification	#Employees (Range)	Categorie Role/Position	API Experience (Range)	Duration	Interviewers
I1	Operational IT Consultancy	5.001-10.000	Director IT Busines Unit	>15	1:19:25	BS, GB
I2	Production	> 100.000	Solution Architect	2-4	0:27:37	BS, GB
I3.1	Software Publishing	1.001-2.000	Business Developer	10-15	0:54:41	BS, GB
I3.2	Software Publishing	1.001-2.000	Solution Architect	10-15	0:54:41	BS, GB
I4	Finance	51-250	Process Expert	2-4	0:33:06	BS
I5	Strategic IT Consultancy	2.001-5.000	IT Consultant	2-4	0:48:02	BS, GB
I6	Retail	50.001-100.000	Product Owner	2-4	0:52:46	BS, GB
I7	Insurance	> 100.000	Enterprise Architect	10-15	0:44:52	BS, GB
I8	Software Publishing	5.001-10.000	IT Business Analyst	5-9	0:44:38	BS
I9	Transportation	2.001-5.000	Portfolio Manager	2-4	0:47:32	BS, GB
I10	Operational IT Consultancy	251-500	Director IT Busines Unit	5-9	1:00:35	BS
I11	Operational IT Consultancy	5.001-10.000	IT Consultant	2-4	0:58:16	BS, GB
I12	Production	10.001-50.000	Business Developer	>15	ca. 0:45:00	BS
I13	Production	5.001-10.000	IT Consultant	2-4	0:46:32	BS
I14	Insurance	> 100.000	Enterprise Architect	10-15	0:33:53	BS
I15	Operational IT Consultancy	251-500	IT Consultant	2-4	0:41:42	BS
I16	Production	> 100.000	API Strategist	10-15	ca. 0:55:00	BS
I17	Production	51-250	CTO	10-15	ca. 0:40:00	BS

Results – Typical Actors (Stakeholders) in the API environment [RQ1]
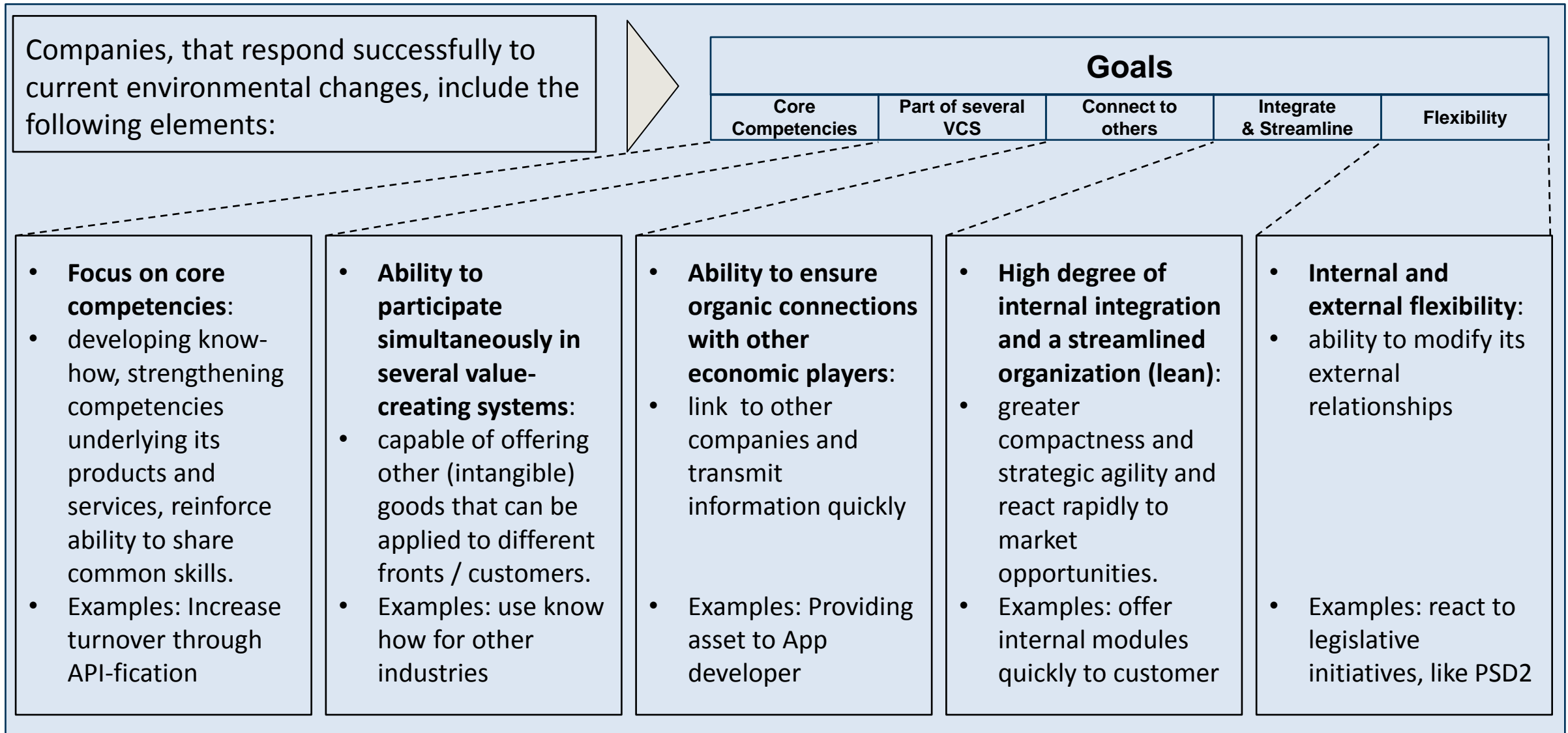
Mostly actively involved ([in-] direct API touchpoint

- **Data / Functionality Provider**: where data or algorithms come from
- **Web Service Provider**: actual API provider
- **(Technical) API Supporter**: organizations like consultancies, API Mgt platforms, etc.
- **Platform Provider**: organization that provides platform where API can demonstrate value
- **UI / App Developer**: provide the API with a customer interface
- **API Enricher / Orchestrator**: use existing API(s) and enrich with additional data
- **Partner**: consume API, concrete relationship with API Provider
- **End User**: benefit from API value (and pay)
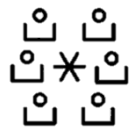
Mostly influencing / getting influenced (no API touchpoint)

- **Legislative Authority**: forcing change by legislative initiatives
- **Lobby Alliance**: influencing legislative authorities and design rules, e.g. Tech Org.
- **Inter-Trade Organization** ('Standardgremien'): influencing legislative authorities and design rules, e.g. BiPRO (insurance), VDA (automotive)
- **Job Market**: getting influenced, provides work force, e.g. API developers
- **Society**: getting influenced, mainly reputation
- **Shareholder**: influencing innovation and economic value
- **Other unknown actors**: not relevant or not spotted yet

In total around 15 different actor categories

Results – Explanation: Goal Categorization by C. Parolini

Companies, that respond successfully to current environmental changes, include the following elements:	**Goals**				
	Core Competencies	**Part of several VCS**	**Connect to others**	**Integrate & Streamline**	**Flexibility**

- **Focus on core competencies**:
- developing know-how, strengthening competencies underlying its products and services, reinforce ability to share common skills.
- Examples: Increase turnover through API-fication

- **Ability to participate simultaneously in several value-creating systems**:
- capable of offering other (intangible) goods that can be applied to different fronts / customers.
- Examples: use know how for other industries

- **Ability to ensure organic connections with other economic players**:
- link to other companies and transmit information quickly
- Examples: Providing asset to App developer

- **High degree of internal integration and a streamlined organization (lean)**:
- greater compactness and strategic agility and react rapidly to market opportunities.
- Examples: offer internal modules quickly to customer

- **Internal and external flexibility**:
- ability to modify its external relationships
- Examples: react to legislative initiatives, like PSD2

Source: Parolini, Cinzia (1999): Value Net. A Tool for Competitive Strategy: John Wiley & Sons Ltd.

Results – Goals in the API environment [RQ2]

Important to keep in mind:
- Non-private API [partner & public]
- Value creation of API offering stakeholders [no developer, end user, etc. viewpoint]

(Selection of) Goals for API providers

Core Competencies	Part of Several VCS	Connect to others	Integrate & Streamline	Flexibility
• Increase turnover through API-fication (internal knowledge to externals) • Increase customer's experience and decrease contract termination rate • Use customer insights to improve existing services and improve customer satisfaction	• use know how for other industries (see chemical industry or banking) • Increase turnover through cross-selling activities (e.g. retail and insurance) • Increase turnover by selling (anonymized) insights (retail)	• Providing asset to App developer to ensure market position (see banking) • Increase company reputation to better attract developer talents on job market • Externalize (API) development by connection to developer communities easily	• offer internal modules quickly to customer • Change internal mindset to make employees better capture the potential of APIs • Break up silos between business and IT • Improve data flow through API and increase time-to-value for externals	• react to legislative initiatives, like PSD2 and meet regulatory compliance • Better provide existing information via API (omnichannel capability)

In total around 50 different goals or API providers

Results – Overview Archetypes [RQ3]

Value Creating Systems Archetypes

- In total **14 different Value Creating System Archetypes** (intra-industries and inter-industries)

- In total **11 archetype industries**: Operations, Banking, Insurance, Logistics, Automotive, Retail, Content, Production, Agriculture, etc.

- Used well known **e3 value model approach** to capture among others actors, value streams, connections
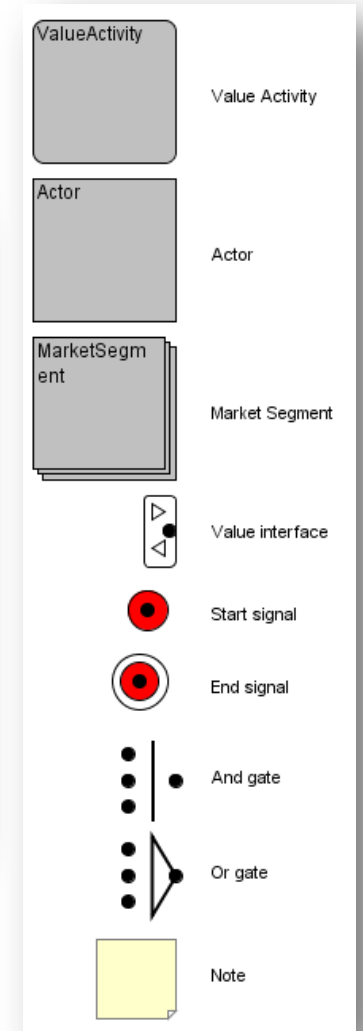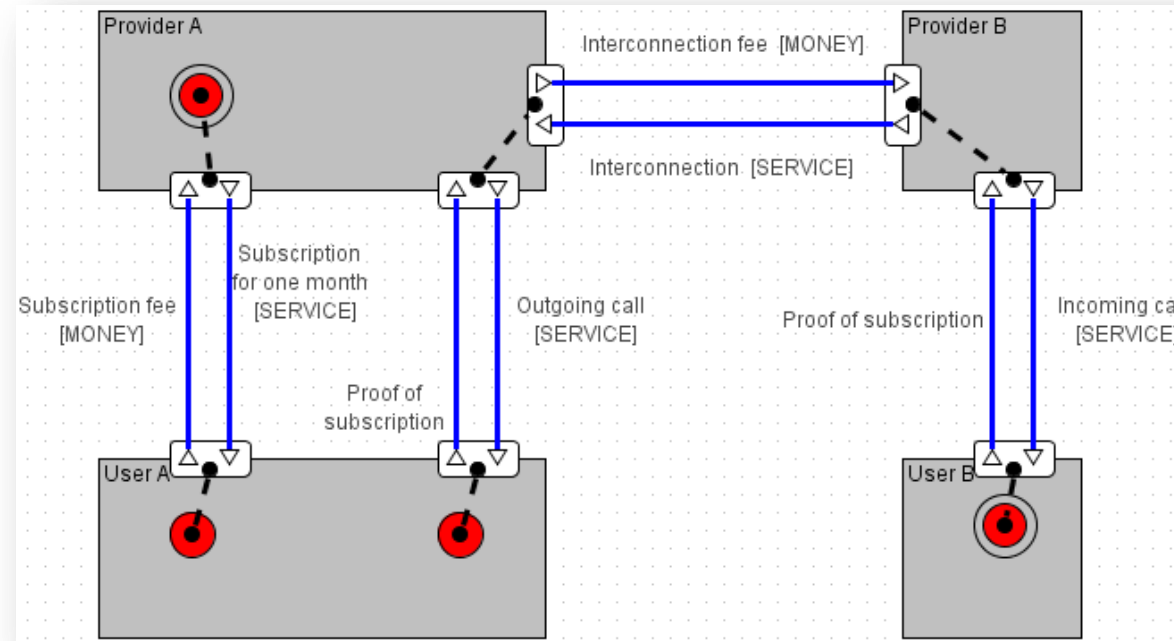
Present 2 different e3 VM on the following slides

- Operations
- Banking

Important to notice:

- The **value creating system archetypes do not entail all possible interrelations** between the actors.
- **Only the most common** or most likely **value streams** between the specific actors were conceptually modeled.
- In addition, the values streams are **not weighted by importance**.

Results – Refresher: e3 Value Modeling

Reasons for using e3 value modeling

- Relatively **easy to read** and simple language
- **Emphasis on value**.
- **Ecosystem mapping**.
- Facilitating **comparison** (to other e3 value models
- Supporting **material** and **tooling** available
- Presence of a concrete **graphical syntax**
- Continued **interest** in the language from the **research community** [4]

Source: [4] Horkoff, Jennifer; Lindman, Juho; Hammouda, Imed; Knauss, Eric (2018): Experiences Applying e3 Value Modeling in a Cross-Company Study.

Fact Sheet

- Industry: Operations
- Actors (selection):
  - Web Service Provider
  - Platform Provider
  - Additional Service Provider
  - Customer of Acc. SW

- Goals (selection):
  - Increase Revenue
  - Increase Customer 'Stickiness'
  - Foster Platform

   _____

- Further specifics:
  - More detailed as first example
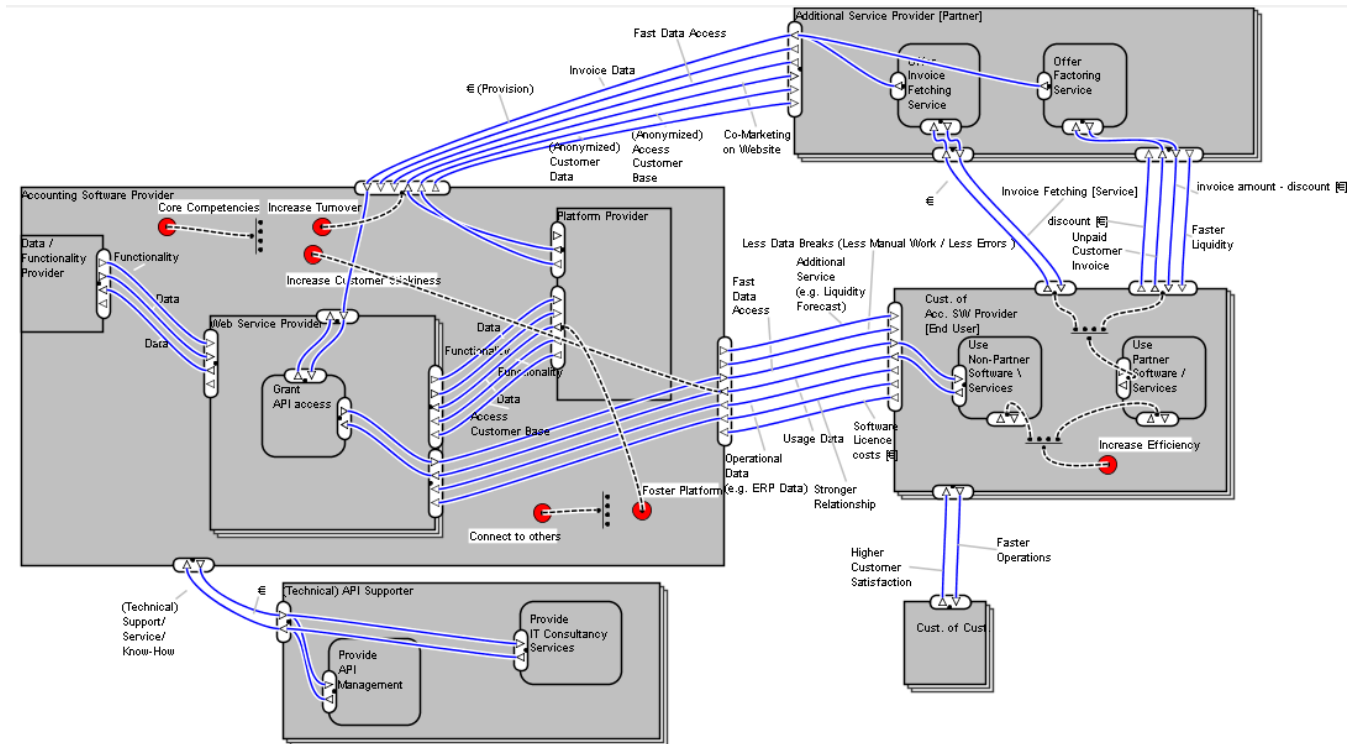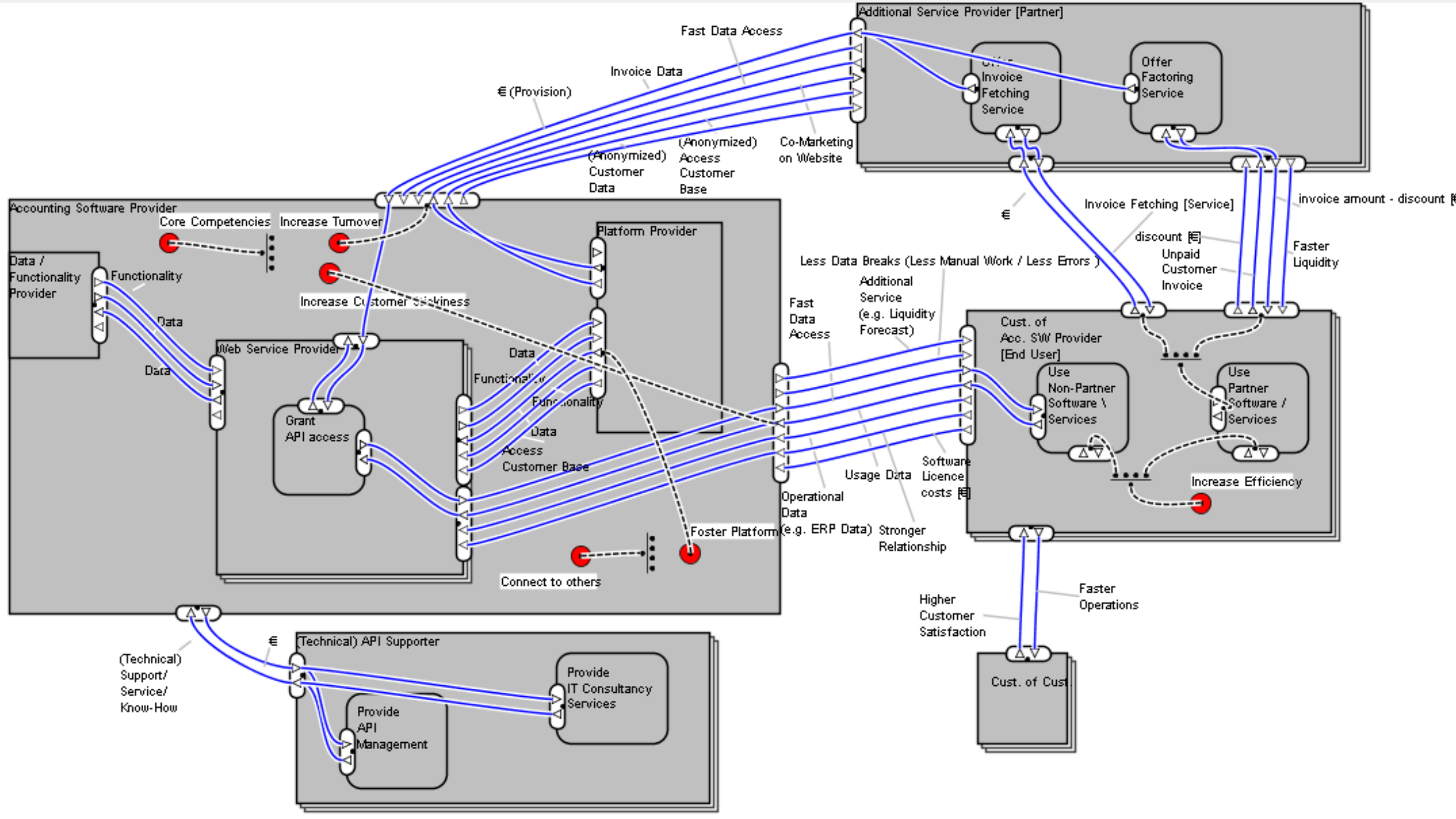
Fact Sheet

- Industry: Banking
- Actors (selection):
  - Web Service Provider
  - Regulatory Authority
  - API Enricher / Orchestrator
  - UI/App Developer
  - User Online Banking
  - Insurance Company (3rd party)
- Goals (selection):
  - Meet regulatory compliance
  - Increase Company Reputation

  _____

- Further specifics:
  - No money between API provider and other actors due to regulatory obligations

Discussion & Implications
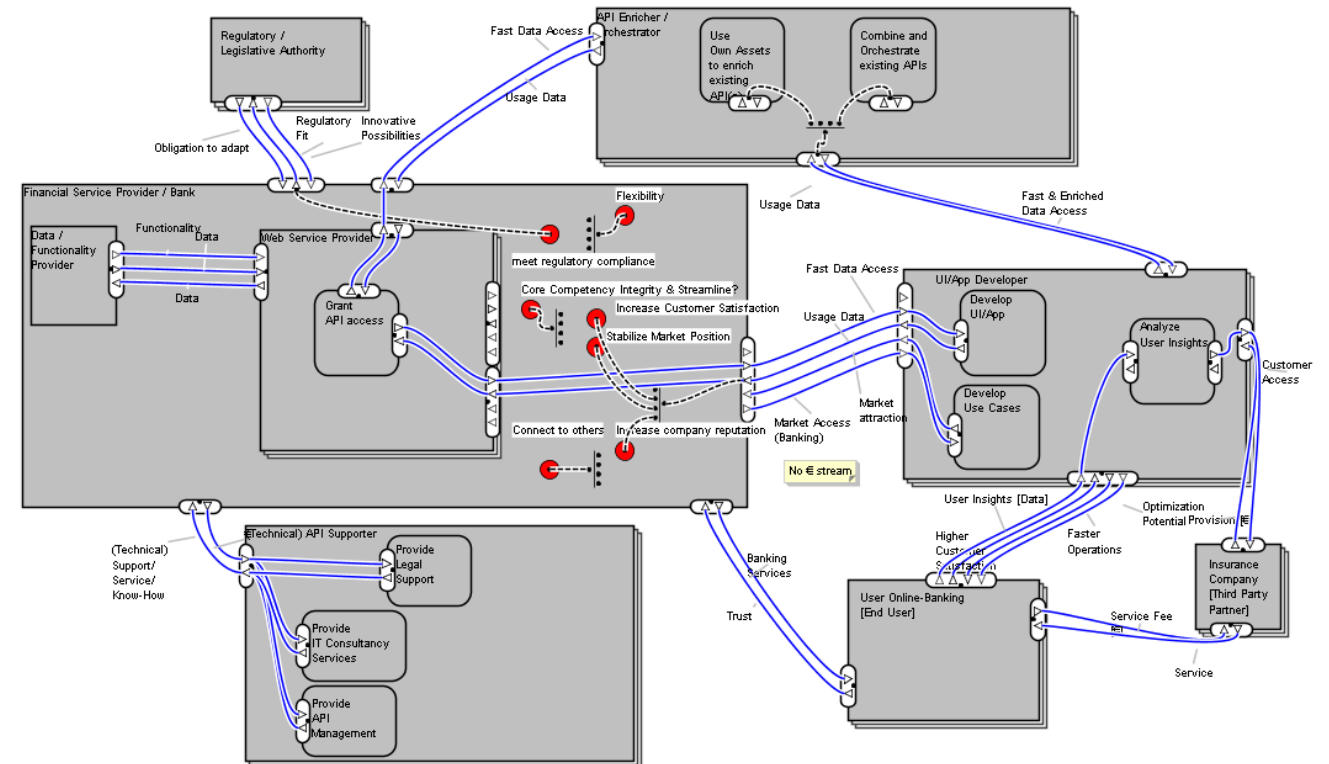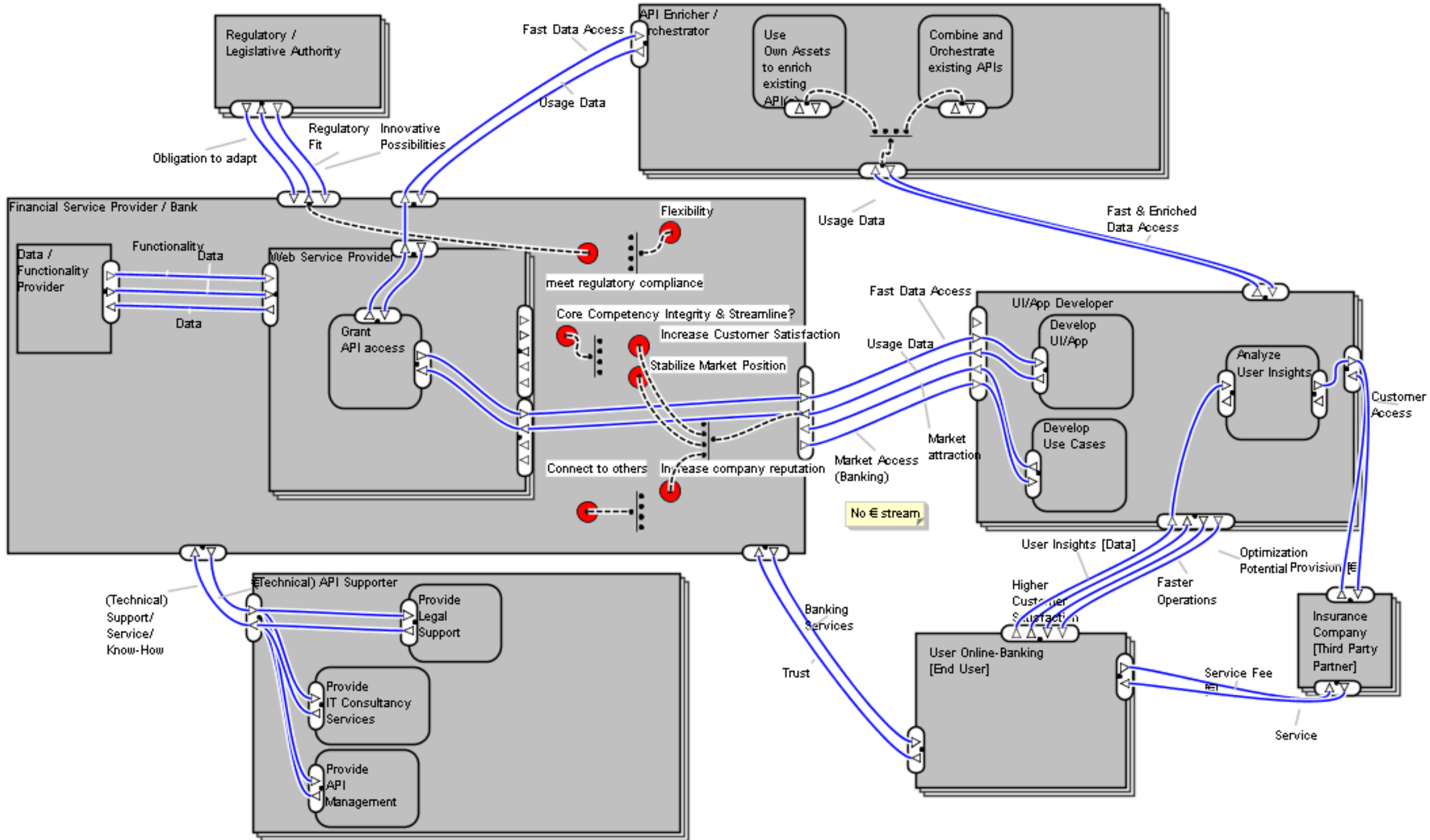
Discussion

- **Confirmed Assumptions**:
  - Companies still lack a clear API strategy with non-private (partner/open) APIs
  - Additionally, when using non-private APIs, they often struggle with monetization (→ not or indirect)
- **Most common goals**:
  - Increase turnover
  - Stronger customer relationship / integration (via better customer experience)
  - Getting more data from different actors and use insights for product development or better customer approach
  - Be compliant with regulatory settings
- **Interesting insights**:
  - Communication gap between Mgt & IT

Implications for Organizations (API provider)

- By not defining a API strategy, organizations keep internal know how and **assets untouched**
- With increasing speed in business environment, they are likely to **lose touch to market and customers**

- In order to successfully drive an API strategy and use existing assets, organizations **first have to work internally** on acceptance and mindset
  - **breaking up silos is key** between business and IT departments to fully leverage synergies and understanding
  - **Create understanding** within the organizations for (technical / business) departments, to use knowledge and accelerate API-fication

Conclusion & Future Work

Goal	Solution Approach	Key Findings	Future Work

• Creating transparency of API-enabled Value Creating system by defining
 	
  • Actors
 	
  • Goals
 	
  • Value Creating System Archetypes
	• Extensive **Literature Review**
	• 17 **Semi-structured expert interviews** within the API environment
	• Use Grounded Theory Methodology to **create a broad overview of actors, goals and ecosystems** (incl. value streams)
		• Companies **still lack a clear API strategy**
		• Organizations **struggle more with mindset** (missing top management support, business vs IT, missing synergies) than technical issues
		• Most common goals**: increase turnover**, keep existing customers
			• Approve findings with **quantitative research** among API professionals & business
			
			• Research on measures to **change internal API mindset**?
			
			• **Guide line**: How to better make use of assets and enhance their API-fication?

Literature (selection)

- [1] Iyer, Bala; Subramaniam, Mohan (2015): The Strategic Value of APIs. In Harvard Business Review, checked on 9/20/2019.;
- [2] Koch, Fridolin Jakob (2019): Opportunities and Barriers for Advancing the API Economy within the Automotive Industry. Master's Thesis. Technische Universität München, Munich.;
- [3] Frost & Sullivan (2018): What Business Executives are Learning about Software Development and How it is Helping Achieve KPIs.
- Jarkko Moilanen; Marjukka Niinioja; Marko Seppänen; Mika Honkanen (2019): API Economy 101. Changes Your Business.
- De, Brajesh (2017): API Management. Berkeley, CA: Apress.
- Mohagheghzadeh, Amir; Lindman, Juho; Horkoff, Jennifer (2018): Managing Organizational Resources as Platform Boundary Resources. MCIS 2018 (Proceedings, 23).
- Horkoff, Jennifer; Lindman, Juho; Hammouda, Imed; Knauss, Eric (2018): Experiences Applying e3 Value Modeling in a Cross-Company Study.

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Back up

TLΠ

Interview Questions

Information about Interviewee

1. Which industry does your company belong to?
2. How many employees are there in your company?
3. What is your role in your current company?
4. How many years have you been working in / dealing with API / API Economy / API Strategy / API Business Models?

Content related Questions

Start

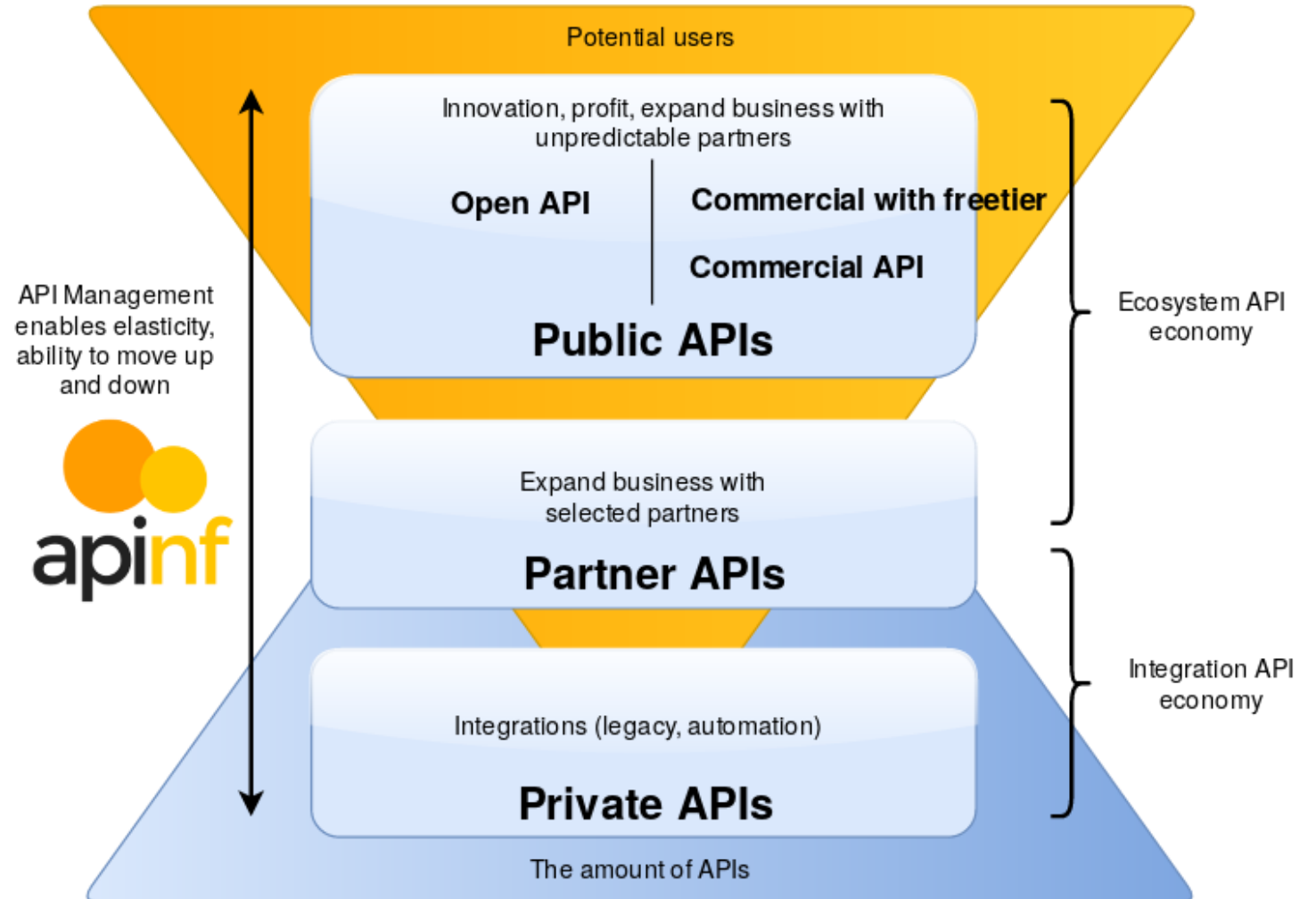1. What experience do you have in offering non-private interfaces (APIs)?

Modell

2. What were/are your goals to achieve by offering non-private APIs?
3. Can you explain the business models mentioned in more detail?
    a. What exactly do you offer via your interface?
    b. Actuators
        i. Which actuators are participating in your API business model?
        ii. Who are the users of the APIs (individual partners, completely open)?
    c. Value streams
    d. Further influencing factors / elements
4. What are the reasons why you have chosen the business models mentioned above, also depending on your own industry?
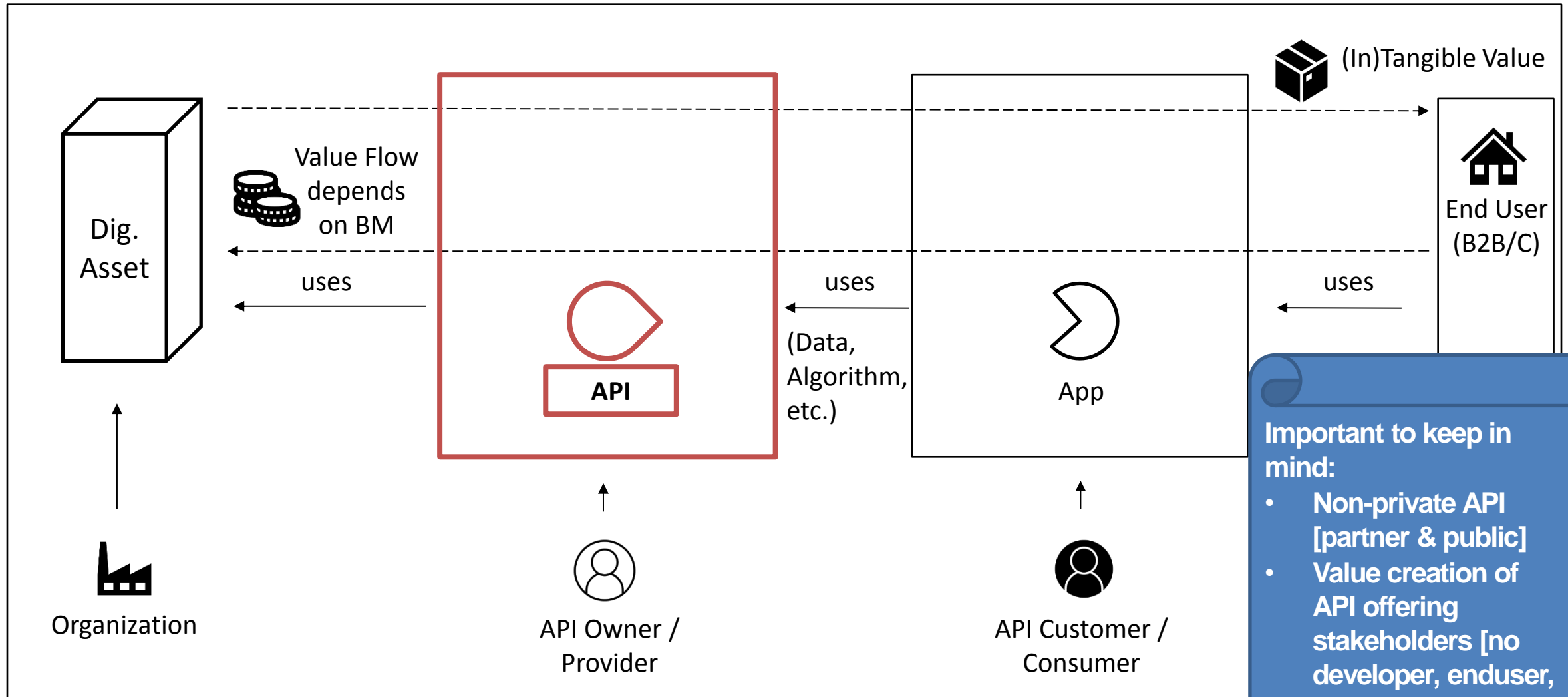
Further Resources for Information

5. Can you name any other API business model contacts we could talk to on this topic?

Motivation – Set the scope

Important to keep in mind:

- **Focus on non-private API [partner & public]**

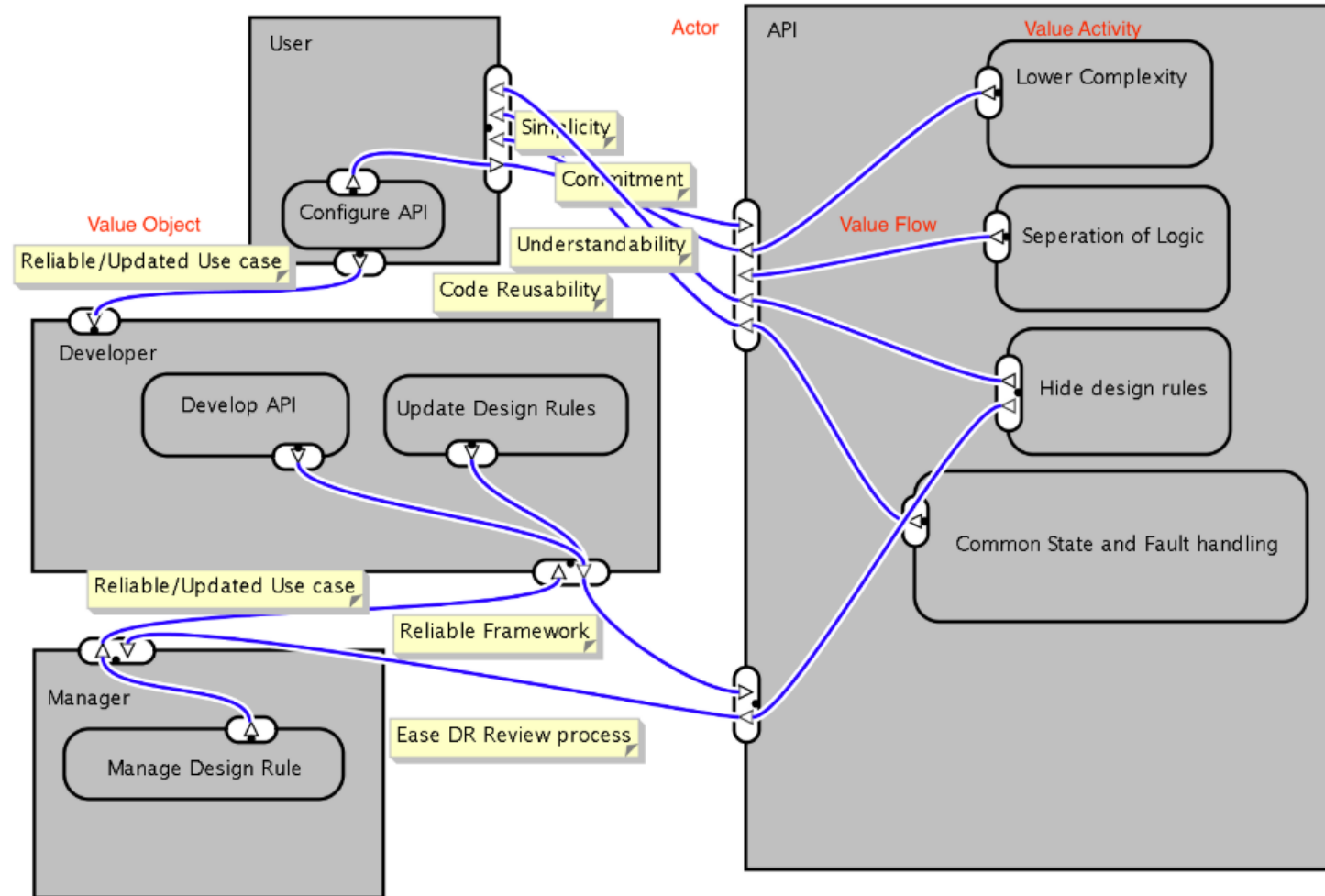- **Focus on value creation of API offering stakeholders [no developer, enduser, etc. viewpoint]**
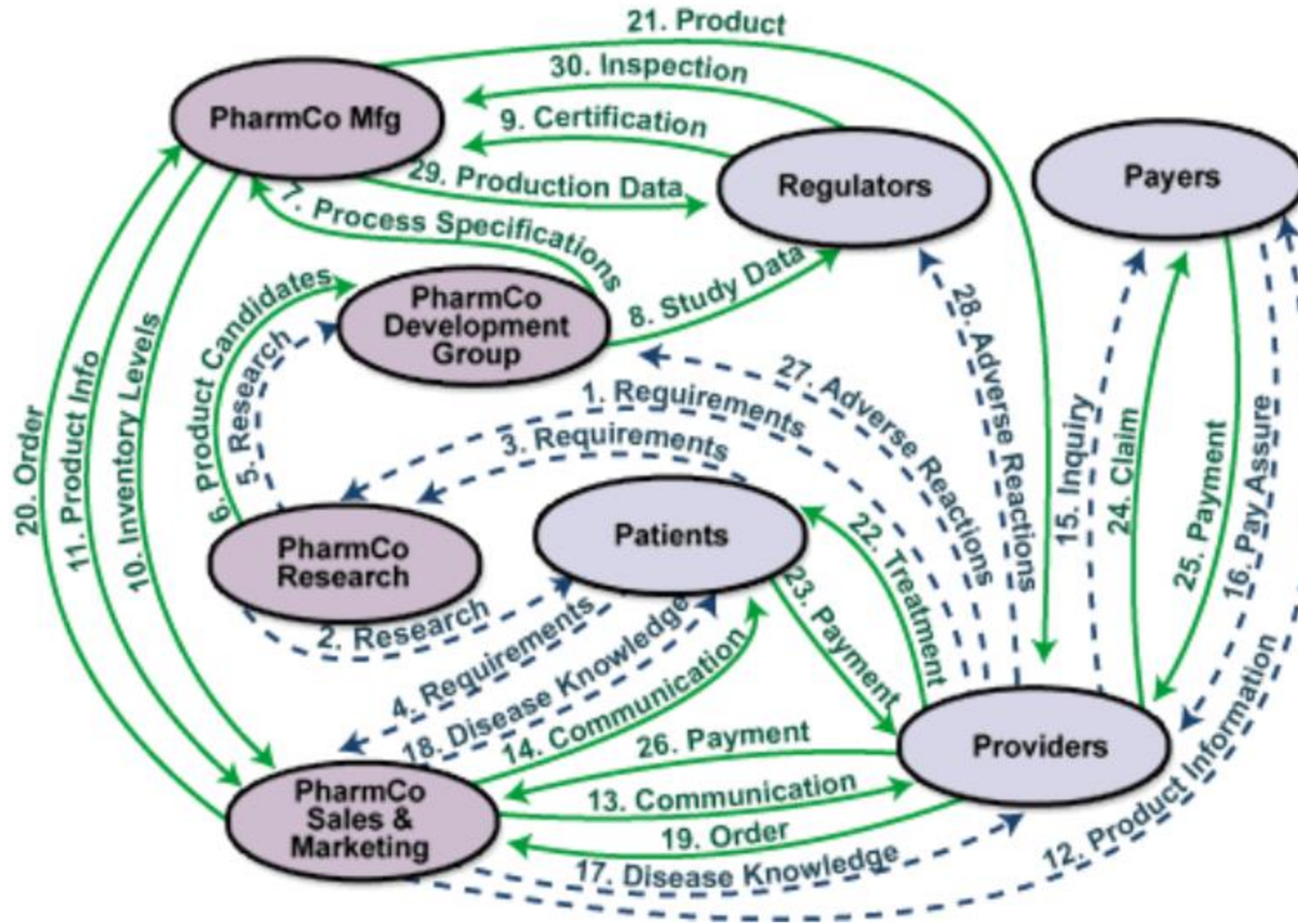
Motivation: What are APIs we focus on?

(In)Tangible Value

Dig. Asset

Value Flow depends on BM

uses

API

uses

(Data, Algorithm, etc.)

App

End User (B2B/C)

uses

Organization

API Owner / Provider

API Customer / Consumer

Important to keep in mind:
- **Non-private API [partner & public]**
- **Value creation of API offering stakeholders [no developer, enduser, etc. viewpoint]**

Source: adapted from "Digital Value Chain in API Econmoy"; https://medium.com/apinf/digital-value-chain-in-api-economy-37ce8771b54e; and "The API Industry Supply Value Chain", https://medium.com/@APIdays/the-api-industry-supply-value-chain-541c16a2c0f1; last accessed: 22.03.2018

Extract of a simplified E3 Value Model of Actors in the API Economy

Source: Mohagheghzadeh, Lindman et al. – Managing Organizational Resources as Platform, p.9

Examples Value Modelling – Value Map

Examples Value Modelling – Value Net

Figure 2.9 Support activities in the value net model
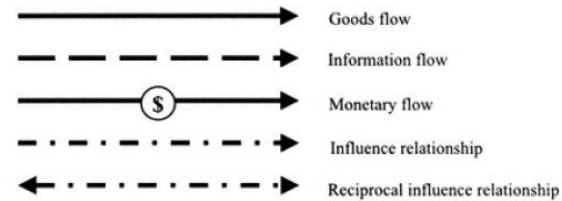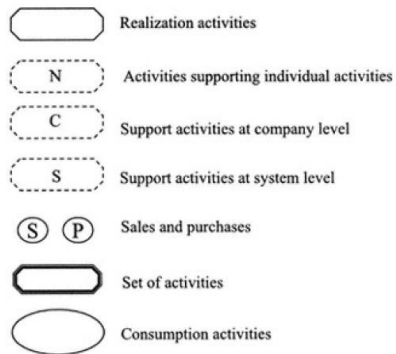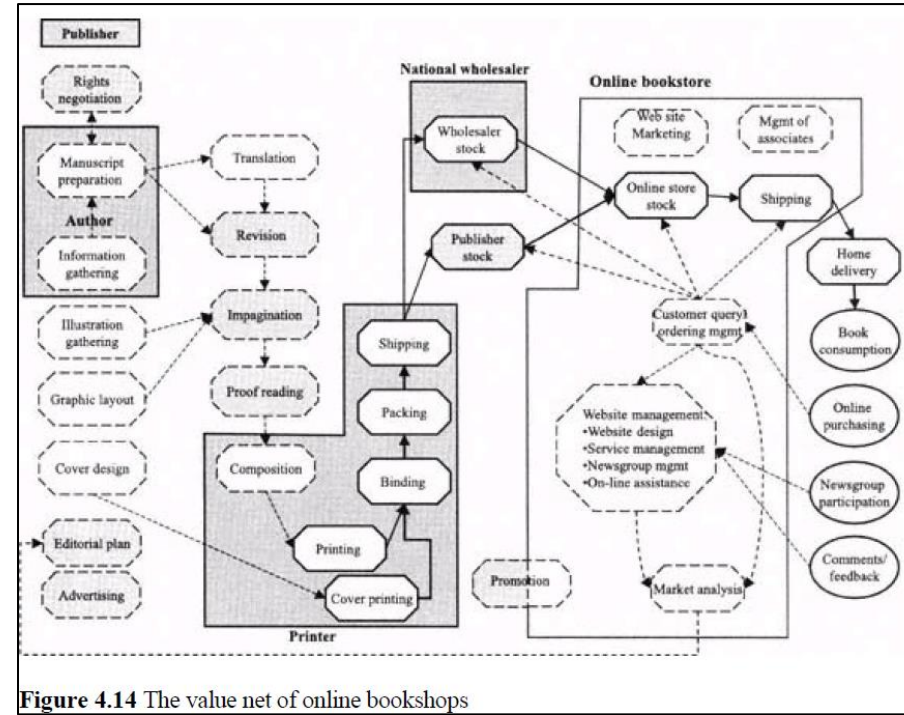
Figure 4.14 The value net of online bookshops

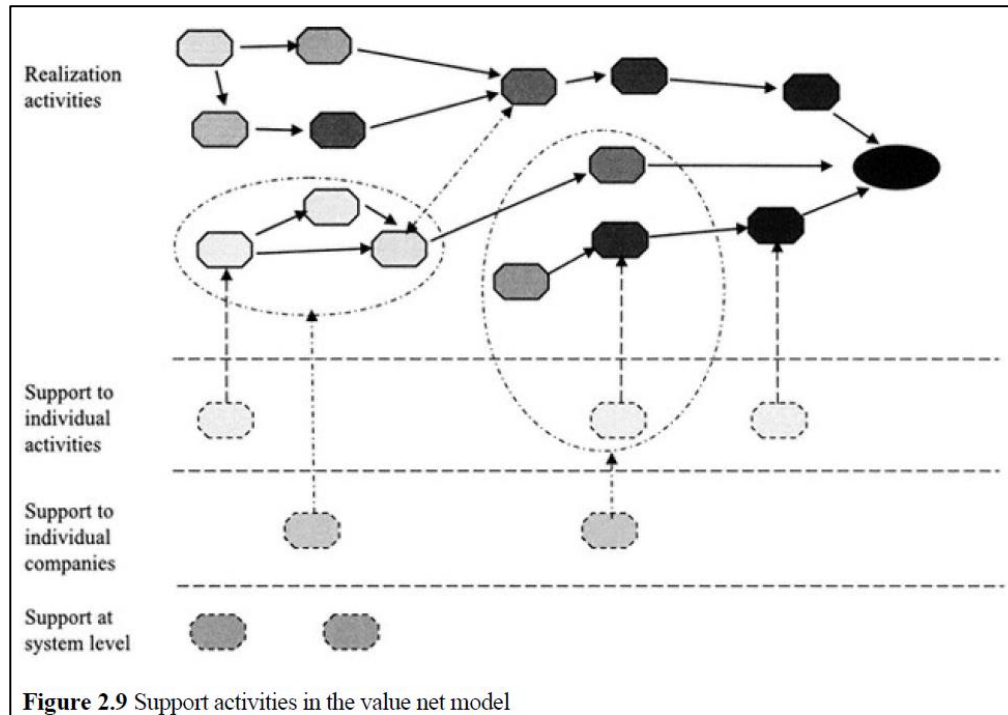Figure 2.11 The representation of different types of value net activities

Figure 2.6 The representation of the relationships between value net activities

Parolini

Source: Parolini, C., The value net: A tool for competitive strategy, Wiley, 1999

Examples Value Modelling – Value Stream Map
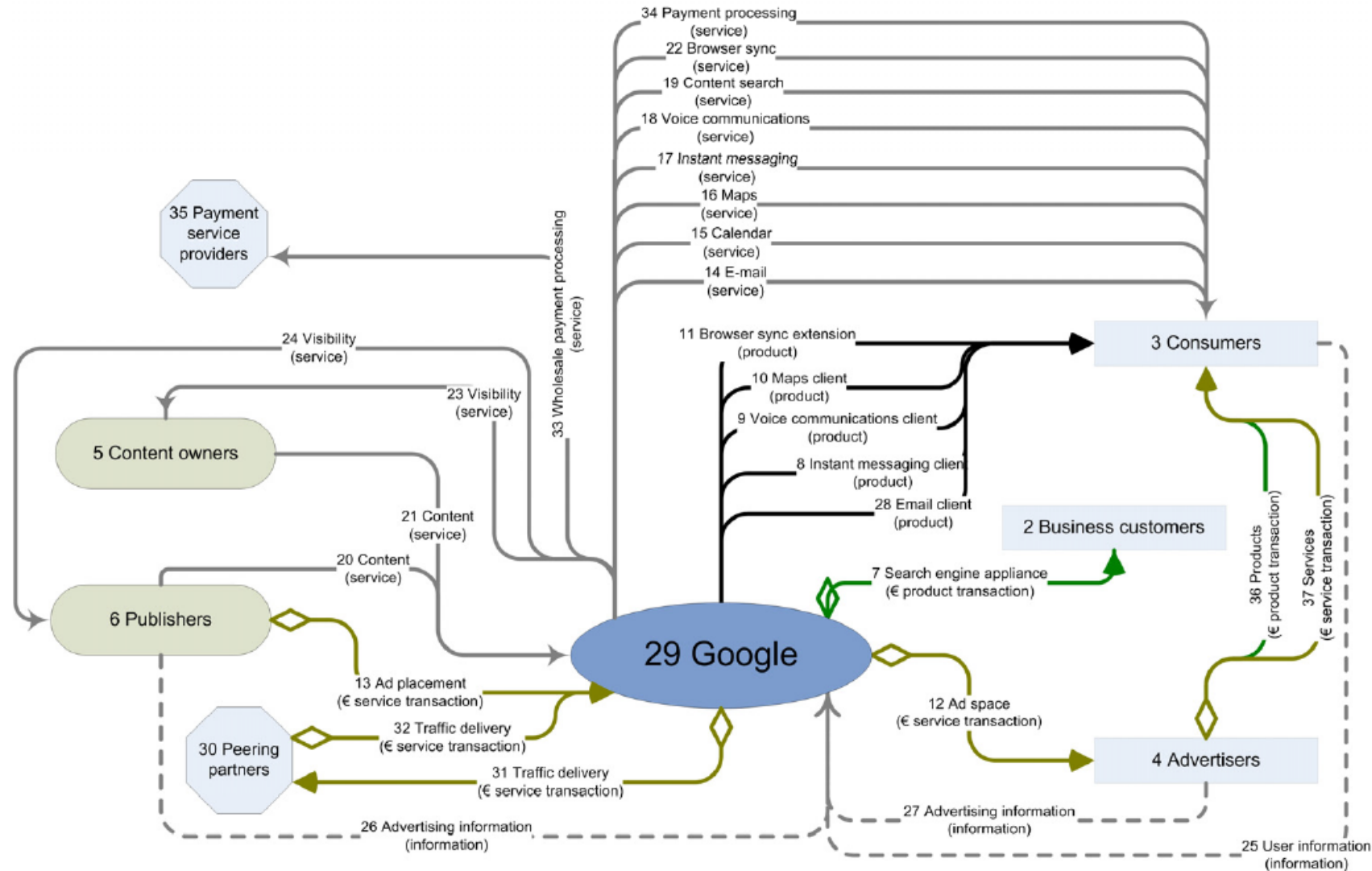
Pynnönen

Figure 3 Example of Google's value stream map (see online version for colours)

Souza et al.

?
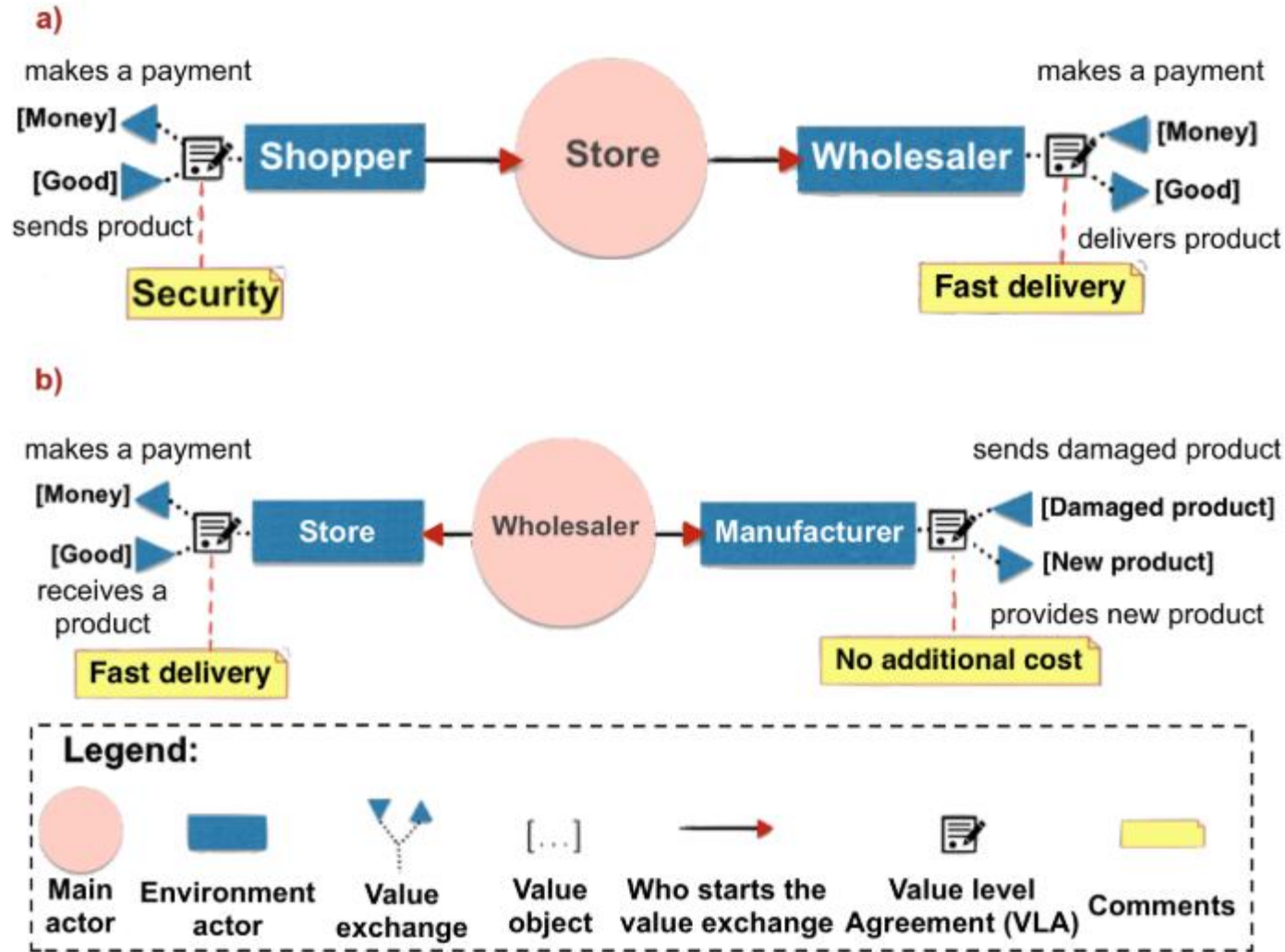
Is there a rule / scale for price and value?

Oster-walder

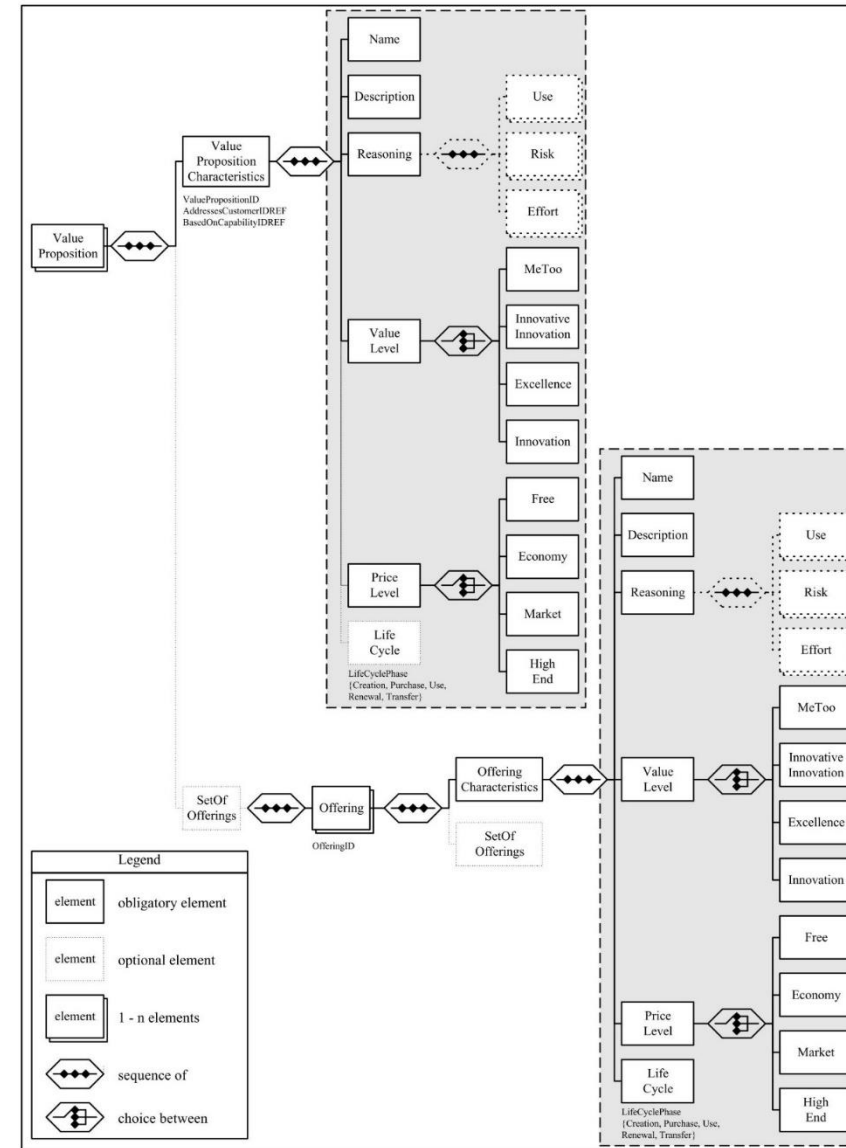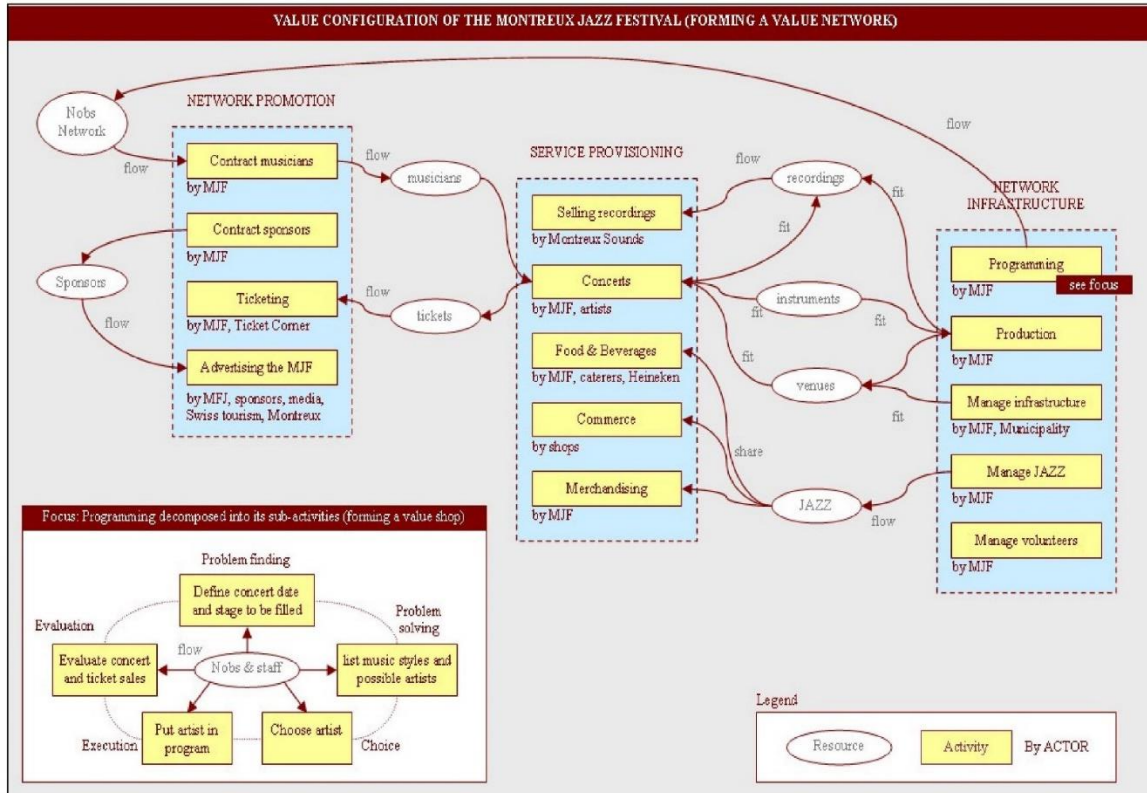| Customer Equity	{Acquisition}			{Retention}	{Add-on selling}		
Relationship description	Orange tries to make new phone models affordable and tries to be present in the market as a young brand for communicating human emotions.			Orange rewards loyalty and communications of its customers with points, which can be used to buy a new mobile phone or pay bills.	Orange tries to make customers use data services, such as WAP, SMS and MMS as much as possible (especially teenagers).		
Name of the relationship mechanism	Phone subsidies	Orange World portal	Habbo Hotel	Loyalty points	Location based services	SMS Publisher	Orange Heartbreak
Relationship mechanism description	Orange pays a part of or the whole price of a new phone a customer wants to buy in exchange for a 12-month contract with Orange	A portal that provides a mixture of news, sports, entertainment and mobile phone features, such as games. Customer login for Orange phone account management	A virtual meeting place with public and private rooms where people can gather and chat, handle e-mail, instant messages and SMS'	-	Location based services for places of interest, route planning, traffic and cinema guides	A tool that allows customers to create their own SMS-channel to send information to channel-subscribers	SMS-based services that allow (teen) customers to flirt anonymously by using their mobile phone
Reasoning	{Risk}: Minimizes the risk to be stuck with an expensive phone that is soon outdated. {Use}: Customers can afford the newest mobile phones with the newest phone features (e.g. MMS)	{Use}: Provides customers and prospects with an information portal and mobile entertainment services. Allows customers to manage their phone account	{Use}: Provides potential (teen) customers with a place to hang out and manage their e-mail, instant messages and SMS'.	{Risk}: Minimizes the risk to be stuck with an expensive phone that is soon outdated. {Use}: Customers can afford the newest mobile phones with the newest phone features (e.g. MMS)	{Effort}: minimizes the efforts for finding useful and location-based information	{Use}: Allows customers to send information to a list of people that are interested in the same topics (e.g. info for the members of a hobby soccer team)	{Use}: Allows teenagers to resolve the most pressing problems of their age - love issues – without losing their face.
CBC	{Evaluation}	{Awareness}	{Awareness}	{After Sales}	{After Sales}	{After Sales}	{After Sales}
Value level/ price level							
Function	-	Brand	Brand	-	Personalization	Personalization	-
Channel	Orange shops Retailers	Internet	Internet	-	Mobile phone	Mobile phone Internet	-
By Actor	Self	Self	Self	Self	Self (& with partners)	Self	Self
Target customer	All prospects	Customers and prospects	Teen customers and prospects	All current customers	Nomad customers	Active teen customers	Teen customers

Source: Osterwalder, A., The business model ontology: A proposition in a design science approach, University of Lausanne, 2004.
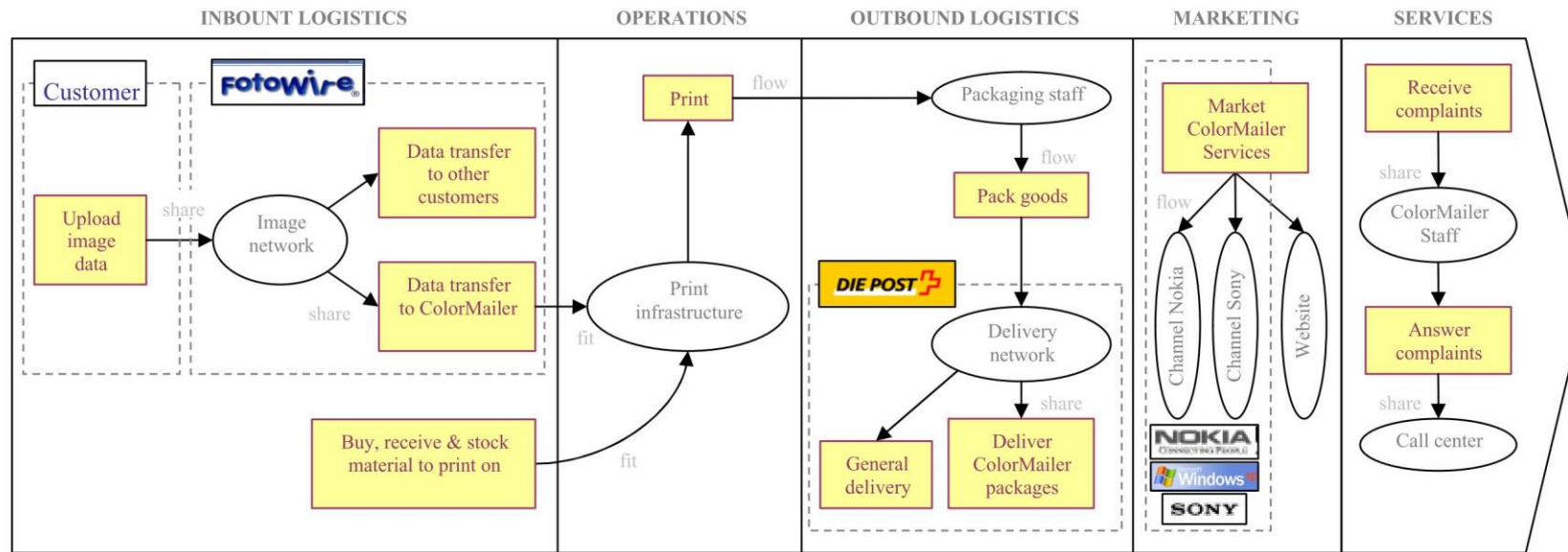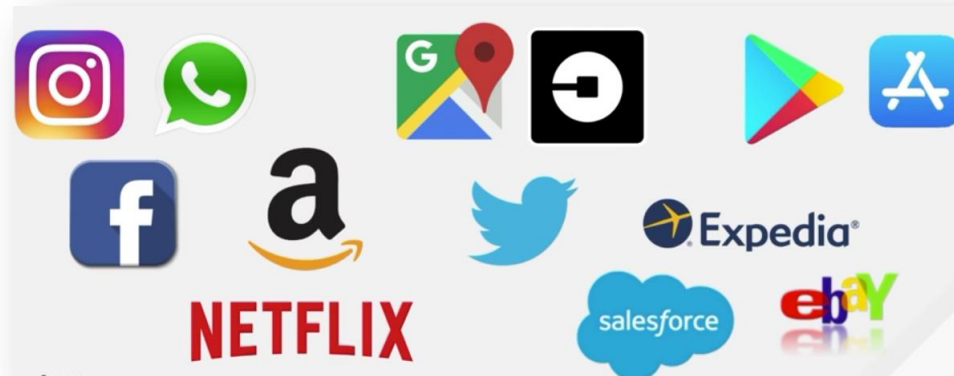
Upload of digital images & order	Transfer of digital images to the printing facilities	Buy, receive & store material to print on	Print digital images on photo paper or goods	Pack goods for delivery	Deliver packages	Answer complaints	Sell ColorMailer services		ACTIVITY Name
The digital images have to be uploaded from the customer's camera or PC	The digital images have to be transferred from the customer to the printing facilities	The primary material to print on has to be received and eventually stored	The digital images have to be printed on either photo paper or goods, such as t-shirts, cups etc.	The order has to be packaged for home delivery	The orders have to be delivered to the customer's home	Possible complaints have to be answered to the customer's satisfaction	ColorMailer's services have to be marketed to potential customers		ACTIVITY Description
{Primary activity}	{Primary activity}	{Primary activity}	{Primary activity}	{Primary activity}	{Primary activity}	{Primary activity}	{Primary activity}		Level
{Inbound logistics}	{Inbound logistics}	{Inbound logistics}	{Operations}	{Outbound logistics}	{Outbound logistics}	{Services}	{marketing}		Nature
{Shares} image network	{Fits} print infrastructure	{Fits} print infrastructure	{Flows} to packaging staff	{Shares} delivery network	{Flows} to customer	{Shares} call center	{Flows} to channels		Related to RESOURCE
Customer	FotoWire	ColorPlaza	ColorPlaza	ColorPlaza	Postal service	ColorMailer	ColorPlaza		By ACTOR
							Sony	Nokia	
							Microsoft	Agfa	

Source: Osterwalder, A., The business model ontology: A proposition in a design science approach, University of Lausanne, 2004.

Oster-walder

Source: Osterwalder, A., The business model ontology: A proposition in a design science approach, University of Lausanne, 2004.

Motivation – Why Value Creation through Business Model matters

vs

"[…] potential business models are unclear for the OEMs. […] [They] are still in an identification stage regarding potential business models." – MA *Fridolin Koch - Opportunities and Barriers for Advancing the API Economy within the Automotive Industry (2019*)

Source: St. Gallen Business Model Navigtor; https://www.thelearningwave.com/uber-digital-and-disruption-whats-happening-and-why-does-it-work/; last accessed: 22.03.2018
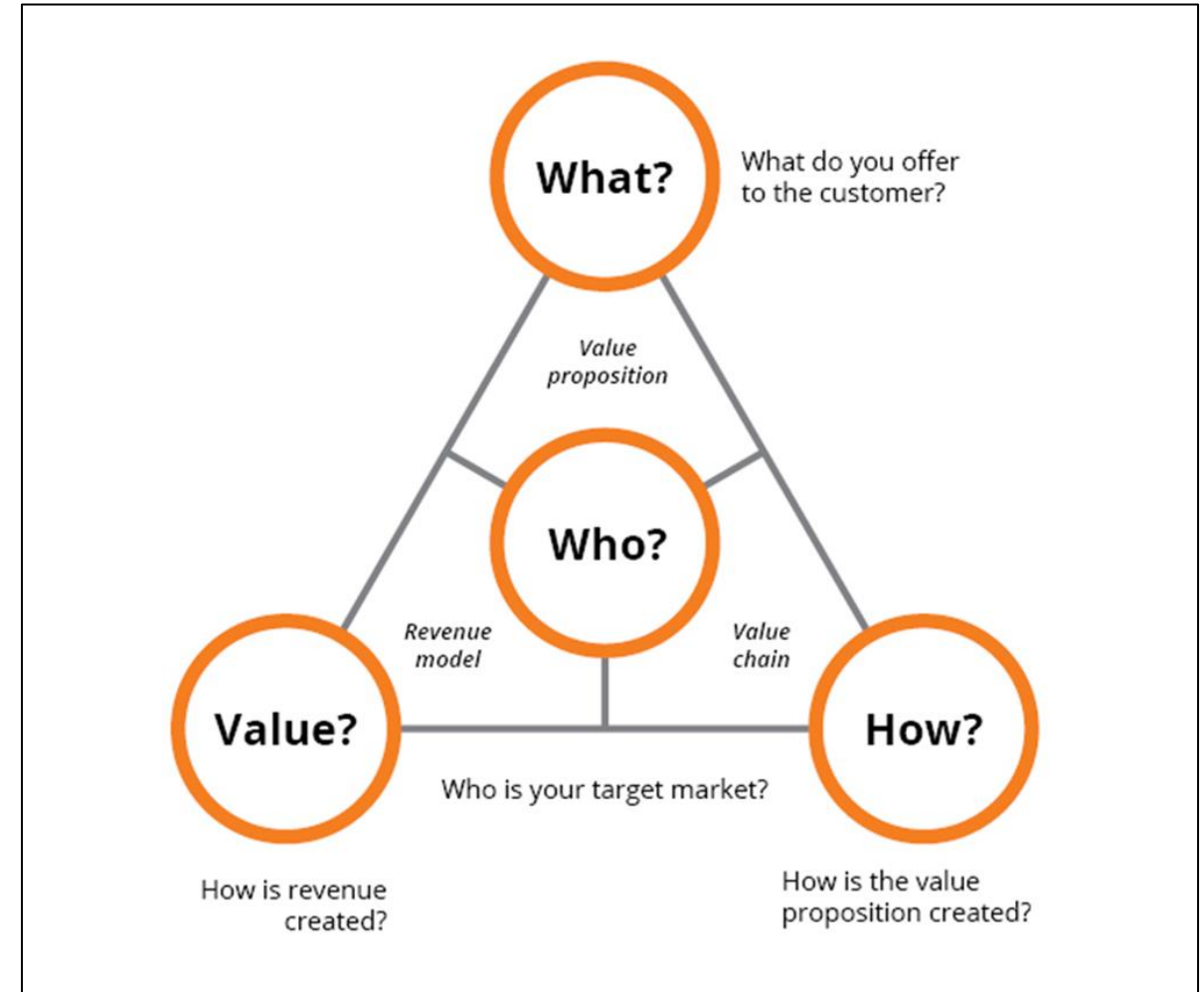
Approach / Goal – Examples of Business Model Patterns

	Freemium	Customer Data Monetization	Hook and Bait
Explanation	A freemium business model offers a basic service for free, additional premium functions or services are only available for a fee.	Customer Data Monetization means that the user gets the service (for free) and the company sells the data to a partner.	The basic product (hook) is offered cheaply or free; the complementary product or refill (bait) is sold expensively. The basic product cannot be used without the complementary product.
Modelling			

Source: BM Toolbox; https://bmtoolbox.net/patterns/; last accessed: 22.03.2018

API Business Models, 2013
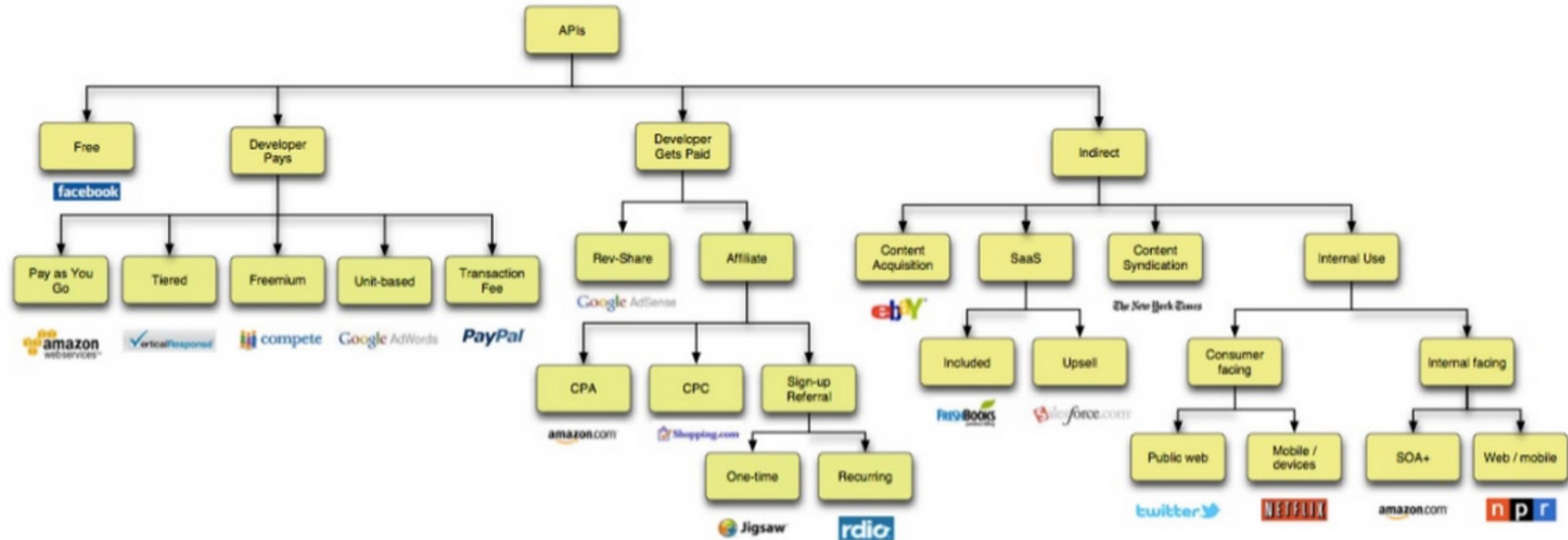
Table 1. Available business model representations and main characteristics

For general Overview and archetypes

Business model representation	Domain of origin	Main concepts	Main scope	Design tool / financial tool	Options considered	
Activity system map* [23]	Strategy	Strategic theme, activity	General	No / No	No	
Business models for e-government (BMeG) [22]	E-business	Partner, object ex-change, (dis)advantage	E-government	Yes / No	No	
Business model ontology (BMO) [17]	E-business	Interrelated building blocks	General	Yes / No	No	
Causal loop diagram [7]	Causality theory	Choice, consequence	General	No / No	No	
e3-value [12]	E-business	Actor, value exchange	General	Yes / Yes	No	Gordijn, Akkermans
E-business model schematics [33]	E-business	Actor, flow, relation	E-business	No / No	No	
Eriksson-Penker business extensions of the Unified Modeling Language [11]	Information systems	Actor, interaction, goal, rule	General	Yes / No	No	
Resource-event-agent* (REA) [16]	Accounting	Resource, event, agent	General	Yes / No	No	
Strategic business model ontology (SBMO) [27]	E-business	Actor, goal	General	Yes / No	No	
Value map [2], [30]	Value networks	Actor, value exchange	General	No / No	No	Allee
Value net* [19]	Value networks	Actor, activity, flow	General	No / No	No	Parolini
Value stream map [24]	Value networks	Actor, value stream	ICT	No / No	No	Pynnönen

* = the contributing author makes no explicit reference to the term "business model": These approaches had been developed before the business model concept gained prominence. Nonetheless, they are listed because of their conceptual similarity to later approaches which are explicitly intended to represent business models.

- Dynamic Value Description method [value]   Souza et al.
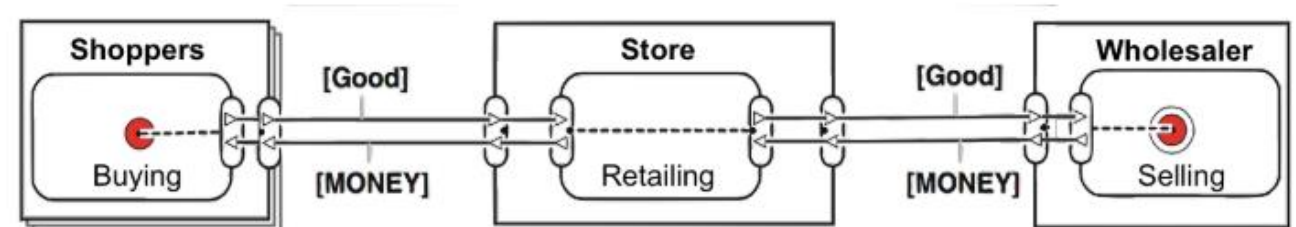
Source: Kundisch, Dennis; John, Thomas (2012 - 2012): Business Model Representation Incorporating Real Options: An Extension of e3-Value. In: 2012 45th Hawaii International Conference on System Sciences., S. 4456–4465.
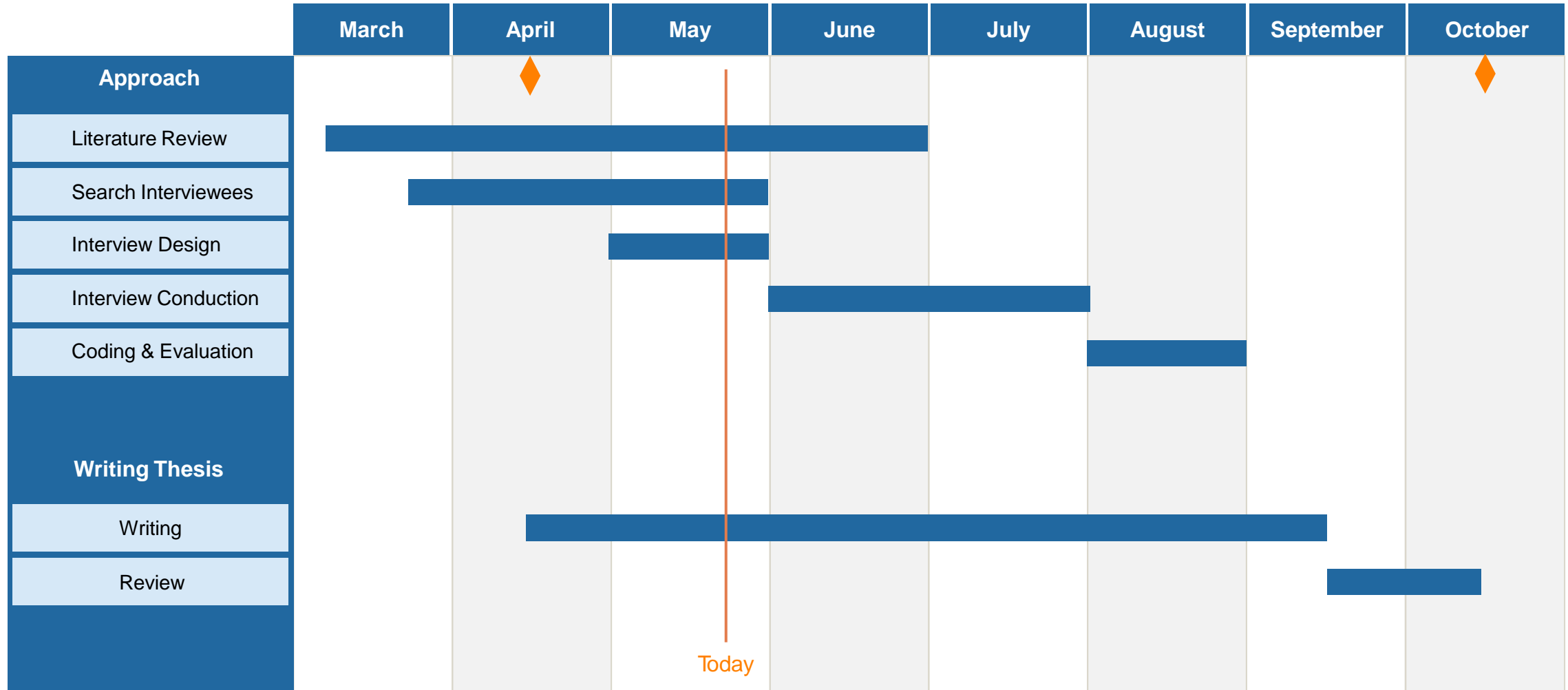
First Results – Overview e3 Value Model

Reasons for choosing the e3 Value Model for the business model archetypes:

- **Includes important elements for business model archetypes (stakeholders/actors, object, value flow, activities)**

- **Clearly structured**

- **Well known in business research**

Source: Gordijn, J. and J. M. Akkermans (2003). "Value based requirements engineering: Exploring innovative e-commerce idea." Requirements Engineering Journal 8(2): 114-134.

Timeline

	March	April	May	June	July	August	September	October
Approach		♦						♦
Literature Review								
Search Interviewees								
Interview Design								
Interview Conduction								
Coding & Evaluation								
Writing Thesis								
Writing								
Review								

Today

♦ Registration Date: 15.04.2019   ♦ Submission Date: 15.10.2019