BUSINESS ECOSYSTEMS

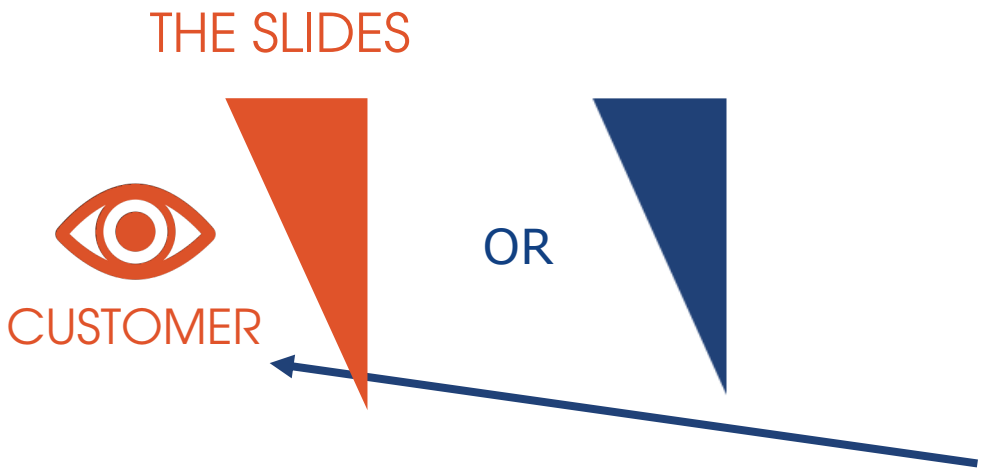
STARTER SEMINARS 2019-2020

SESSION 1

Marc Goldchstein, October 1 2019

COURSE CONTENT

- The Triangles
  - Orange = theoretical & conceptual core information
  - Blue = applications & cases



- The perspective to take when thinking about the concepts discussed

sentryo

- The source

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Introduction to the Business world

for non-business people

VALORIZING RESEARCH

INTRODUCING A BUSINESS DIMENSION TO A PROJECT

- Non-business people leave their comfort zone
  - Researchers, scientists, not-for-profit organizations
- Several new dimensions require attention
  - Selling
  - Finance
  - Investors
  - Board of Directors
  - Marketing
  - Human Resources
  - …

- Objective of Starter Seminars:
  - top-level introduction to some of these concepts…
  - … so that you know what you don't know

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BUSINESS ECOSYSTEMS

WHY BOTHER?

No company is an island:

- Every company is active in one or more markets
- Every company fills one or more roles in the business ecosystem of its market

To become a viable business one must find a sustainable spot in one’s business ecosystem

BUSINESS ECOSYSTEMS

Industries, & markets

Supply chains & value chains

Standards

Network effects & economies of scale

Business ecosystem actors

Regional clusters

BUSINESS ECOSYSTEMS

Sectors, industries, & markets

Supply chains & value chains

Standards

Network effects & economies of scale

Business ecosystem actors

Regional clusters

What is it again that you do?

Classifying your venture

SECTORS

- Primary Sector
  - Extracts or harvests products from the earth: **raw material and basic foods**.
  - Agriculture, mining, forestry, farming, grazing, hunting, gathering, fishing, quarrying.
  - + packaging and processing of the raw material associated with this sector
  - About 3% of the U.S. labor force today,
  - more than 2/3 of the labor force in mid-nineteenth century.
- Secondary Sector
  - Manufactures finished goods
  - All **manufacturing, processing, and construction**
  - Metal working and smelting, automobile, textile, chemical and engineering industries, aerospace manufacturing, energy utilities, engineering, breweries and bottlers, construction, shipbuilding.
- Tertiary Sector
  - **Service industry** to the general population and to businesses
  - Retail and wholesale sales, transportation and distribution, entertainment, restaurants, clerical services, media, tourism, insurance, banking, healthcare, and law.
  - More than 80% of the U.S. labor .
- (Quaternary Sector)
  - Intellectual activities.: **government, culture, libraries**, scientific research, education, and information technology.
  - Others limit iit to **not-for-profit sector**

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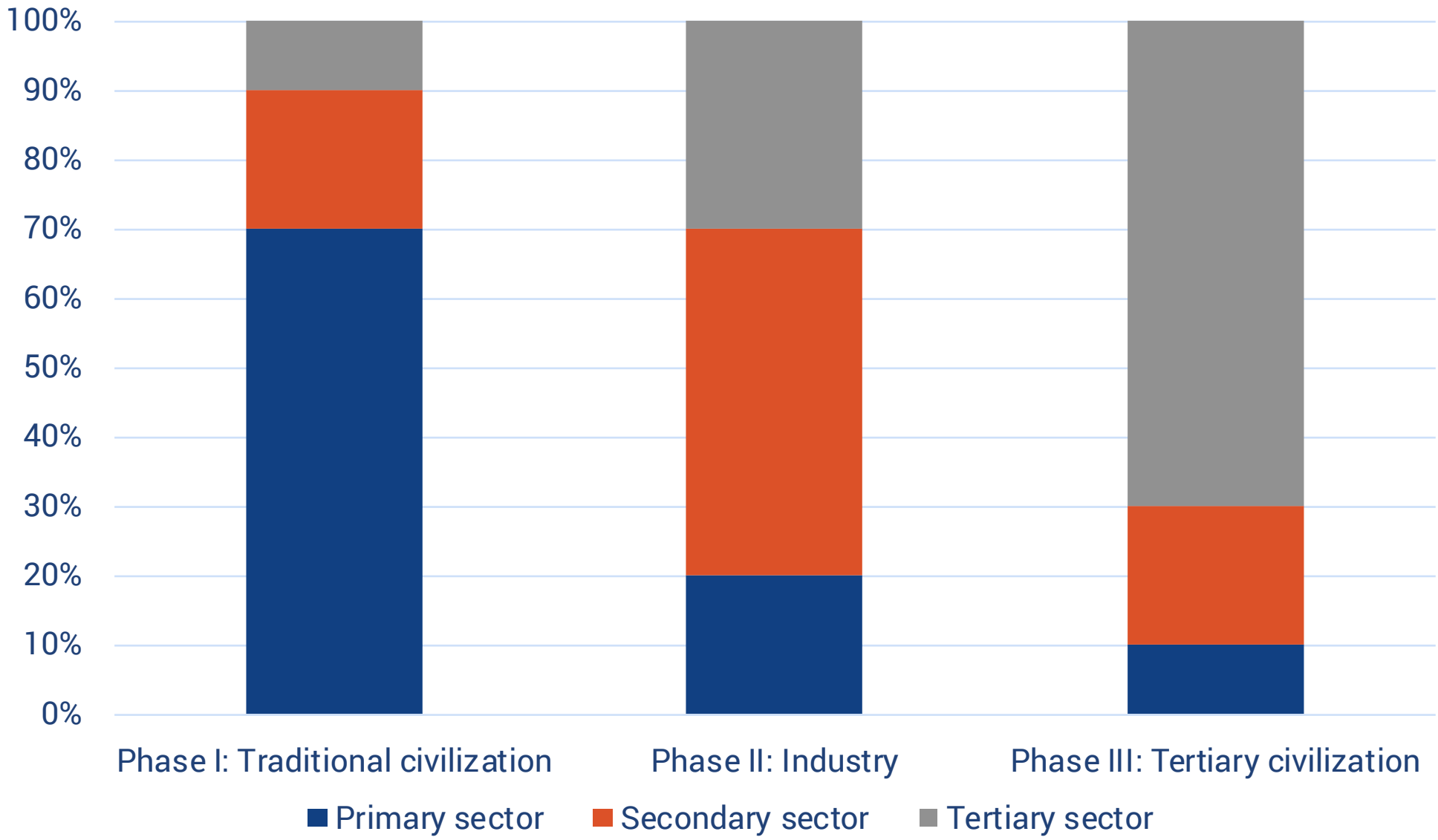
SECTORS

DISTRIBUTION OF DIFFERENT SECTORS OVER TIME.



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Distribution of different sectors over time.

INDUSTRIES

- An **industry** is a collections of similar companies or of companies conducting similar activities.
- **Top-down** classification: large sectors, split into smaller subsegments
  - sometimes quite arbitrary
- Newcomers to economics can use it to grasp the scope of business activities
- Industry Classification (benchmark)
  - 10 industries
  - 20 supersectors
  - 41 sectors
  - 114 subsectors
- The organism doesn't care about its classification

Industry	Supersector	Sector	Subsector
0001 Oil & Gas	0500 Oil & Gas	0530 Oil & Gas Producers	0533 Exploration & Production
			0537 Integrated Oil & Gas
		0570 Oil Equipment, Services & Distribution	0573 Oil Equipment & Services
			0577 Pipelines
		0580 Alternative Energy	0583 Renewable Energy Equipment
			0587 Alternative Fuels

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INDUSTRIES

STANDARD INDUSTRIAL CLASSIFICATION

Range of SIC Codes	Division
0100-0999	Agriculture, Forestry and Fishing
1000-1499	Mining
1500-1799	Construction
2000-3999	Manufacturing
4000-4999	Transportation, Communications, Electric, Gas and Sanitary service
5000-5199	Wholesale Trade
5200-5999	Retail Trade
6000-6799	Finance, Insurance and Real Estate
7000-8999	Services
9100-9729	Public Administration
9900-9999	Nonclassifiable

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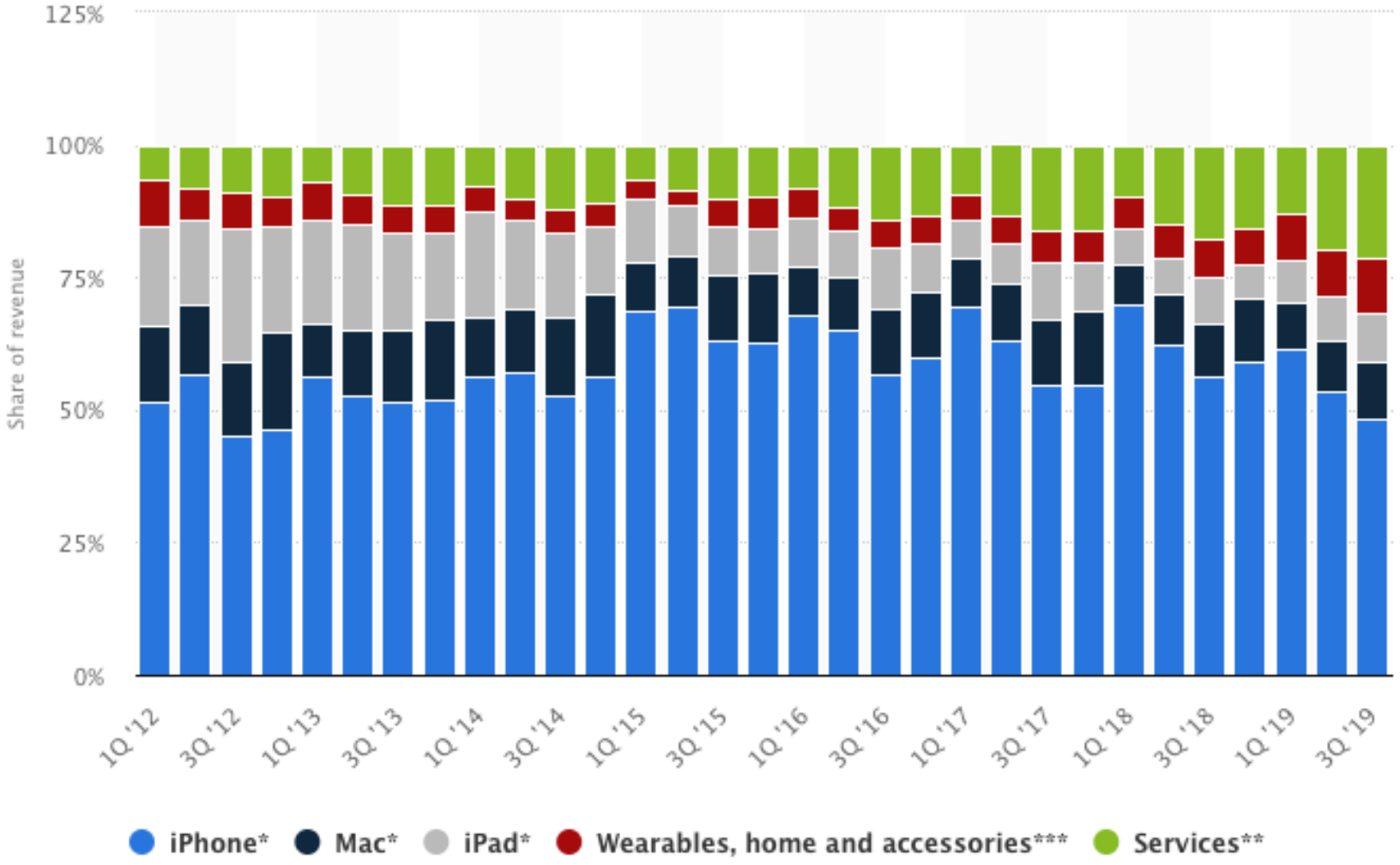

- Apple Primary Industry Code
  - SIC CODE 3571 - Electronic Computers
  - NAICS CODE 334111 - Electronic Computer Manufacturing

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MARKETS

- Markets are those meeting places where products and services are **traded**. They are the **interfaces** between customers and suppliers.
- Its definition is grounded from **bottom-up**
  - Consumers, suppliers (+ consultants and trade show organizers) drive the definition of markets
  - Gradual and ad-hoc classifications, overlaps, no top-down classification of markets
  - Are there trade fairs, consultants, magazines? Then there is a market
  - Partly driven by marketing strategies of suppliers and industry specialists


EXILIM
NOKIA
NOKIA
9:41

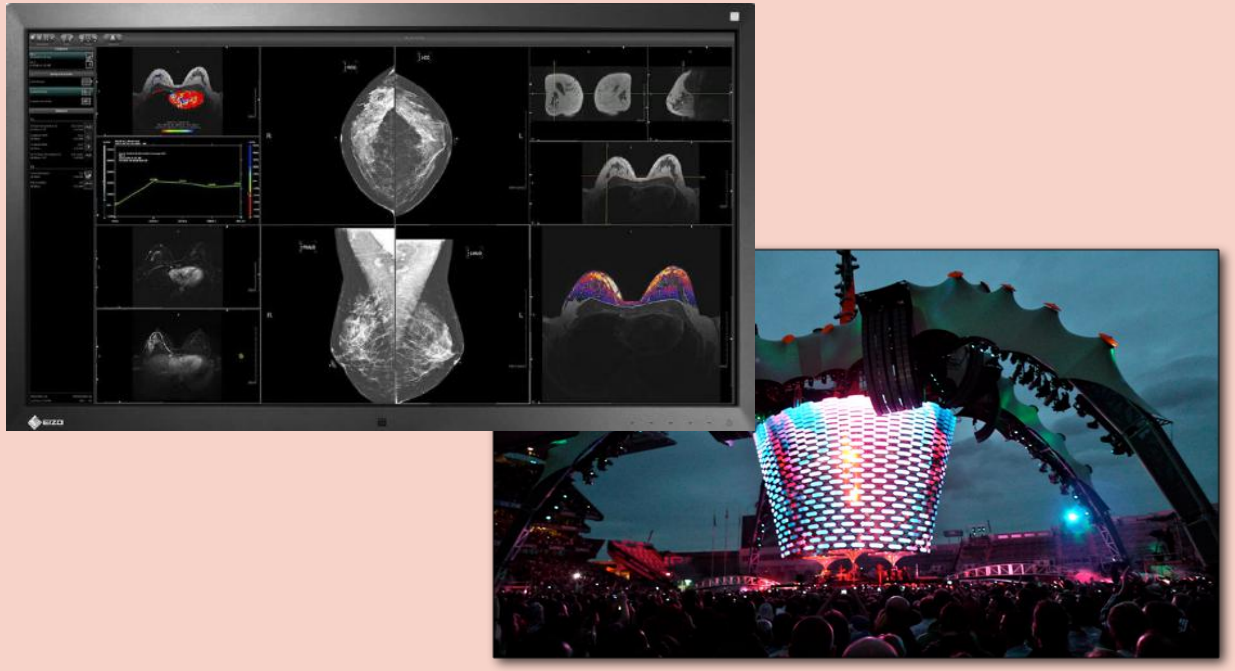
MARKETS

OVER TIME…

- … markets merge
  - *PDA+GSM+iPod+camera+ gaming console = iPhone*
  - *-> Will these markets disappear as separate entities? On what does it depend?*
- … markets split
  - *'Computers' -> hardware, operating system, software, storage, peripherals, internet...*
- … markets (dis-)appear
  - *Analog photography*
  - *the nucleic acid isolation market (see further)*
- … markets can be encapsulated in others
  - *Changes in one overall markets unavoidably impacts encapsulated markets*
- Several types of links between markets are possible for supplier
  - *Same core competencies, same customers*

SEGMENTS & NICHES

- Segments = **subsets** of a wider market (size)
- Niches = **smaller** and more **specialized** segment (specialization)
- Example LCD screens
  - Segments: TVs, PCs, mobiles
  - Niches: medical monitors, concert stages



MARKETS

HORIZONTAL & VERTICAL

- Horizontal = offering goods and services to **multiple groups of customers with common needs**; generally broad markets
- Vertical = offering goods and services specific to **a group of customers with specialized needs**.
- Succeeding in Vertical Markets requires a **thorough understanding** of the sectors; often seasoned professional are required to succeed.
- Examples
  - Horizontal
    - *Washing powder*
    - *Cars*
    - *Search engines*
    - *Dafalgan*
  - Vertical
    - *Software for film post-production*
    - *Biotechnology patent lawyers*
    - *Vision systems for industrial automation*
    - *Software for cultural centers*

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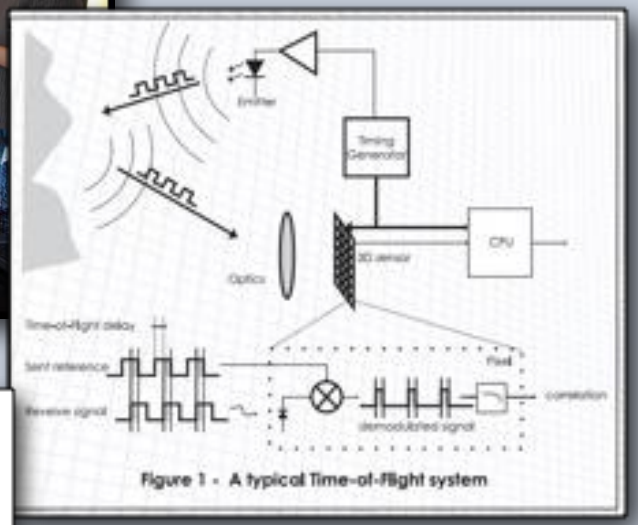
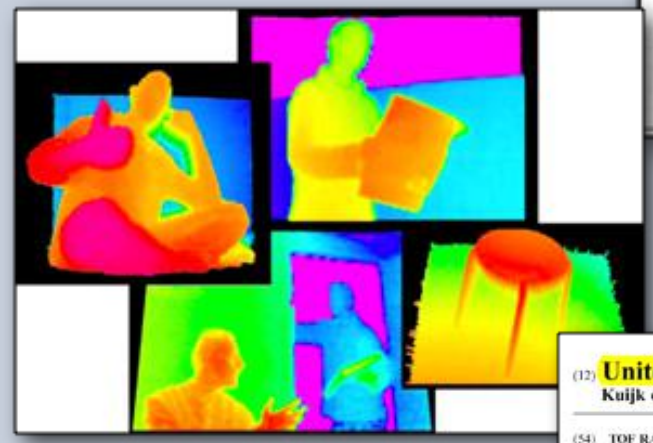
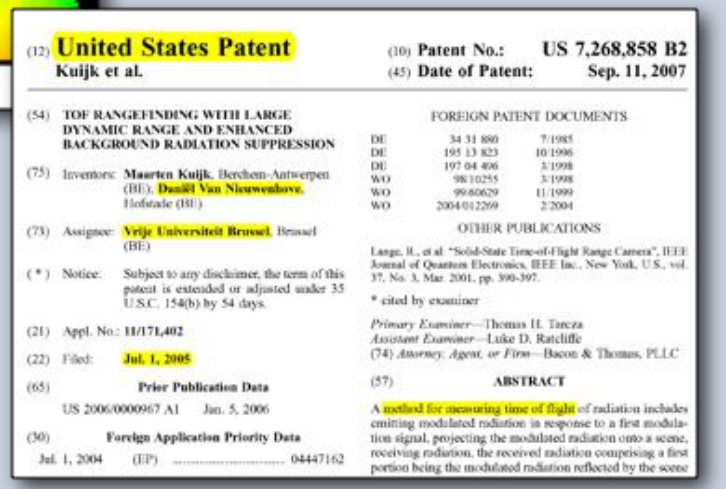
HORIZONTAL & VERTICAL: OPTRIMA CASE

- VUB spin-off
- Core technology: 3D imaging
- Enormous range of application areas







(12) **United States Patent**
Kuijk et al.

(10) Patent No.: US 7,268,858 B2
(45) Date of Patent: Sep. 11, 2007

(54) TOF RANGEFINDING WITH LARGE DYNAMIC RANGE AND ENHANCED BACKGROUND RADIATION SUPPRESSION

(75) Inventors: Maarten Kuijk, Berchem-Antwerpen (BE); Daniël Van Nieuwenhove, Hofstade (BE)

(73) Assignee: Vrije Universiteit Brussel, Brussel (BE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 54 days.

(21) Appl. No.: 11/171,402

(22) Filed: Jul. 1, 2005

(65) Prior Publication Data

US 2006/0000967 A1 Jan. 5, 2006

(30) Foreign Application Priority Data

Jul. 1, 2004 (EP) 04447162

FOREIGN PATENT DOCUMENTS

DE	34 31 880	7/1985
DE	195 13 823	10/1996
DE	197 04 406	3/1998
WO	98/10255	3/1998
WO	99/60629	11/1999
WO	2004/012269	2/2004

OTHER PUBLICATIONS

Lange, R., et al. "Solid-State Time-of-Flight Range Camera", IEEE Journal of Quantum Electronics, IEEE Inc., New York, U.S., vol. 37, No. 3, Mar. 2001, pp. 390-397.

* cited by examiner

Primary Examiner—Thomas H. Tarcza
Assistant Examiner—Luke D. Ratcliffe
(74) *Attorney, Agent, or Firm*—Bacon & Thomas, PLLC

(57) ABSTRACT

A method for measuring time of flight of radiation includes emitting modulated radiation in response to a first modulation signal, projecting the modulated radiation onto a scene, receiving radiation, the received radiation comprising a first portion being the modulated radiation reflected by the scene

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MARKETS

OPTRIMA CASE: POTENTIAL TARGET MARKETS

- Television
  - DepthSense™ and OptriCam™ enables natural **interface to TVs based on simple gestures**, allowing new and intuitive ways of interacting with your media-centre. A simple hand gesture will change the TV channel, turn up the volume, surf the Internet or flip through the photo or music library.
- Gaming
  - **You are the controller**
- Automobile
  - Optrima NV has licensed its DepthSense ™ 3D CMOS Sensor technology to **Melexis** NV for adaption of the technology to the automotive market.
- Health-Lifestyle
  - New applications that can help elderly people or less valid patients home, in hospitals or in care centers benefit from “gaming alike **rehabilitation and revalidation** programs”.
- Automation
  - Optrima’s DepthSense™ and OptriCam™ systems provide reliable 3D data for autonomously guided vehicles, with improved obstacle identification and avoidance, **service robots in industrial** and in assembly, quality control monitoring, material handling and automation.
- Security
  - By using the OptriCam™ 3D Time-of-Flight camera a reliable set of depth data becomes available. This increases the robustness and flexibility of many **surveillance, inspection, and logistics systems**: camera based factory automation, person-counting applications at airports, elevator and door/gate security detection systems.
- The engineers know nothing of these (end) user markets...

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OPTRIMA CASE: POTENTIAL VERTICAL MARKET

- The automated milking market.
  - Selling “2757 Industrial Machinery”
  - To “3573 Farming & Fishing”

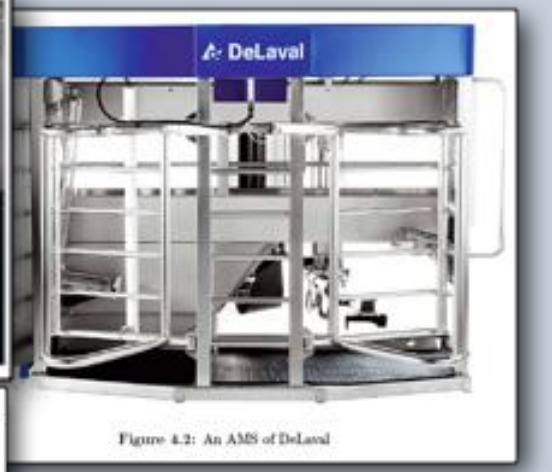

Figure 4.2: An AMS of DeLaval

Table 4.1: Annual expenses: Automatic milking-robot - Manual milking installation

	Investment 1 milking-robot	Investment milking shed technique
Price (in €)	110.000,-	70.000,-
Depreciation	6.5%	6.5%
Interest	5%	5%
Maintenance	4%	3%
Electricity/Water	2%	3%
Total per year (in €)	**16.500,-**	**10.500,-**

De melkrobots en hun 'kunnen'

Bedrijf	DeLaval	Insentec	Lely	Packo Fullwood	RMS
Robot	VMS	Galaxy R.M.S	Astronaut A3	Merlin	Titan
Boxen per robotarm	1	1of 2	1	1	2, 3, 4, 5
Fixatie	geleideplaat/mestafschot voerbak	nee	nee	geleideplaat	voerbak
Speendetectie	2 lasers CCD camera	1 laser camera	1 laser (3 stralen)	1 laser (3 stralen)	1 laser geluid camera
Uierhoogte maximaal (cm)	80	90	78	78	75
Uierhoogte minimaal (cm)	25-27	32	31,5	35	32
Voorbehandeltechniek	aparte beker water/lucht/pulsatie	aparte beker water/lucht/pulsatie	borstels water/wrijven	borstels water/wrijven	melkbeker water/lucht
Afname-apparatuur	afname per kwartier	afname per kwartier	afname per kwartier	afname per kwartier	afname per kwartier
Eerste melkstraal afvoeren	ja	ja	ja	ja	ja
Stimulerende pulsatie	nee	ja	ja	nee	ja
Pulsators per uier	2 (Links/Rechts)	2 (Voor/Achter)	4	1	1
Meting per kwartier	melkhoeveelheid melkstroom geleidbaarheid kleur	melkhoeveelheid melkstroom geleidbaarheid kleur	melkhoeveelheid melkstroom geleidbaarheid kleur cellen (optie)	melkhoeveelheid melkstroom geleidbaarheid kleur	melkhoeveelheid melkstroom geleidbaarheid kleur
Actie naar aanleiding van afwijking	melk scheiden	melk scheiden	melk scheiden	nee	melk scheiden
Sprayen	gericht	gericht	gericht	niet gericht	niet gericht
Bediening	touchscreen	knoppen	touchscreen	knoppen	touchscreen
Managementprogramma	VMS management	Saturnus	T4C	Fusion Crystal	Datamanager
Reinigen uitwendig	beker/laser/vloer	beker en laser	laser	laser	beker
Aantal krachtvoer/toevoegmiddelen	4	3	5	4	4
Ondergrond	rubber	rubber	rubber	traanplaat/rubber	rubber
Energieverbruik (kWh/kg melk)	0,0185	0,018	0,02	0,026	0,027
Waterverbruik (kg/kg melk)	0,309	0,19	0,225	0,129	0,3
Prijs 1 box (euro)	115.000-120.000	110.000-115.000	110.000	108.200	-
Prijs 2 boxen (euro)	205.000-210.000	160.000-170.000	210.000	201.400	147.000

NB. De gegevens zijn volgens opgave van de fabrikanten

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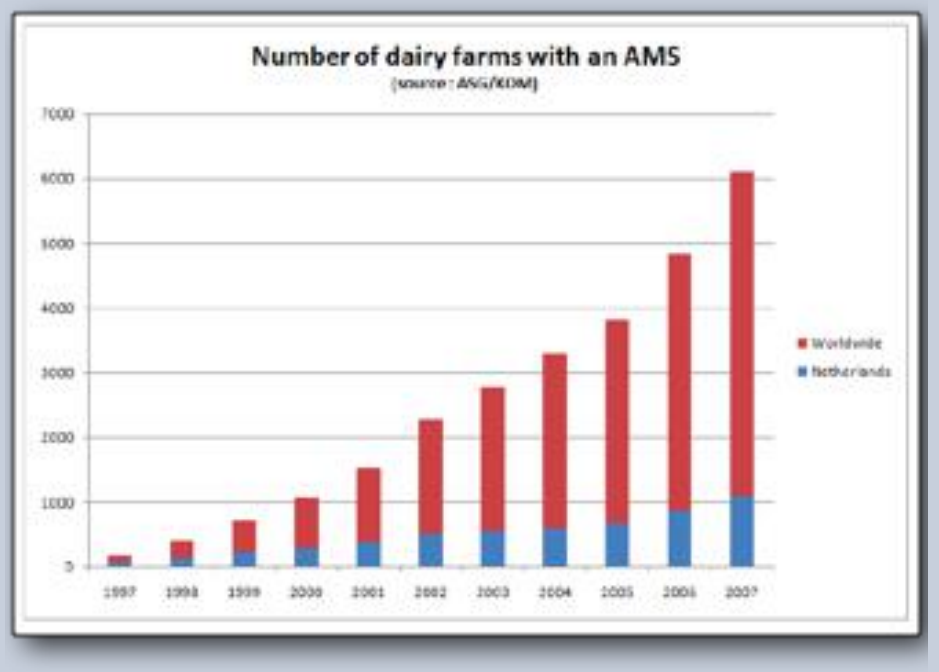
OPTRIMA CASE: VS. VERTICAL…

- The automated milking market.
  - Selling “2757 Industrial Machinery”
  - To “3573 Farming & Fishing”
- Magnitude comparison



VS.

Apple Sells 47 iPhone 6 and 6 Plus Per Second

Telenet Digital TV heeft 1.056.000 abonnees

telenet digital tv

Eind juni 2010 keken 1.056.000 klanten digitale TV via Telenet-kabel. Dat is een stijging van 31% vergeleken jaar.

Million-selling game consoles

Platform	Firm	Released[‡]	Units sold
PlayStation 2	Sony	2000	>155 million
Nintendo DS	Nintendo	2004	154.01 million
Game Boy	Nintendo	1989	118.69 million
PlayStation	Sony	1994	102.49 million
Wii	Nintendo	2006	101.52 million
Xbox 360	Microsoft	2005	84 million
PlayStation 3	Sony	2006	>83.8 million
PlayStation Portable	Sony	2004	82 million
Game Boy Advance	Nintendo	2001	81.51 million

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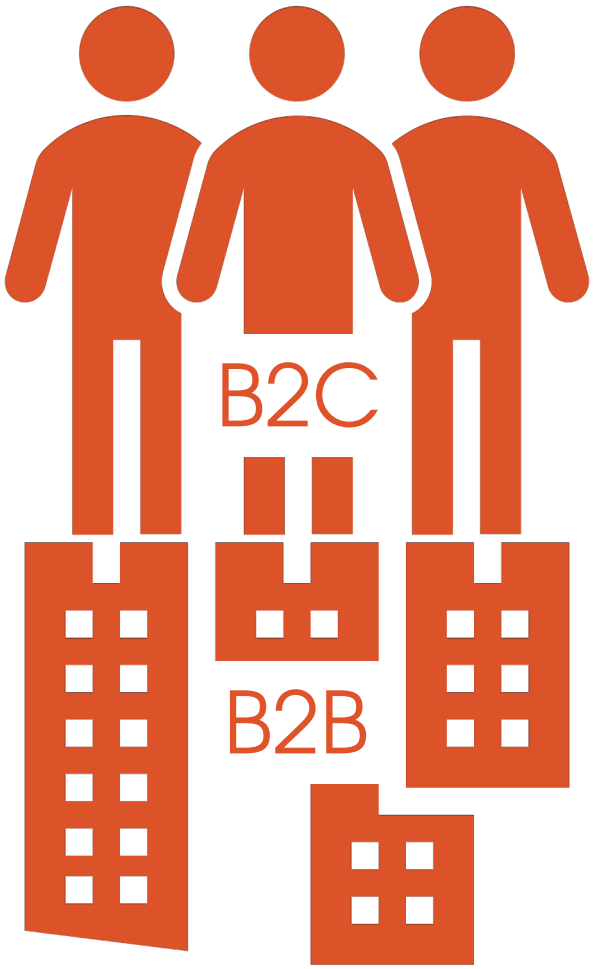

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B2B & B2C

- B2B = Business-to-Business
- B2C = Business-to-Consumer
- `**B2B market far larger** than B2C market
  - Several layers and dimensions of B2B behind each consumer product (see supply chain)
  - Most companies are business to business
- Comparing B2B and B2C: two **main differences** with **implications on marketing strategies and tactics**
  1. Market structure, segmentation and demand
  2. Decision making process

B2B & B2C: MARKET SEGMENTATION

- In B2C
  - Psychological, demographical, sociological criteria…
- In B2B
  - More ‘sober’ criteria
  - Can be linked to clear, concrete, understandable performance criteria

- Example of B2C segmentation criteria
  - Demographic segmentation
    - *age, gender, education, religion, occupation, income and marital status.*
  - Geographic segmentation.
  - Behavioral segmentation.
    - *brand loyalty, awareness, knowledge, social media interaction and purchasing patterns.*
  - Psychographic segmentation.
    - *personality, lifestyle, values and social class.*

B2B & B2C: STRUCTURE & DEMAND

- **Fewer**, **larger** customers
- Scale and **strategic importance** of contract for all parties
- **Interdependence** between buyer and seller
- **Long term relationship**
  - Close interaction: joint problem analysis, developments; operational integration...
  - Risk of overdependence!
- Often geographic **clustering** of certain activities
- **Derived demand**
- **Market size determined by end-user market**
- **Fluctuation of demand**
  - Especially for investment goods: close link to economic situation
- **International scope of sales**
  - Most B2B companies act on international scale
  - US (America), Europe (EMEA), Asia: often different markets, market leaders
- **It's a small world**...
  - Each market segment is a village
  - Importance of reputation
  - High customer satisfaction required

B2B VS. B2C: DECISION MAKING IN B2B

- : More **professional** attitude
  - Business buying process of is one of the most **rational** processes!
  - Major impact on marketing!
- More **complex, more people involved**
- Decision process takes **longer**
- More **formalized**
  - Product specifications
  - Services, support, maintenance, insurances,
  - Contracts!
- Role of the **industrial buyer**
- Decision making process **flavored by national cultures**

- The Decision making Unit
  - Not necessarily a formal group
  - Range of participants
    - ***Users:*** *often initiate the process, can be anybody in organization*
    - ***Influencers:*** *often technical department, staff*
    - ***Buyers:*** *in larger organizations: dedicated department*
    - ***Decision makers:*** *depends on importance of decision*
    - ***Gate keepers****: protect decision makers from unwarranted influence of sellers*
  - -> Multi-level sales!

B2B: IMPLICATION ON MARKETING

- Especially in B2B clear, rational reasons determine if products are bought
  - B2C adds other types of arguments
  - but rational reasons remain applicable
- **It is essential that the entrepreneur knows explicitly why a certain customer should buy from him**
  - He must therefore fully understand the logic of the customer
- Entrepreneurs **must** consider things from the **perspective of their customer**
- Tools to formalize this:
  - performance criteria (see later)
  - value proposition (see later)

BUSINESS ECOSYSTEMS

Sectors, industries, & markets

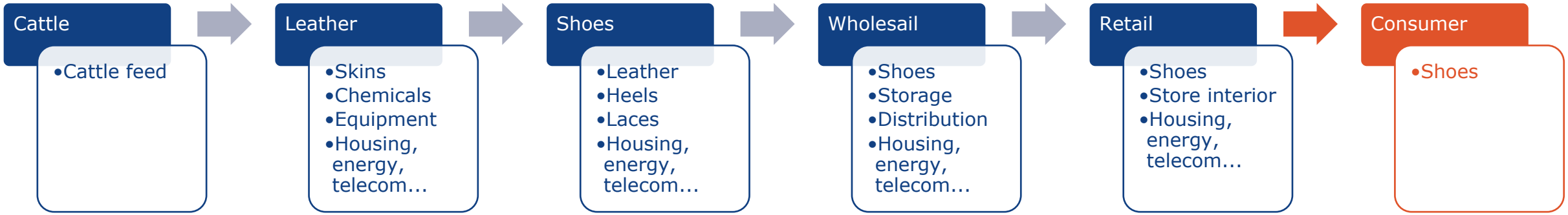
Supply chains & value chains

Standards

Network effects & economies of scale

Business ecosystem actors

Regional clusters


Cattle
•Cattle feed
Leather
•Skins
•Chemicals
•Equipment
•Housing, energy, telecom...
Shoes
•Leather
•Heels
•Laces
•Housing, energy, telecom...
Wholesail
•Shoes
•Storage
•Distribution
•Housing, energy, telecom...
Retail
•Shoes
•Store interior
•Housing, energy, telecom...
Consumer
•Shoes

> A supply chain is a network between a company and its suppliers to produce and distribute a specific product to the final buyer. This network includes different activities, people, entities, information, and resources. The supply chain also represents the steps it takes to get the product or service from its original state to the customer.

Investopedia

SUPPLY CHAIN

- **Many steps** are taken before an end user need is fulfilled
- Your contribution is only small part of the whole picture
- Supply chains: '*the sequence of events*' in this industry/market
  - How step by step the product is built and marketed
  - Value increases as value is added by players
- Can be extraordinarily complex or very straightforward
- **Different roles** are possible, choice impacts many aspects
  - Competitive position
  - Capital needs
  - Minimum size
  - Scalability
- Supply chains are crucial to understand **what it exactly is that you do as a company**
- **->** Do you see the **whole picture**?

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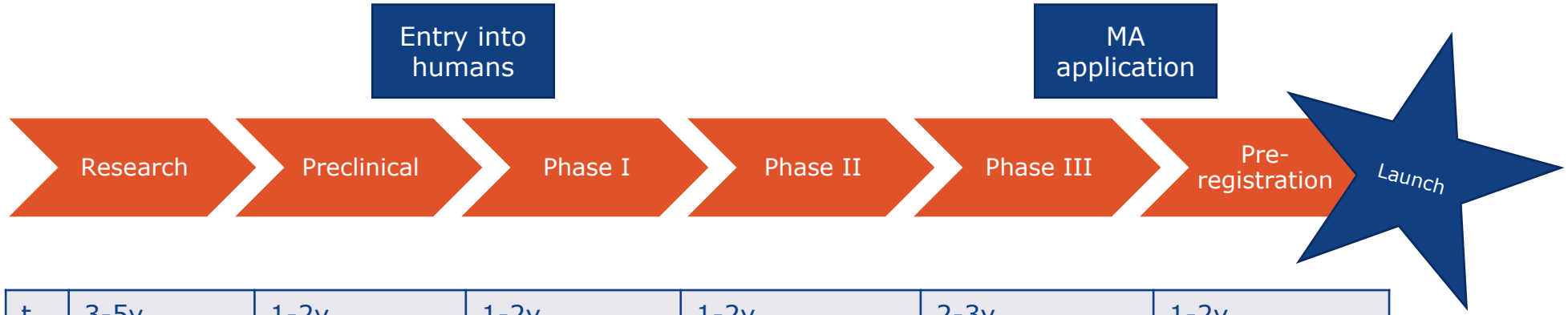
SUPPLY CHAIN

EXAMPLE BIOTECH



t	3-5y	1-2y	1-2y	1-2y	2-3y	1-2y
p	0%	1%	5%	10%	50%	75%
?	Understand disease mechanism	Test candidate drugs in lab and animals for toxicity, side-effects and therapeutic value	Test safety in healthy volunteers (20-200 candidates)	Test efficiency in targeted (200 -300 patients) disease	Confirm efficacy in large patient sample (300-3000 patients)	FDA/EMA review: safety, quality and efficacy
	Identify targets and compounds			Determine appropriate dose	Monitor side-effects	

Drug development phases

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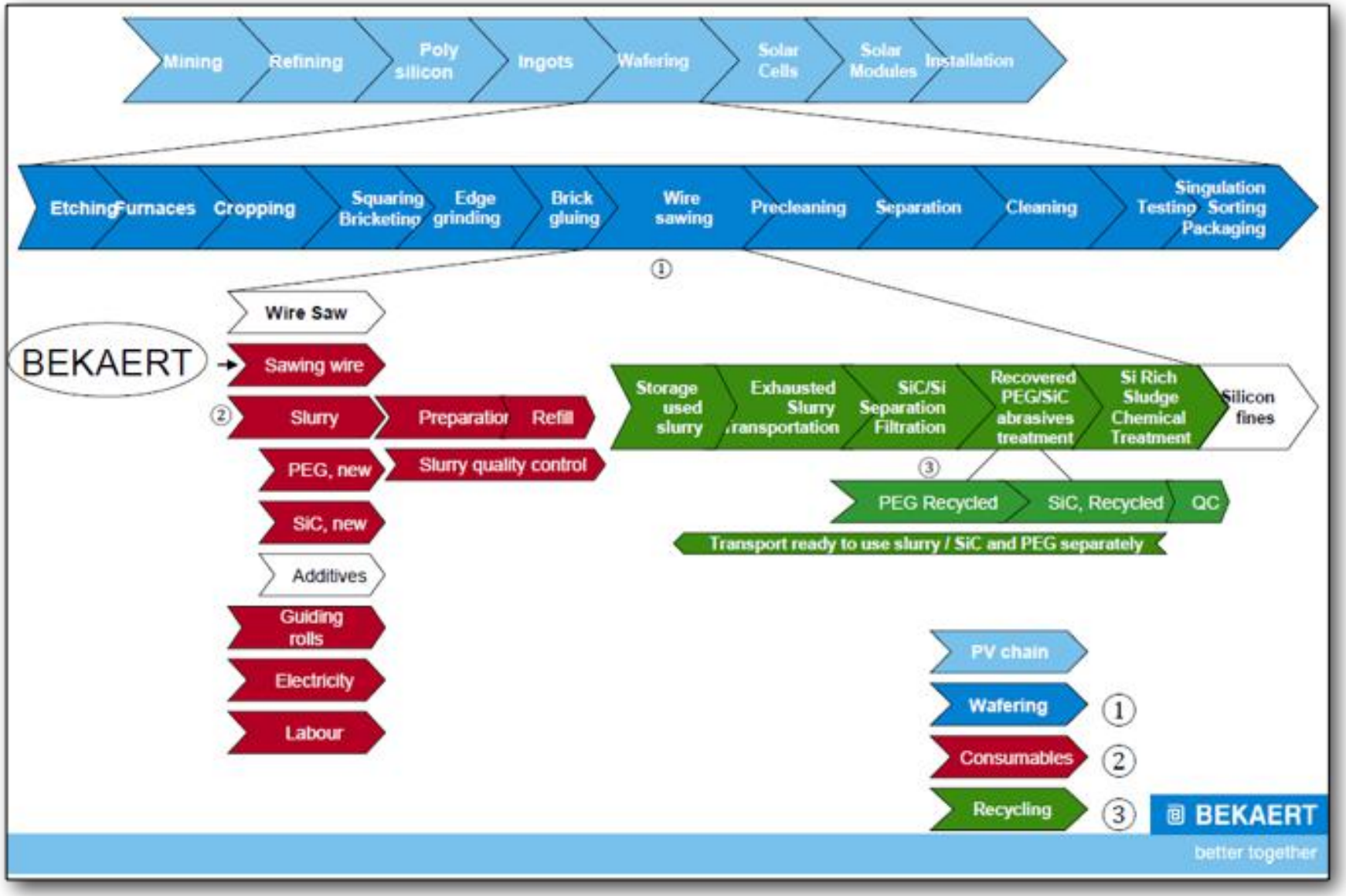
SUPPLY CHAIN

BEKAERT'S SUPPLY CHAIN



Bekaert: steel wire transformation and coatings

BEKAERT
better together

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> The activities that a firm performs become part of the value added produced from a raw material to its ultimate consumption. Along the way, many different firms or businesses have their own activities along the supply chain. Thus, each firm has its own value chain.

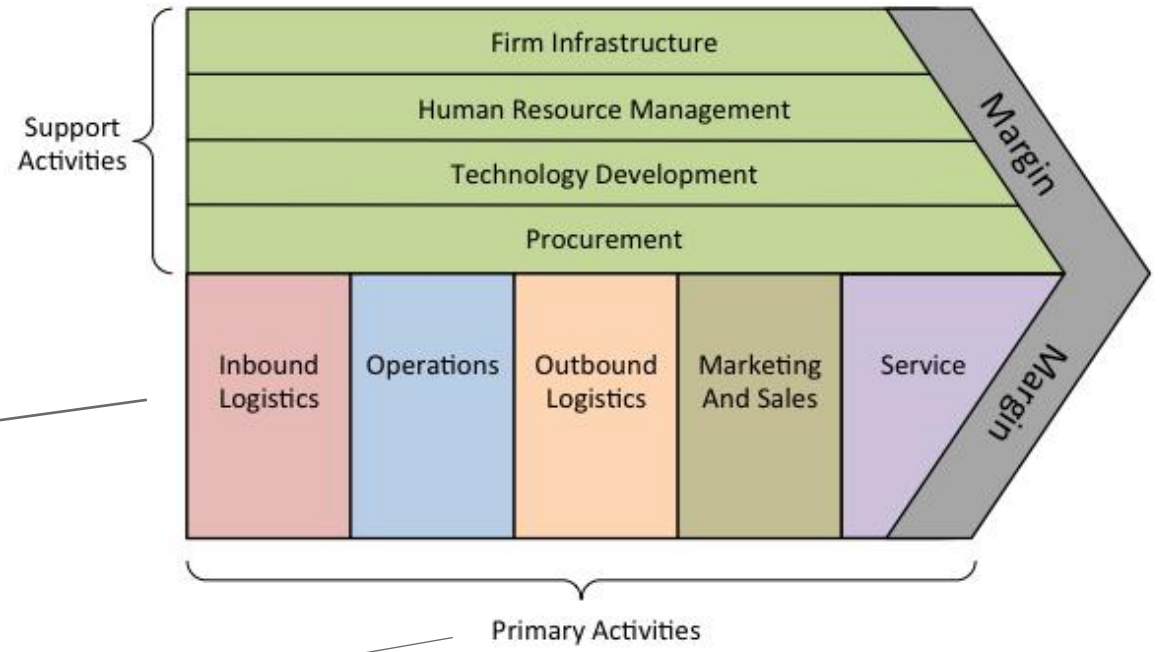
J. McGee

2014

VALUE CHAIN

ABOUT VALUE CHAINS

Most organizations, engage in many activities to **create value.** Value is the amount that buyers are willing to pay for product / service that a firm provides.



Organised like a production line, headings differ according to nature of operations.

Porter's value chain (1985); McGee (2014)

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VALUE CHAIN

PRIMARY ACTIVITIES

- Inbound logistics
  - Activities associated with receiving, storing, and disseminating rights to the product, such as material handling, warehousing, stock management, and so on.
- Operations
  - All of the activities required to transform inputs into outputs and the critical functions which add value, such as machining, packaging, assembly, service, testing, and so on
- Outbound logistics
  - All of the activities required to collect, store, and physically distribute the output. This activity can prove to be extremely important both ingenerating value and in improving differentiation, as in many industries control over distribution strategies is proving to be a major source of competitive advantage – especially as it is realized that up to 50% of the value created in many industry chains occurs close to the ultimate buyer
- Marketing and sales
  - Activities associated with informing potential buyers about the firm's products and services, and inducing them to do so by personal selling, advertising and promotion, and so on
- Service
  - The means of enhancing the physical product features through after-sales service, installation, repair, and so on.

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VALUE CHAIN

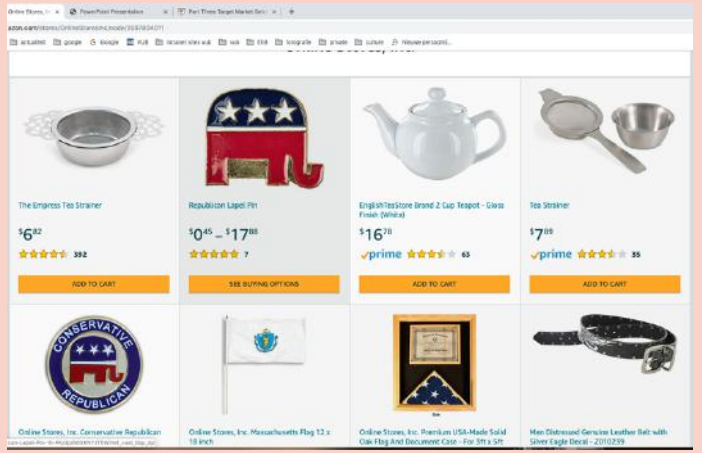
SECONDARY ACTIVITIES

- Procurement
  - This concerns the acquisition of inputs or resources. Although, technically this is the responsibility of the purchasing department, almost everyone in the firm is responsible for purchasing something. While the cost of procurement itself is relatively low, the impact can be very high.
- Human resource management
  - This consists of all activities involved in recruiting, hiring and training, developing, rewarding, and sanctioning the people in the organization
- Technology development
  - This is concerned with the equipment, hardware, software, technical skills, and so on, used by the firm in transforming inputs to outputs. Some such skills can be classified as scientific, while others – such as food preparation in a restaurant – are "artistic." Such skills are not always recognized. They may also support limited activities of the business, such as accounting, order procurement, and so on, and in this sense may be likened to the value added component of the experience effect.
- Firm infrastructure
  - This consists of the many activities, including general management, planning, finance, legal, external affairs, and so on, which support the operational aspect of the value chain. This maybe self-contained in the case of an undiversified firm or divided between the parent and the firm's constituent business units.

SUPPLY CHAIN

THE LAST STEPS IN THE SUPPLY CHAIN

- The lasts steps towards the customer are integral part of the supply chain.
- Distribution and marketing are a substantial challenges, especially in consumer markets
  - Brand name value, existing retail network
  - Internet is a game-changer: see Amazon, Netflix, Facebook, Google
- In business markets approaches vary strongly
  - Internet, regional offices, distributors, specialized partners,…



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THE WHOLE PRODUCT

IT'S THE OVERALL CUSTOMER EXPERIENCE THAT COUNTS:

- Complementary products and services needed to provide a full solution to end-user
  - E-book reader and e-books
  - HD-DVD TV's/players and HD programs & DVD's
  - OS and Software
  - Game console & games
- Consultancy, support, training, maintenance, developer community…
- Customization, adaption to local language
- Your offering may depend on complementary technologies (e.g. digital photography and data storage, internet, printers...)

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THE WHOLE PRODUCT

EXAMPLE USECASE E-BOOKS

- Use Case
  - A use case is a software and system engineering term that describes how a user uses a system to accomplish a particular goal.
  - (www.techopedia.com)

For airplane maintenance

- ‘He pulls out his e-book’.
- ‘Which contains all the documentation for the Boeing 737 e’
- ‘All automatically downloaded each night’
- ‘There is a hyperlink in the text’ .
- ‘To a knowledge base where actual experiences are tracked’
- ‘Clicking on it’

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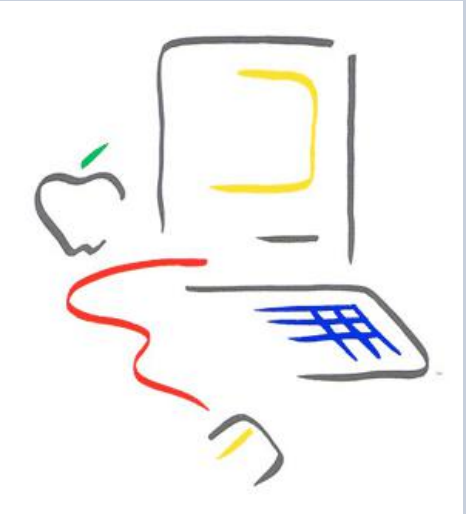
THE WHOLE PRODUCT

EXAMPLE APPLE

- Apple strategy: maintain tight control over hardware, software and the services they access
  - First Mac only opened with special screwdriver, no expansion slots
- Unsuccessful strategy **for 30 years**
  - Apple could not beat the power of modularity and scale
  - Intel / Microsoft windows / PC manufacturers / software / add-ons



Dow Jones Apple vs. Microsoft, Dell, Intel (1984-1997)

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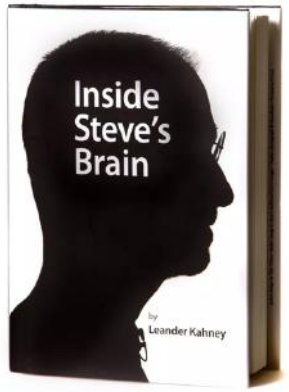
THE WHOLE PRODUCT

- this integral control has become a major asset in recent times
- iPod, iPhone, iPad
  - designing and manufacturing devices
  - operating systems
  - application software
  - developer tools, relations
  - internet application
  - content provision
  - marketing, brand name
  - ‘vertical integration’
- it is the right approach for the digital entertainment age
  - Jobs wanted to make complex devices like computers and smartphones into truly mass-product products
  - for that he needed to control all aspects of the customer experience
- ‘Apple is the only company that controls the whole widget. it turns out that this is Apple’s greatest strategic advantage’

EXAMPLE APPLE



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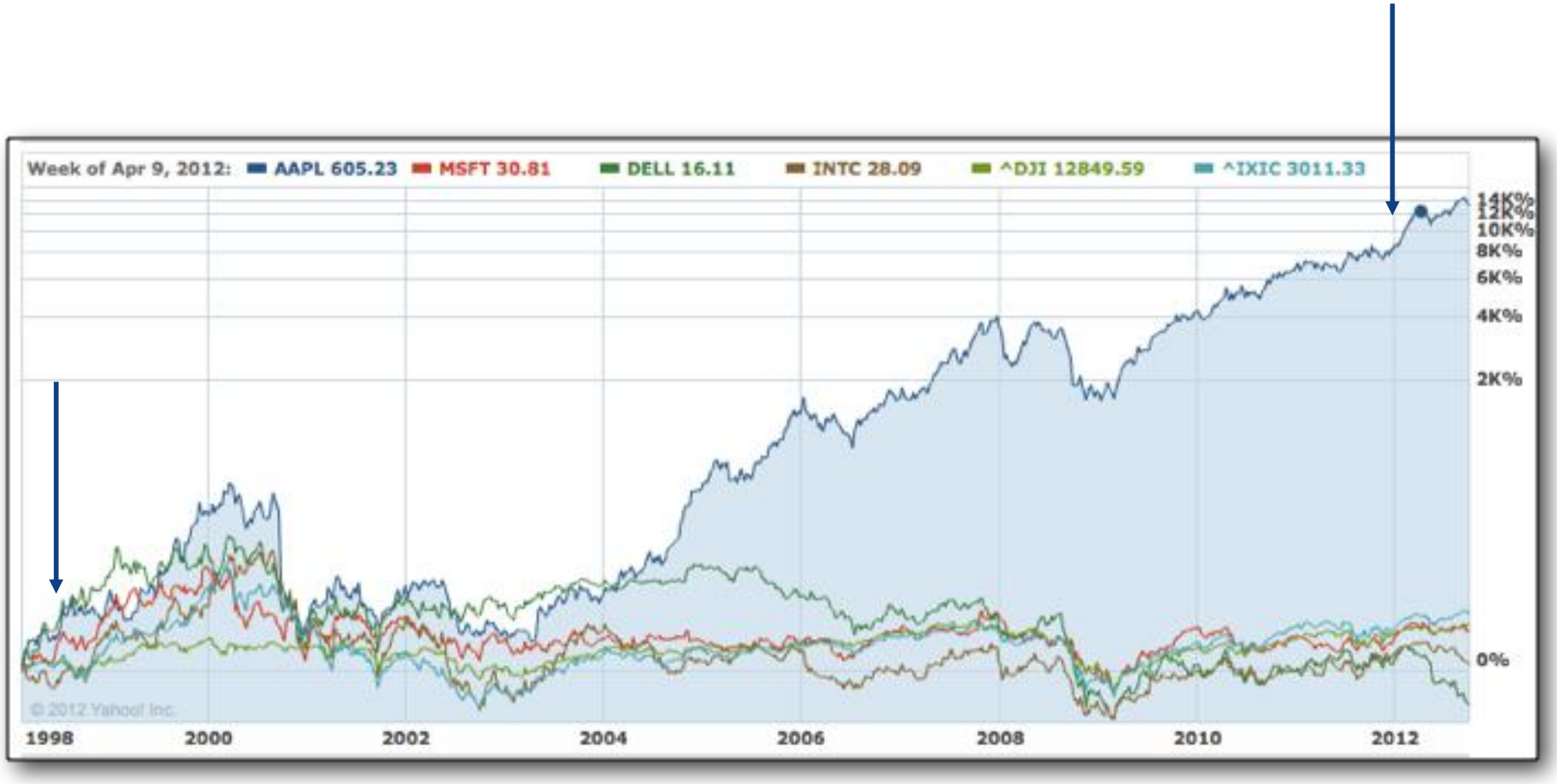
THE WHOLE PRODUCT

EXAMPLE APPLE



Apple, the sequel... (1998 – 2012)

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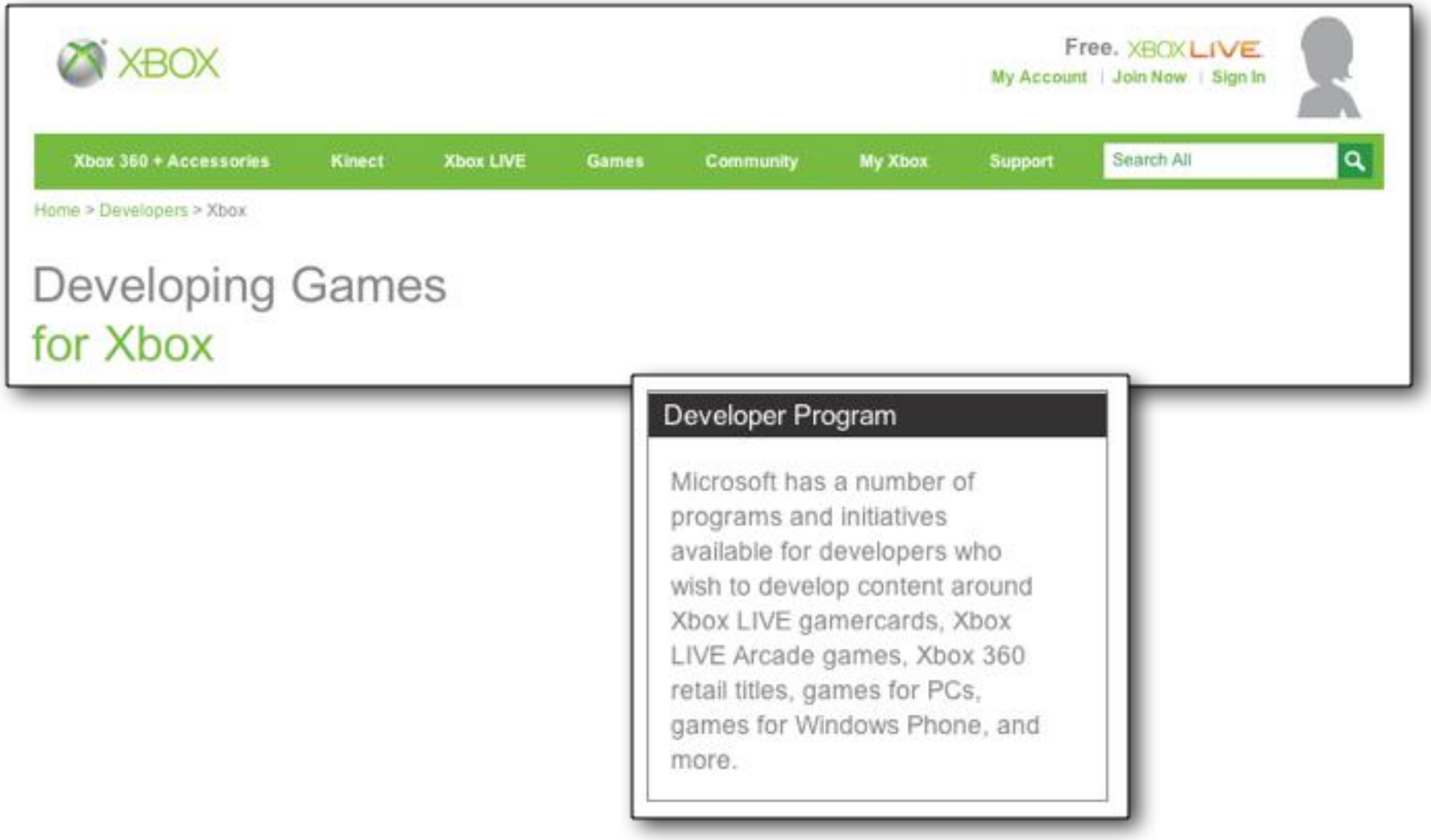
THE WHOLE PRODUCT

EXAMPLE X-BOX



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SUPPLY & VALUE CHAIN DIMENSIONS

INTEGRAL VS. MODULAR PRODUCT

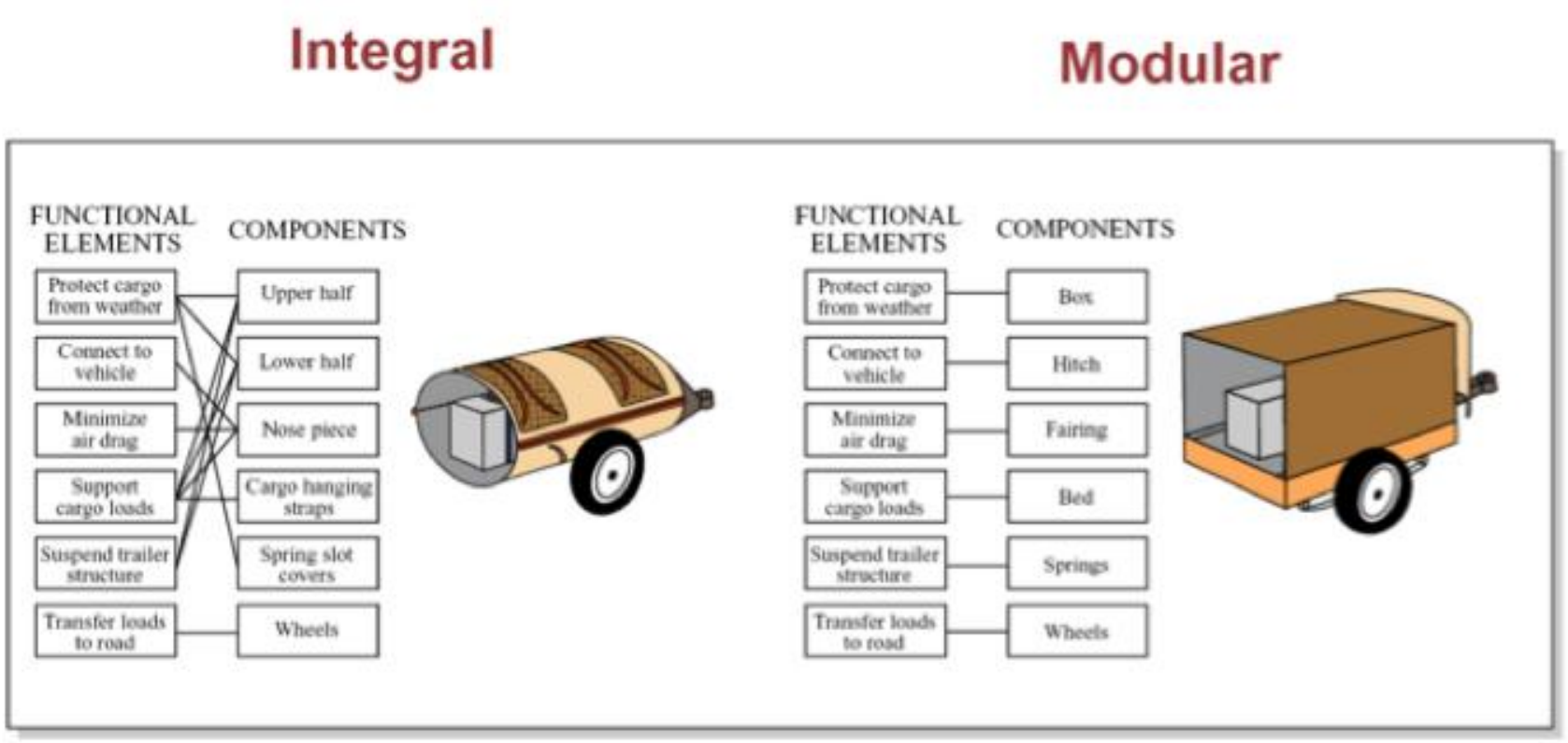

Image by MIT OCW.

Product architecture

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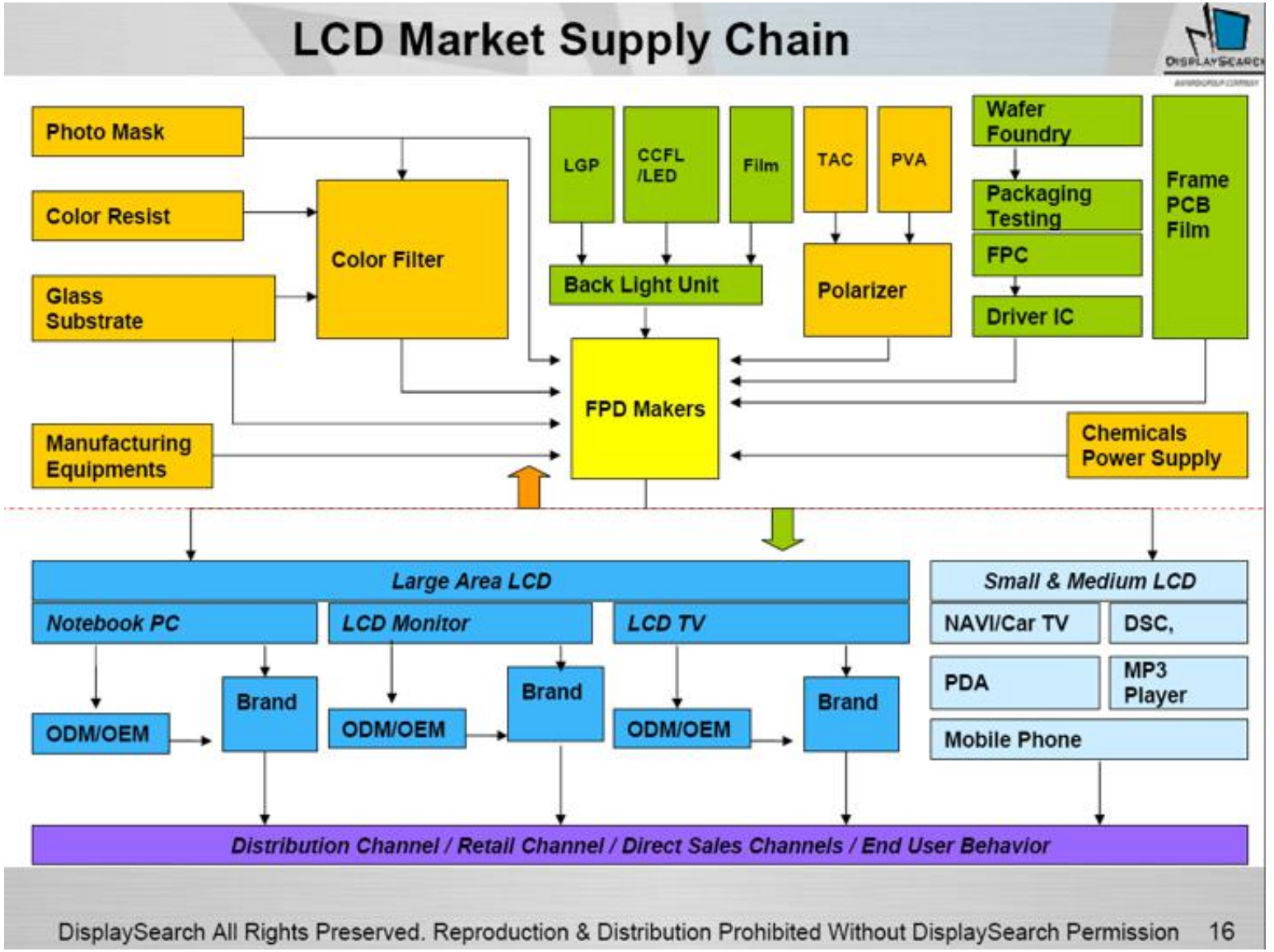
SUPPLY & VALUE CHAIN DIMENSIONS



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SUPPLY & VALUE CHAIN DIMENSIONS

SUPPLY CHAINS CAN COLLIDE

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SUPPLY & VALUE CHAIN DIMENSIONS

SUPPLY CHAINS CAN COLLIDE

- What changes...
  - Distribution
  - Printing, post-press
  - Prepress
- What remains (+/-) the same...
  - Layout
  - Content creation
  - Brand owner
- The new supply chain
  - Reader device
  - Telecom network
  - Online store
  - Prepare for posting
- The real questions for newspaper publishers: will they still make money?
  - At what price can they sell a digital newspaper?
  - What commission will they need to give for ‘distribution’, and to who?
- One of the biggest battles on e-books / e-newspapers (and music, video, television) are the **relations** between content owners/publishers and device/service suppliers...
  - Who owns the billing system, commissions

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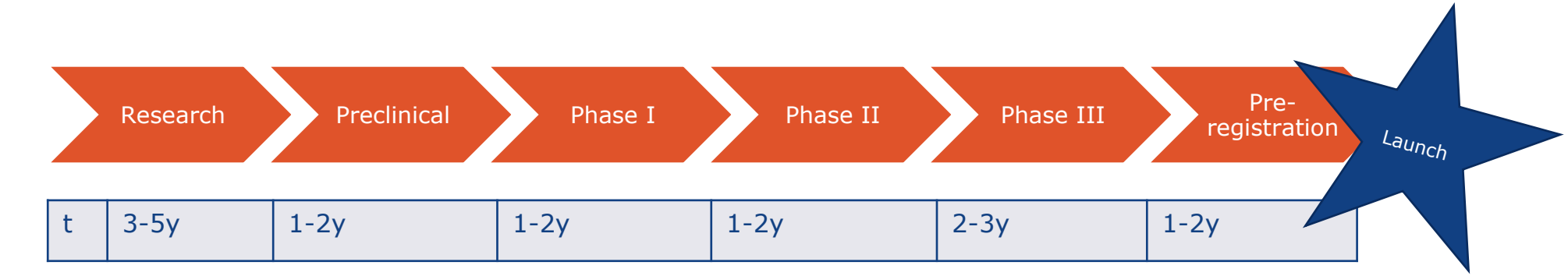
SUPPLY & VALUE CHAIN DIMENSIONS

RELEVANCE OF TIME DIMENSION



VS.

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SUPPLY & VALUE CHAIN DIMENSIONS

SUPPLY CHAINS: OPTRIMA CASE

- VUB spin-off
- Core technology: 3D imaging
- Enormous range of application areas

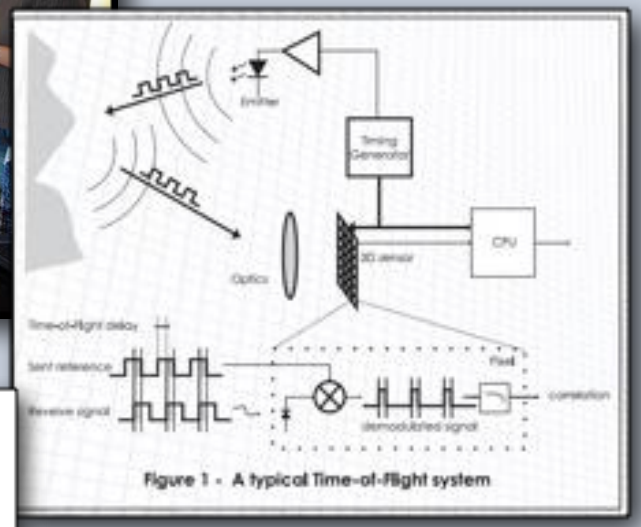
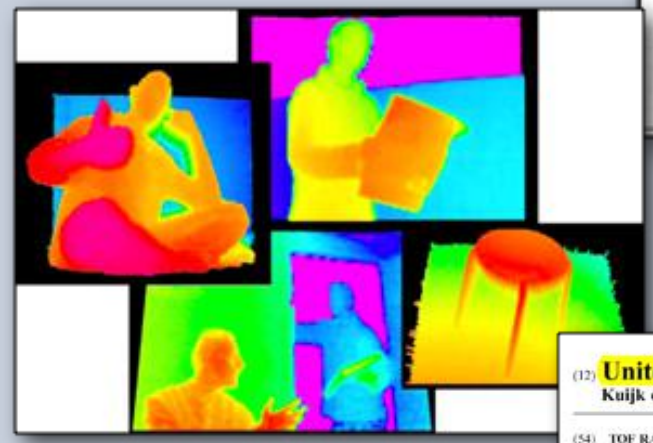


Figure 1 - A typical Time-of-Flight system



(12) **United States Patent**
Kuijk et al.

(10) **Patent No.: US 7,268,858 B2**
(45) **Date of Patent: Sep. 11, 2007**

(54) **TOF RANGEFINDING WITH LARGE DYNAMIC RANGE AND ENHANCED BACKGROUND RADIATION SUPPRESSION**

(75) Inventors: **Maarten Kuijk**, Berchem-Antwerpen (BE); **Daniël Van Nieuwenhove**, Hofstade (BE)

(73) Assignee: **Vrije Universiteit Brussel**, Brussel (BE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 54 days.

(21) Appl. No.: **11/171,402**

(22) Filed: **Jul. 1, 2005**

(65) **Prior Publication Data**

US 2006/0000967 A1 Jan. 5, 2006

(30) **Foreign Application Priority Data**

Jul. 1, 2004 (EP) 04447162

FOREIGN PATENT DOCUMENTS

DE	34 31 880	7/1985
DE	195 13 823	10/1996
DE	197 04 406	3/1998
WO	98/10255	3/1998
WO	99/60629	11/1999
WO	2004/012269	2/2004

OTHER PUBLICATIONS

Lange, R., et al. "Solid-State Time-of-Flight Range Camera", IEEE Journal of Quantum Electronics, IEEE Inc., New York, U.S., vol. 37, No. 3, Mar. 2001, pp. 390-397.

* cited by examiner

Primary Examiner—Thomas H. Tarcza
Assistant Examiner—Luke D. Ratcliffe
(74) *Attorney, Agent, or Firm*—Bacon & Thomas, PLLC

(57) **ABSTRACT**

A method for measuring time of flight of radiation includes emitting modulated radiation in response to a first modulation signal, projecting the modulated radiation onto a scene, receiving radiation, the received radiation comprising a first portion being the modulated radiation reflected by the scene

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SUPPLY & VALUE CHAIN DIMENSIONS

SUPPLY CHAINS: OPTRIMA CASE

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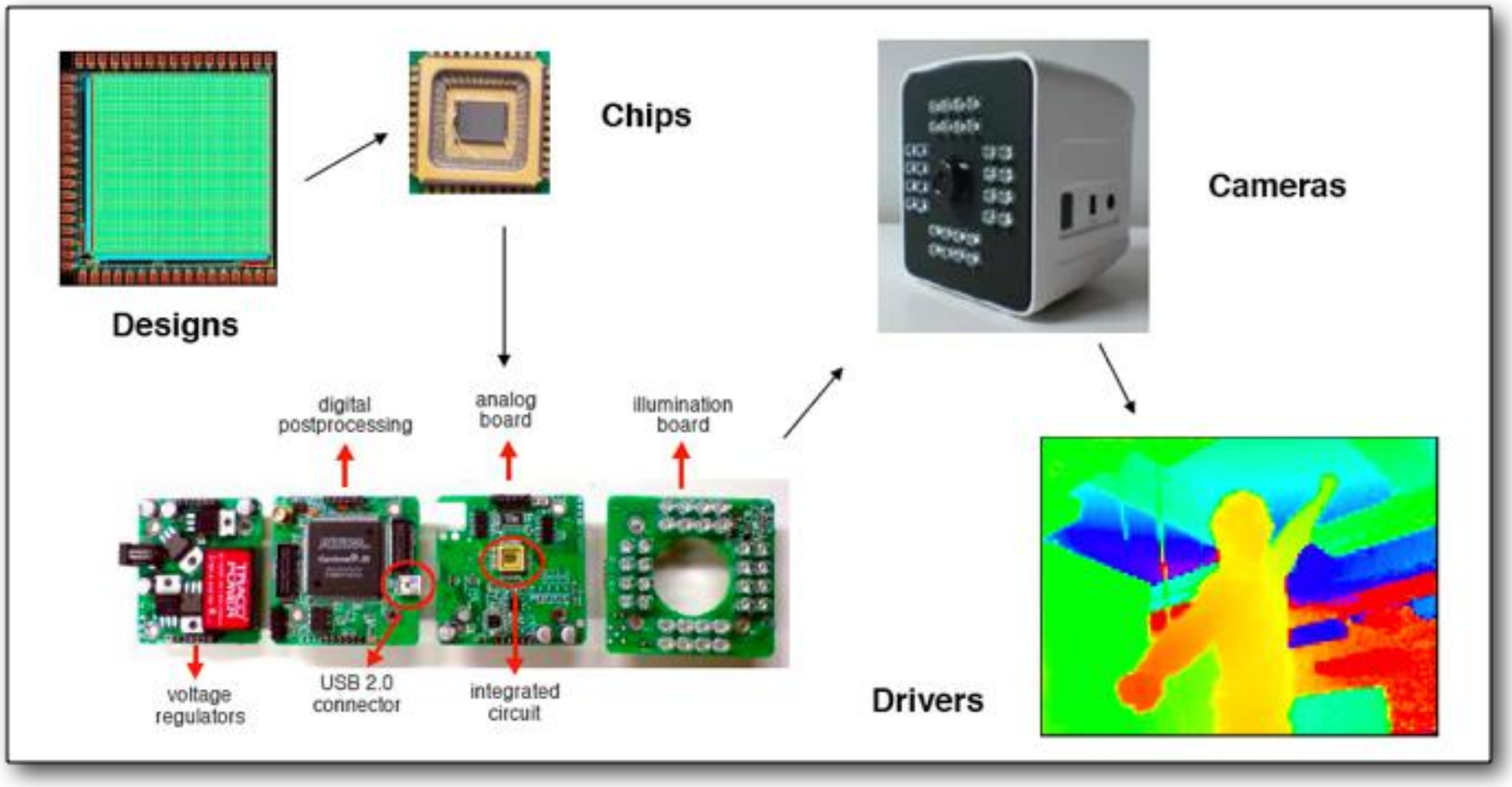
The Optrima supply chain 1.0.

SUPPLY & VALUE CHAIN DIMENSIONS

SUPPLY CHAINS: OPTRIMA CASE



The Optrima supply chain 1.0.

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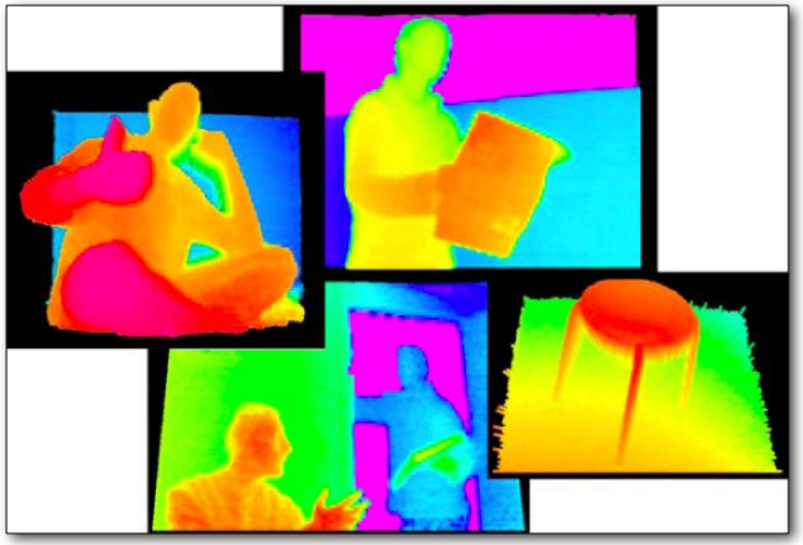
SUPPLY & VALUE CHAIN DIMENSIONS

What is next in Optrima's supply chain?

SUPPLY CHAINS: OPTRIMA CASE



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SUPPLY & VALUE CHAIN DIMENSIONS

SUPPLY CHAINS: OPTRIMA CASE

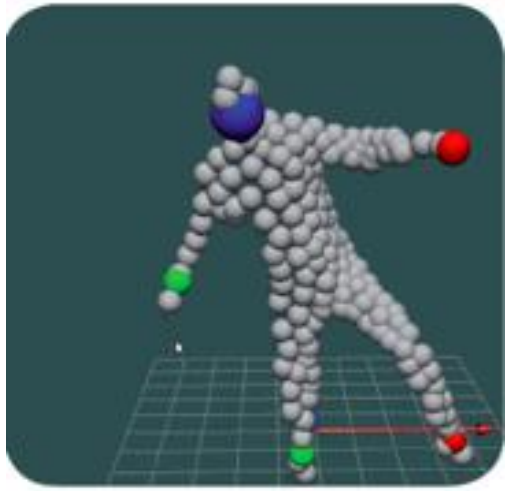
3D Gesture Recognition Platform for Game and Application Developers

Softkinetic iisu is a complete development and deployment gesture recognition platform for creating innovative Interactive Digital Entertainment, Serious Games and Consumer Electronics applications. iisu is compatible with all 3D depth sensing cameras and allows application developers to build natural, immersive, transparent and intuitive interfaces for video games, PC applications, home media center control, interactive marketing applications, fitness solutions or industrial simulation environments.

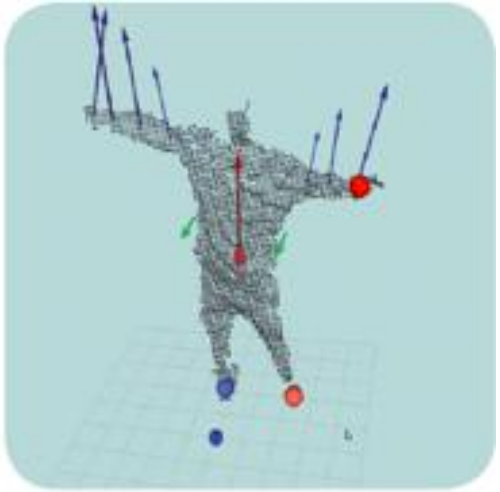
SOFTKINETIC
THE INTERFACE IS YOU

Corporate Headquarters

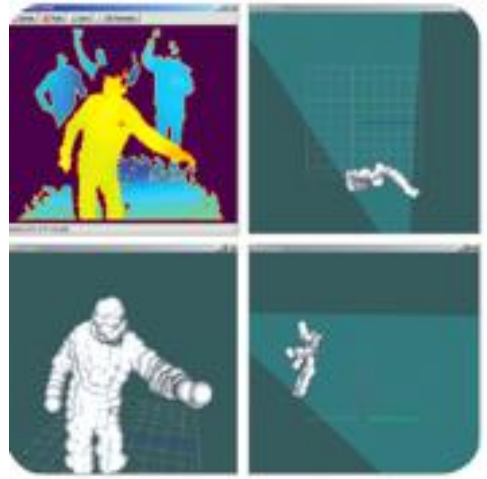
Softkinetic S.A.
24 Avenue L. Mommaerts
Brussels B-1140
Belgium



Body parts



Gesture analysis



Scene calibration, classification & filtering

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The need for gesture recognition.

Merging with SoftKinetic

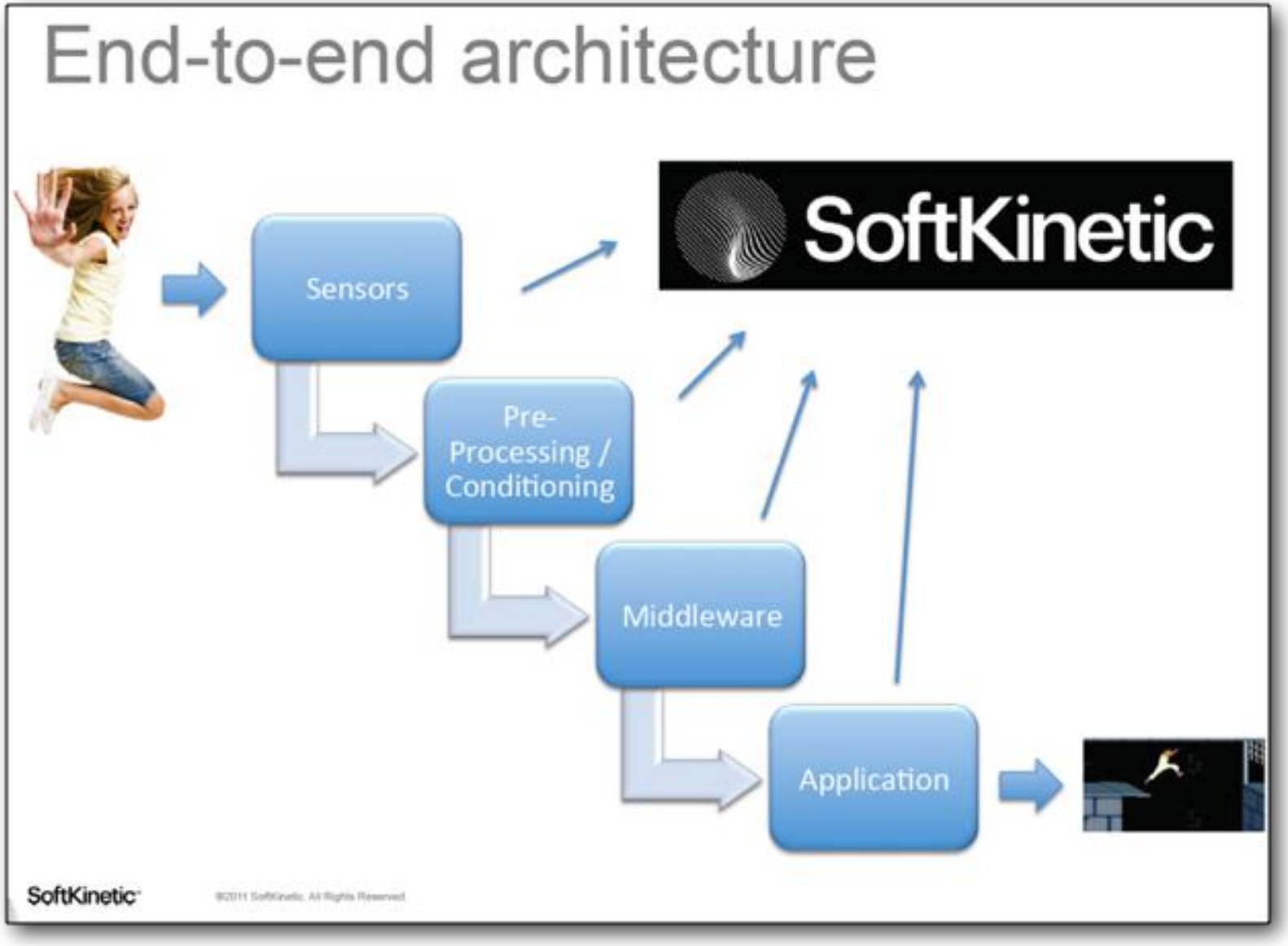
- SoftKinetic: iisu™ (Interface-is-U)
  - Strong middleware
  - Known in the market
- Optrima
  - Strong 3D camera technology
- Together → unique position with whole stack
- Branding
  - KISS (Keep it Stupid Simple)
    - → SoftKinetic will do!

SoftKinetic

Merging with Softkinetic.

SUPPLY & VALUE CHAIN DIMENSIONS

SUPPLY CHAINS: OPTRIMA CASE



Merging with Softkinetic.

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SUPPLY & VALUE CHAIN DIMENSIONS

Breaking news (2015)

SUPPLY CHAINS: OPTRIMA CASE

- **Sony Acquires Belgian Innovator of Range Image Sensor Technology, Softkinetic Systems S.A., in its Push Toward Next-Generation Range Image Sensors and Solutions**
- Tokyo, Japan - Sony Corporation is announcing that it has completed the acquisition of Softkinetic Systems S.A., after reaching an agreement with the company and its major shareholders. With this acquisition, Softkinetic - which possesses time-of-flight ("ToF") range image sensor technology, as well as related systems and software - has become a wholly-owned subsidiary of Sony.
- Sony will **focus on combining Softkinetic's ToF** range image sensor technology expertise **with its own technologies** with the aim of **developing the next generation of range image sensors and solutions**, not only in the field of imaging, but for broader sensing-related applications as well.

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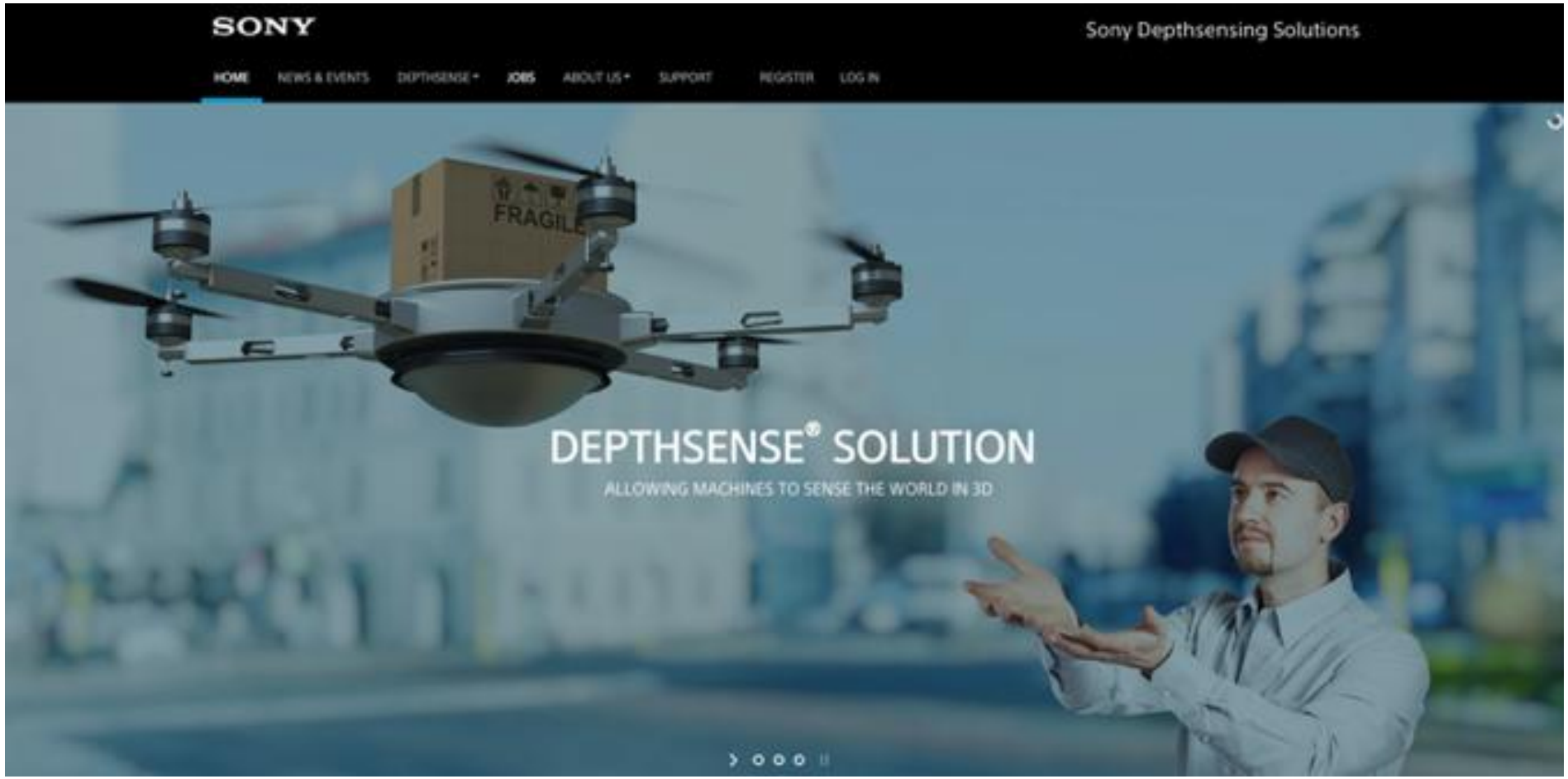
SUPPLY & VALUE CHAIN DIMENSIONS

SUPPLY CHAINS: OPTRIMA CASE



Softkinetic… Sony Depthsensing Solution

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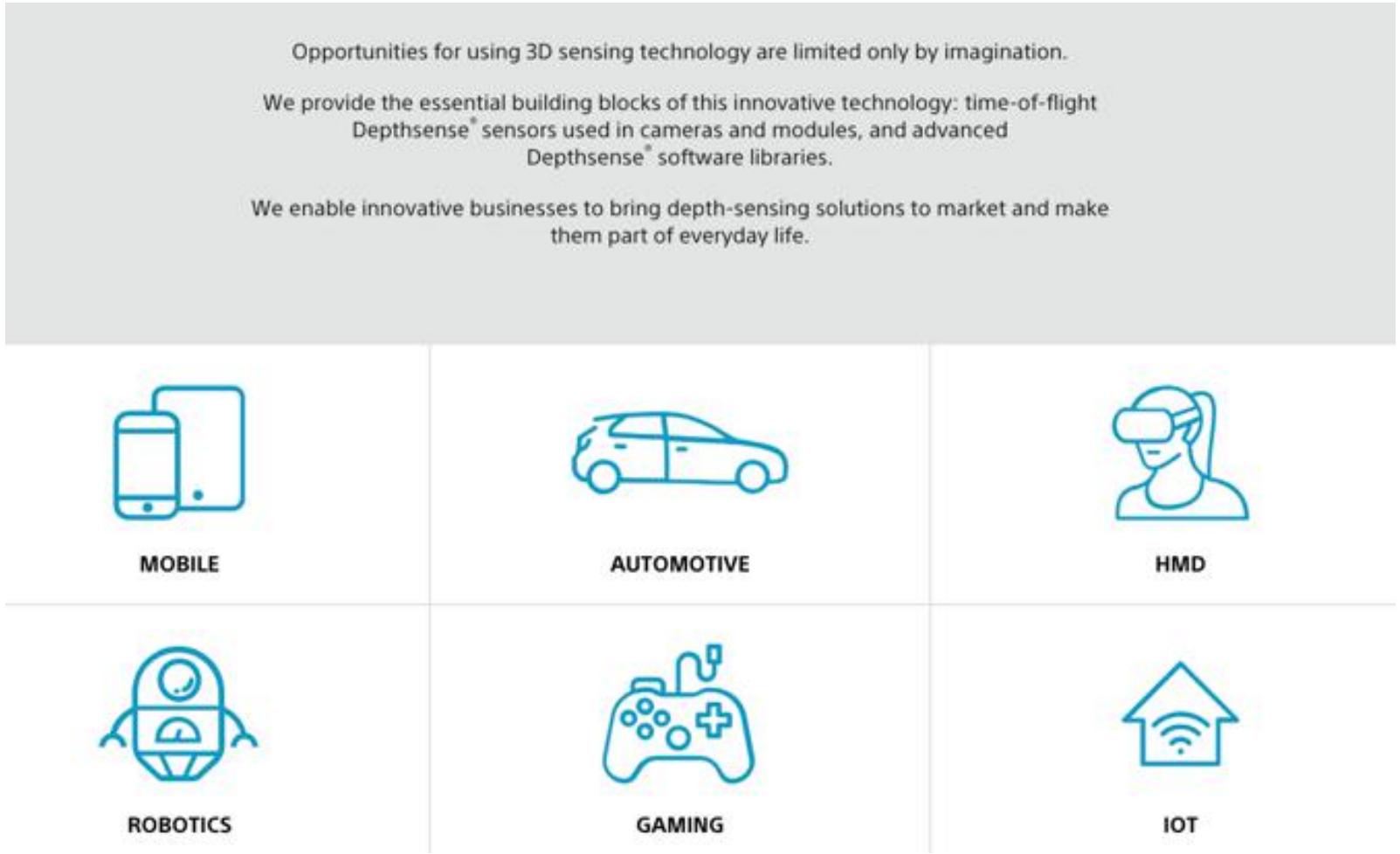
SUPPLY & VALUE CHAIN DIMENSIONS

SUPPLY CHAINS: OPTRIMA CASE



Horizontal vs. Vertical markets…

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BUSINESS ECOSYSTEMS

Sectors, industries, & markets

Supply chains & value chains

Standards

Network effects & economies of scale

Business ecosystem actors

Regional clusters


1,00,000,00,00,000
Total Business crosses
Rs. One Lakh Crore
Thank you,
each one of our 15 million customers.
The Union Bank Team

“A standard is (a limited set of) common way(s) to do something or to approach/solve a problem.”

STANDARDS

ABOUT STANDARDS

- A common way of doing something
  - Can be achieved
    - *bottom-up or top-down*
    - *unanimously or not*
  - It assures **not everybody does it his/her own way**
- Standards can be…
  - Part of society, very formal and entrenched
    - *driving on right hand side, GSM, internet...*
  - Purely technical
    - *form factors for screws*
  - Very long lasting or very transient
    - *QWERTY/AZERTY*
  - Governed
    - *Europe= GSM standard, US: competing technologies*
- Standards are a **key dynamic** in business ecosystems:
  - The advent of a standard is part of the maturation process of an industry (see Industry Life Cycles)
  - Standards often generate their own ecosystems and vice-versa
  - Two or more competing standards...
  - Standards can create opportunities for niche players
  - Standards are reviewed and updated on a regular basis.

MIT MANAGEMENT SLOAN SCHOOL

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STANDARDS

WHY STANDARDS?

- Standards **facilitate**
  - Manufacturers know what is expected from them
    - *To build a GSM telephone*
    - *To use the electricity grid*
    - *To write software for the internet*
  - Ease of communication between actors
    - *“5 liters of paint, RAL 1003”*
  - Compatibility between users
    - *PDF*
- **Society and economy** needs standards
  - Allows products and people to work together and be interchangeable
  - Provide assurance that a product delivers a certain performance
  - Provide the tools (symbols, terminology) for designers, manufacturers and users to communicate.

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STANDARDS

STANDARD TYPES

1. Official, public standards
2. De-facto standards
3. Dominant designs
4. # parallel standards
5. Quality standards

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STANDARDS

WHO SETS STANDARDS?

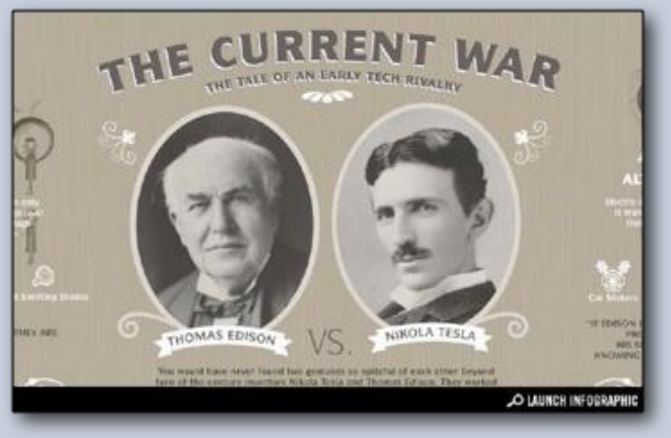
1. Legislator, **government** agencies, military
2. National, regional, international, and sectoral **standardization bodies**
   - International Organization for Standardization (ISO)
   - European Telecommunications Standards Institute
   - International Telecommunication Union
   - World Wide Web Consortium
   - Universal Postal Union
   - American Petroleum Institute
   - DIN, ASA…
3. Sometimes standards emanate from **groups of companies**
   - USB: Compaq, DEC, IBM, Intel, Microsoft, NEC and Nortel.
   - Audio CD: Philips + Sony
4. Vast **battles** of influence and market share (especially in emerging industries) can introduce standards
   - Usually connected to de facto standards
   - Microsoft Windows vs. Apple Macintos

SOME STANDARDS BATTLES

- Electric power
  - DC (edison) vs AC (westinghouse)
- Roads
  - Width, side of the road, signage
- Color television
  - Mechanical (CBS) vs electronic (RCA)
- Air travel
  - Door on front left, jetways/airbridges, taxi ways
- Video cassettes
  - Betamax (sony) vs VHS (matsushita+)
- Cellphones(1)
  - Several co-existing standards
  - TDMA (ericsson/AT&T) vs CDMA (qualcomm) vs GSM (EU) vs PHS
- Personal computers
  - Microsoft windows vs mac OS
- 56k modems
  - K56flex (rockwell/lucent) vs x2 (US robotics/3com) vs v.90
- Smartphones
  - Iphone, windows, google

WHO SETS STANDARDS? AC VS DC BATTLE

- DC
  - During the initial years of electricity distribution, direct current was the standard for the USA
  - Edison did not want to lose his patent royalties.
  - Direct current worked well with incandescent lamps that were the principal load of the day, and with motors.
  - Direct-current systems could be directly used with storage batteries, providing valuable load-leveling and backup power during interruptions of generator operation.
  - Edison invented a meter to allow customers to be billed for energy proportional to consumption, but it only worked with direct current.
- AC
  - From his work with rotary magnetic fields, Tesla devised a system for generation, transmission, and use of AC power.
  - He partnered with George Westinghouse to commercialize this system. Westinghouse had previously bought the rights to Tesla's patents
  - EC is technically superior in many aspects (easier to transport).



Rivalry between Edison & Tesla

Edison was a brute-force experimenter, but was no mathematician.

AC cannot be understood or exploited without a substantial understanding of mathematics which Tesla possessed.

Tesla had worked for Edison but was undervalued

Bad feelings were exacerbated because Tesla had been cheated by Edison of promised compensation for his work.

WHO SETS STANDARDS? AC VS DC BATTLE

- Edison carried out a campaign to discourage the use of alternating current
  - spreading disinformation on fatal AC accidents
  - lobbying against the use of AC
  - He directed his technicians to preside over several AC-driven killings of animals, including Topsy, a Coney Island circus elephant
  - He tried to popularize the term for being electrocuted as being "Westinghoused".
- Harold P. Brown, who was being secretly paid by Edison, built the first electric chair for the state of New York to promote the idea that alternating current was deadlier than DC.
- When the chair was first used the technicians misjudged the voltage needed to kill the prisoner. The first jolt of electricity was not enough to kill, and left him badly injured.
- Areporter described it as "an awful spectacle, far worse than hanging."

WHO SETS STANDARDS? AC VS DC BATTLE

- In 1890, the **Niagara Falls Power Company** analyzed proposals to harness Niagara Falls to generate electricity. They preferred electricity, but they couldn't decide which method would be best overall.
- The NFPC was finally convinced to award the contract to Westinghouse. Power was to be generated and transmitted as **alternating current**.
- To appease the interests of GE, they were awarded the contract to construct the transmission lines using the Tesla patents.
- The successful **Niagara Falls system was a turning point in the acceptance of alternating current**. AC replaced DC for central station power generation and power distribution, enormously extending the range and improving the safety and efficiency of power distribution.
- Eventually, GE began manufacture of AC machines.

STANDARDS

MY EXPERIENCE WITH STANDARDS

- **'Quadtree compression' vs. CCITT Group IV**
- Invented @ VUB for SoftCore
- Format to compress scanned pages
- Arguably better technology
  - Faster compression, better visualization
- versus the absolute standard
  - The way fax machines compress images
  - Software libraries available at low cost
- And that for a key element in the perception of customers: long term accessibility of documents...
  - What if SoftCore goes bankrupt? Will I be able to view my documents?
- Lots of efforts to convince users, implicit 'negative point'
- Finally we dropped the technology

- **Mobitex vs GSM SMS**
- Better technology
  - Packed switched
  - Much more reliable
    - *In theory: depends on coverage!*
- Standard: GSM
  - At that time coming up at full speed
  - Massive investments
    - *Main partners of RAM redirect funds to GSM*
- Volume volume volume!
  - Try to order 10.000 modems with a manufacturer if GSM operators order 10 million...
  - Impossible to match coverage
- Downward spiral
  - Mobitex networks close...
  - Customers loose confidence
  - Best employees leave
- Only alternative: survive in niche market

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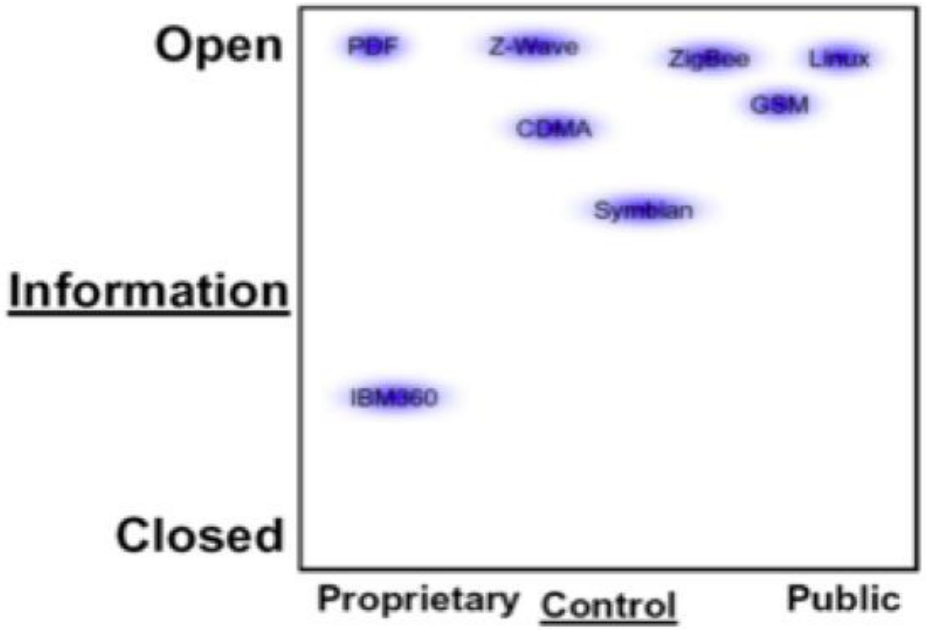
STANDARDS

CONTROL VS. INFORMATION



	Proprietary	Public
Open	Although details of standard are published, owner(s) controls evolution and may capture value • Windows • SD cards	Standards are publicly owned or held in common • TCP/IP • GSM
Information	Interfaces amongst sub-systems, modules or components are standardized, but not published externally • IBM 360 series • Apple	Standards publicly owned or held in common, but kept secret • cryptography • GSM secret keys
Closed		

Control

Is the standard public?

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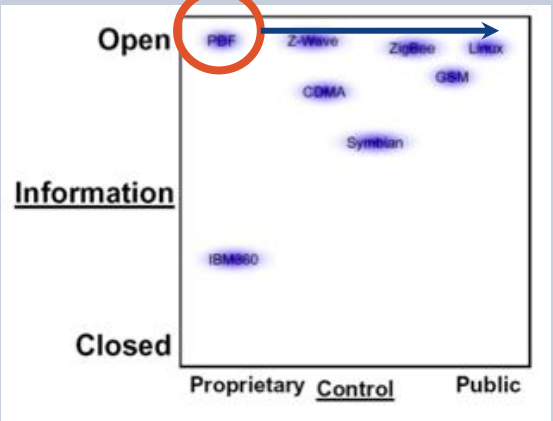
CONTROL VS. INFORMATION EXAMPLE: ADOBE

- Adobe twice decided to make architectural information openly available
  - Postscript
  - PDF
- In both cases they became dominant designs
- It is quite the inverse of protection of intellectual property!
- They succeeded because no major competitor arose to grab market share
- Adobe is generally respected as serious business partner

Adobe



"PDF is now a formal open standard known as ISO 32000, maintained by the international organization for standardization"

STANDARDS

WHICH PRODUCTS ARE LEAST STANDARDIZED?

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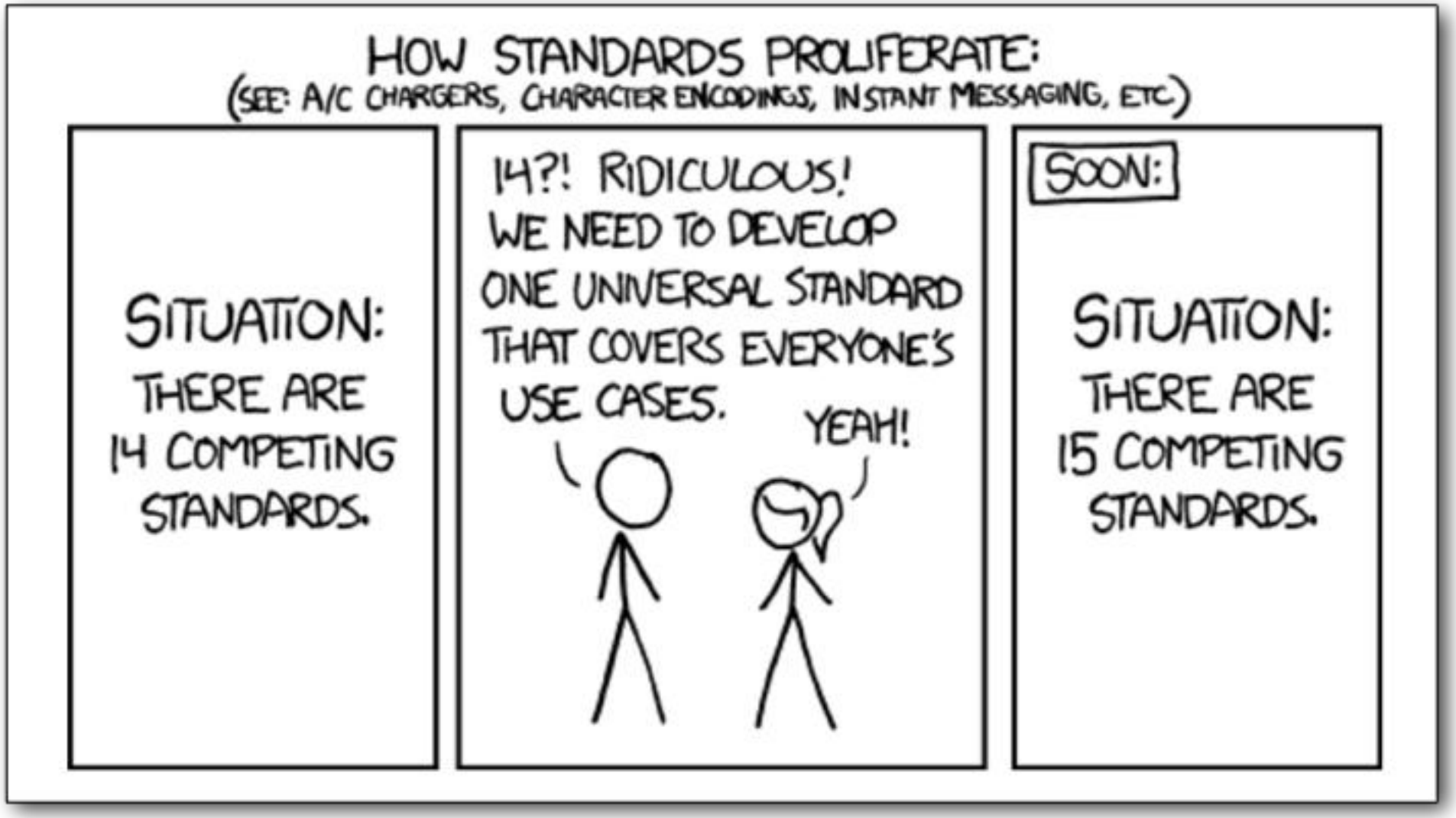
Standards at the expense of performance optimization, uniqueness, personality…

STANDARDS VS. MODULARITY

- Between modules in the supply chain there always are interfaces
  - Harddisk and processor
  - Between trainwagons, between rain and rails
  - Ipod and iTunes
  - …
- Almost always these interfaces are standardized
  - ‘Mais il y a la manière’
  - How widely applicable?
    - *inhouse-only, subset of industry, industry-wide…*
  - How are these defined?
    - *In consensus, by a leader, after a war*


HOW STANDARDS PROLIFERATE:
(SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC.)
SITUATION:
THERE ARE
14 COMPETING
STANDARDS.
14?! RIDICULOUS!
WE NEED TO DEVELOP
ONE UNIVERSAL STANDARD
THAT COVERS EVERYONE'S
USE CASES.
YEAH!
SOON:
SITUATION:
THERE ARE
15 COMPETING
STANDARDS.

STANDARDS AND NETWORK EFFECTS

WHAT TRIGGERS STANDARDS BATTLES, AND WHAT ARE THE OUTCOMES?

- Are two (or more) businesses or business ecosystems vying for dominance?
- How important are network effects?

- Tipping
  - "fight to death"
- Truce
  - Convergence
  - Comprise
- Two (or more)
  - No tipping
  - Duopoly or oligopoly

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BUSINESS ECOSYSTEMS

Sectors, industries, & markets

Supply chains & value chains

Standards

Network effects & economies of scale

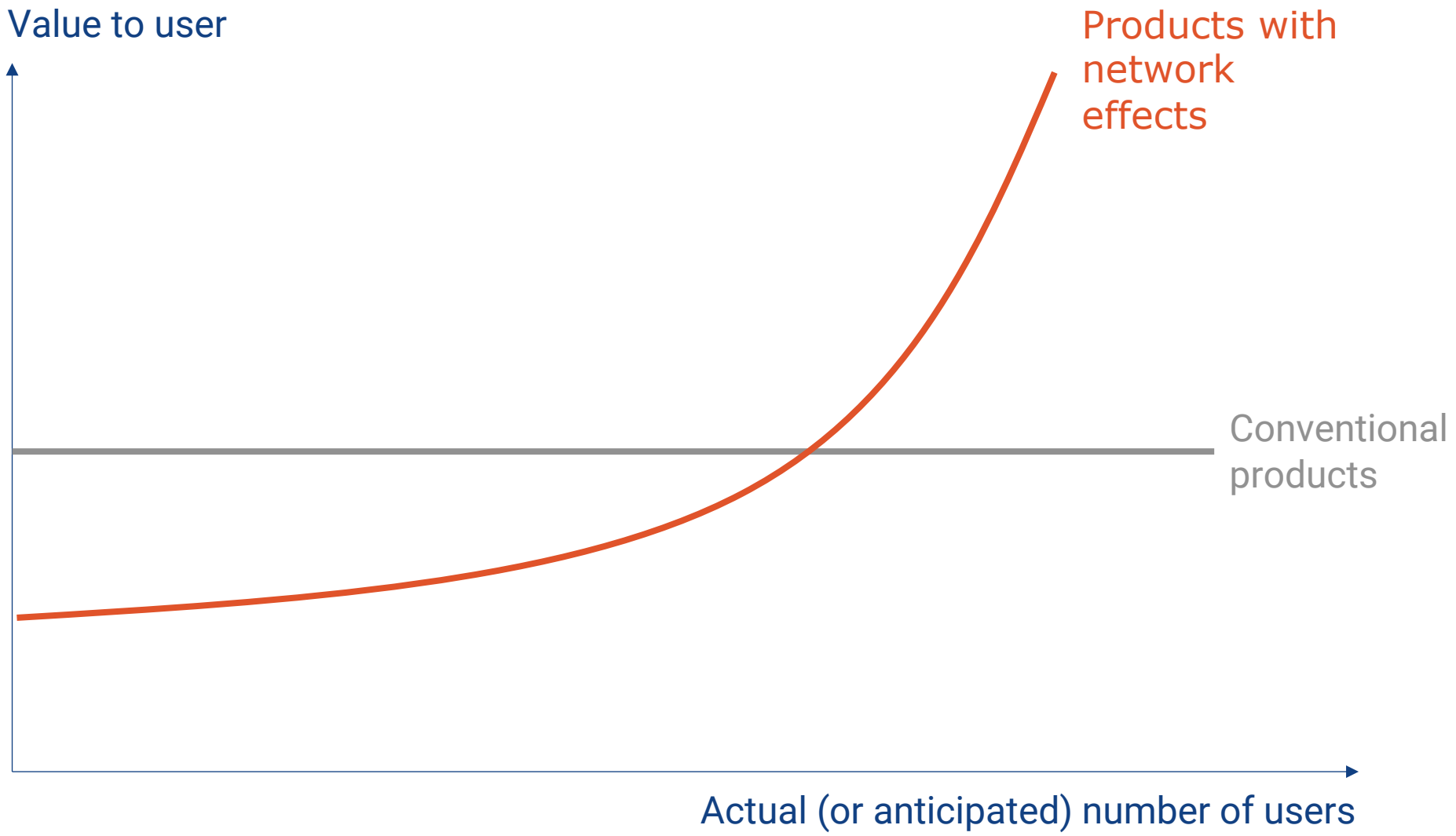
Business ecosystem actors

Regional clusters

NETWORK EFFECTS

DIRECT NETWORK EFFECTS

CUSTOMER



Products with network effects.

NETWORK EFFECTS

DIRECT NETWORK EFFECTS

CUSTOMER

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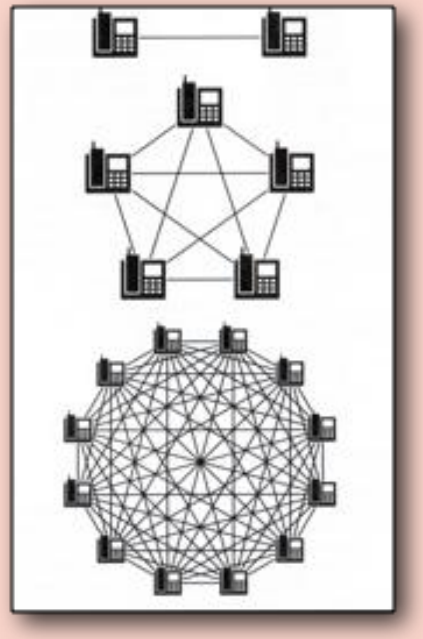
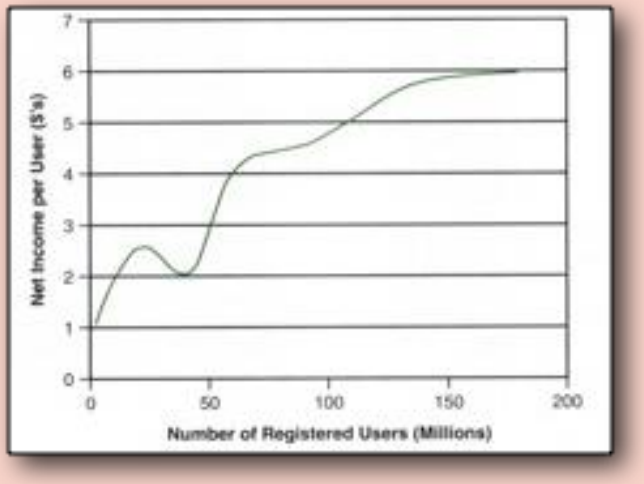
NETWORK EFFECTS

DIRECT NETWORK EFFECTS

CUSTOMER

- I derive value from others using the product
- Metcalfe's law
  - The value of a network goes up as the square of the number of users
    - *10 users => $100; 100 users => $10.000*
  - -> Value of product increases with (anticipated) number of users
- Apply to technologies where interaction or compatibility are important
  - Communication: phones, e-mail, internet, PDF, Facebook
- Network Effects and monopolies and standards
  - Strong network effects lead to monopolies (facebook, MS office) or standards (phones, fax, email, www...)
  - Central argumentation by Bell Telephone to receiving monopoly on US telephone services. In 1908 there were over 4000 local and regional telephone exchanges.





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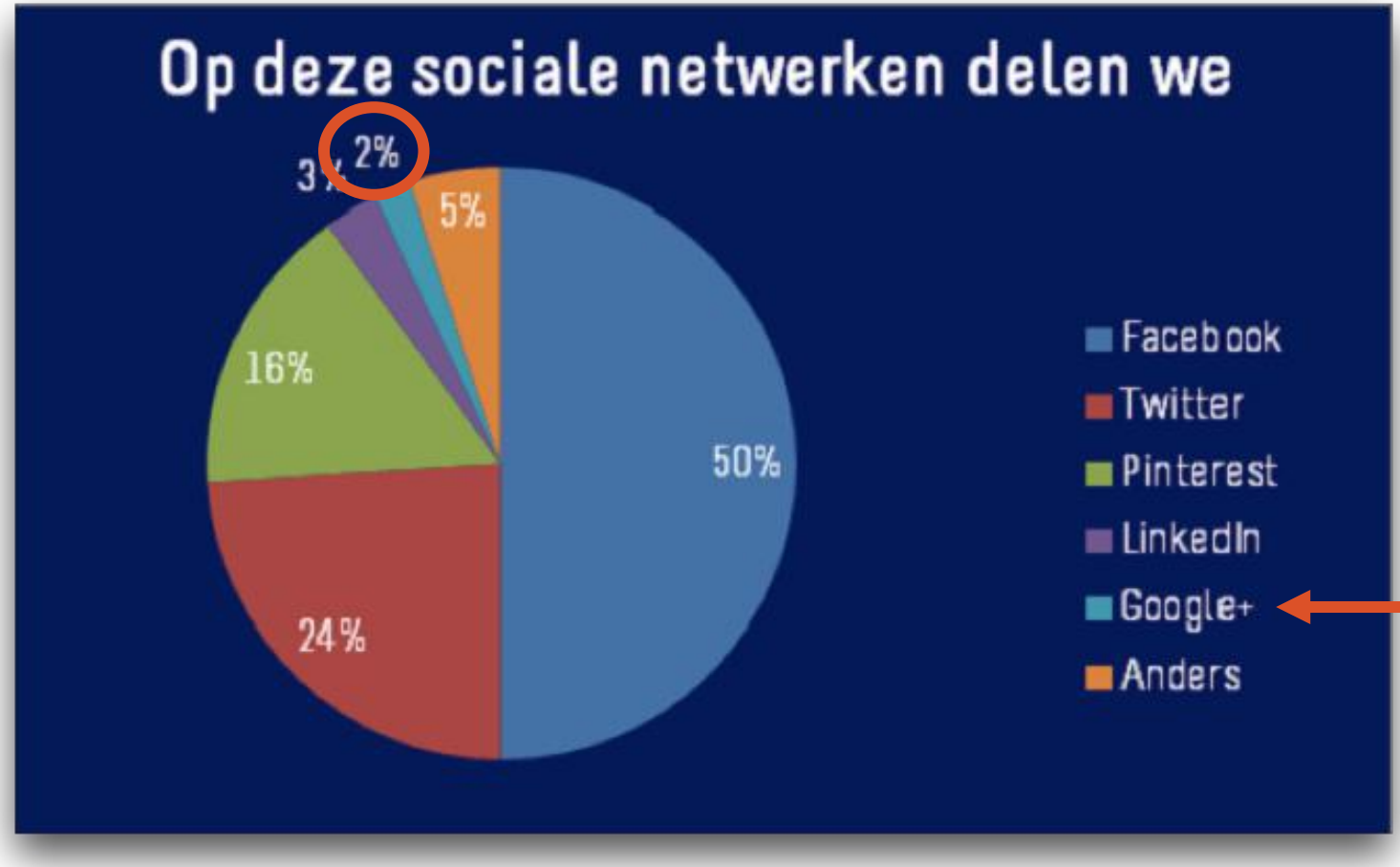
NETWORK EFFECTS

Nobody beats network effects…

EXAMPLE: GOOGLE PLUS

CUSTOMER



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“

Do products with negative (direct) network effects exist?

”

NETWORK EFFECTS

NEGATIVE (DIRECT) NETWORK EFFECTS

CUSTOMER

- The n+1 person decreases the value of a network if additional resources are not provided.
- Usually related to
  - Limits to resources
  - Limits to capacity
  - The connection that overloads the freeway, competition for bandwidth
  - Status goods

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NETWORK EFFECTS

INDIRECT NETWORK EFFECTS

- Indirect, lagged effects
- Supply of complementary goods and services (by third parties and by company) develops only if there is sufficient installed base
- Complementary products
  - Software for OS
  - Games for console
  - VHS movies
- Critical mass, economies of scale
  - Local service offering, 24h support, language support...
- Apply more often than direct effects, but are less severe

NETWORK EFFECTS

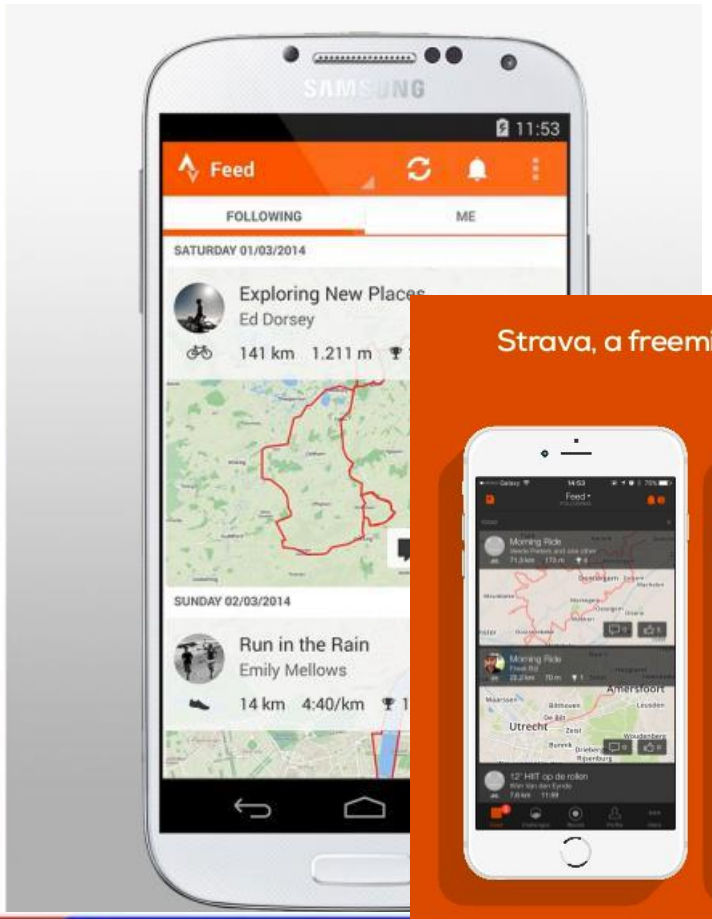
TWO-SIDED NETWORK EFFECTS

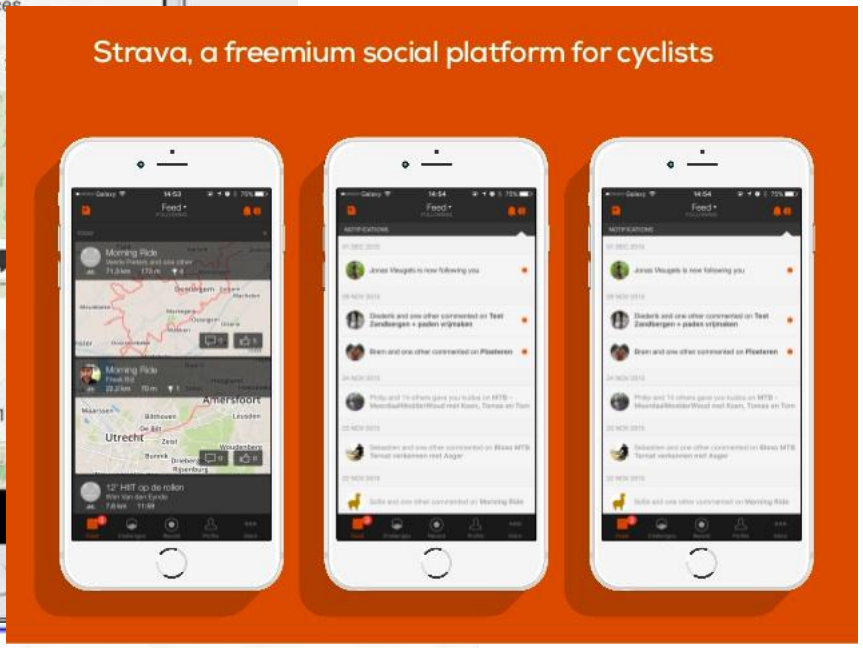
- Economic platforms having two distinct user groups that provide each other with network benefits.
  - Credit cards (cardholders and merchants)
  - Operating systems (end-users and developers)
  - Travel reservation services (travelers and airlines)
  - Yellow pages (advertisers and consumers)
  - Video game consoles (gamers and game developers)
  - eBay
- Particularly useful for analyzing the chicken-and-egg problem of standards battles,
  - See competition between VHS and Beta.
- Useful in explaining many free pricing or "freemium" strategies where one user group gets free use of the platform in order to attract the other user group.
  - Connected to business model (see later)

NETWORK EFFECTS

FREEMIUM EXAMPLE: STRAVA

CUSTOMER





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LOCK-IN & SWITCHING COSTS

- **Switching Costs** are the costs associated to a switch. These can be orders of magnitude larger than costs of a new product.
- The resilience of a standard depends a/o on the Switching Costs.
  - Google search to Bing; Ford to Volkswagen: no switching cost
  - The total cost of installing an ERP system is up to eleven times greater than the purchase price of the software
    - *infrastructure upgrades, consultants, retraining programs…*
  - Change side of the road on which you're driving…
- Switching Costs can be so large that switching is virtually unthinkable: **'lock-in'**
- Types of lock-in
  - Contractual commitment
  - Durable equipment and aftermarkets
  - Brand-specific training
  - Information and databases
  - Specialized suppliers
  - Search costs
  - Loyalty programs

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(DIS) ECONOMIES OF SCALE

ECONOMIES OF SCALE

- **Economies of scale** = **cost advantages** due to expansion.
- Factors that cause cost per unit to fall as output increases:
  - Operations: size of a facility and usage levels of other inputs increase.
  - Purchasing: bulk buying of materials through long-term contracts
  - Managerial: increasing the specialization of managers
  - Financial: lower-interest charges when borrowing from banks access to greater range of financial instruments
  - Marketing: spreading cost of advertising over greater range of outputs, volume buying
  - Technological: taking advantage of returns to scale in production; R&D Department
  - Service offering
- Also related to the **learning curve**
  - New skills or knowledge can be quickly acquired initially, but subsequent learning becomes much slower.
  - Slope of the learning curve represents the rate in which learning translates into cost savings.

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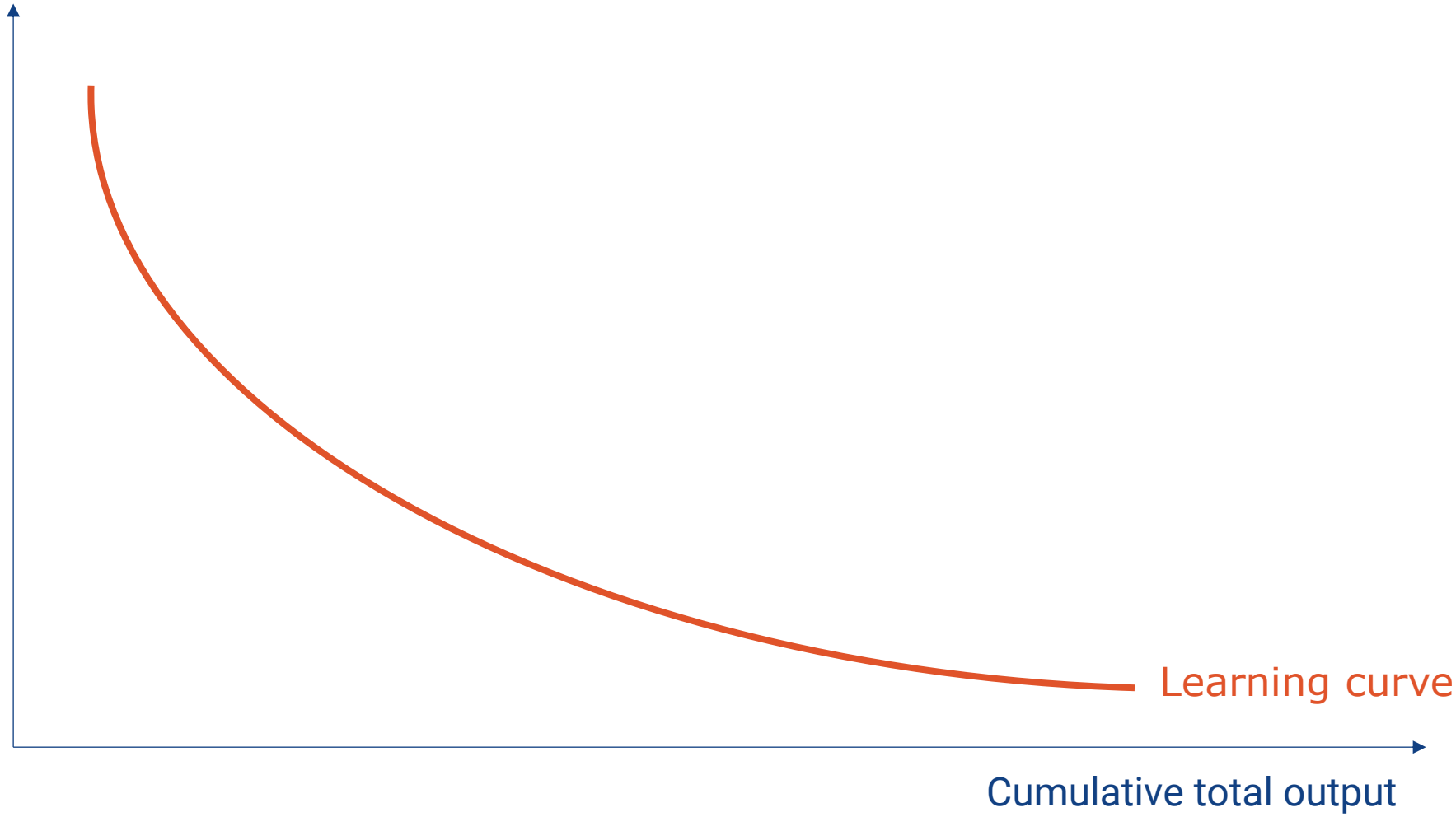
(DIS) ECONOMIES OF SCALE

THE LEARNING CURVE

SUPPLIER



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(DIS) ECONOMIES OF SCALE

DISECONOMIES OF SCALE

- **Cost increase** / **efficieny decrease** due to size
- Sources of diseconomie of scale (wikipedia)
  - Cost of communication
  - Duplication of effort
  - Office politics
  - Isolation of decision makers from results of their decisions
  - Slow response time
  - Inertia (unwillingness to change)
  - Cannibalization
  - Large market portfolio
  - Inelasticity of Supply
  - Public and government opposition

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BUSINESS ECOSYSTEMS

Sectors, industries, & markets

Supply chains & value chains

Standards

Network effects & economies of scale

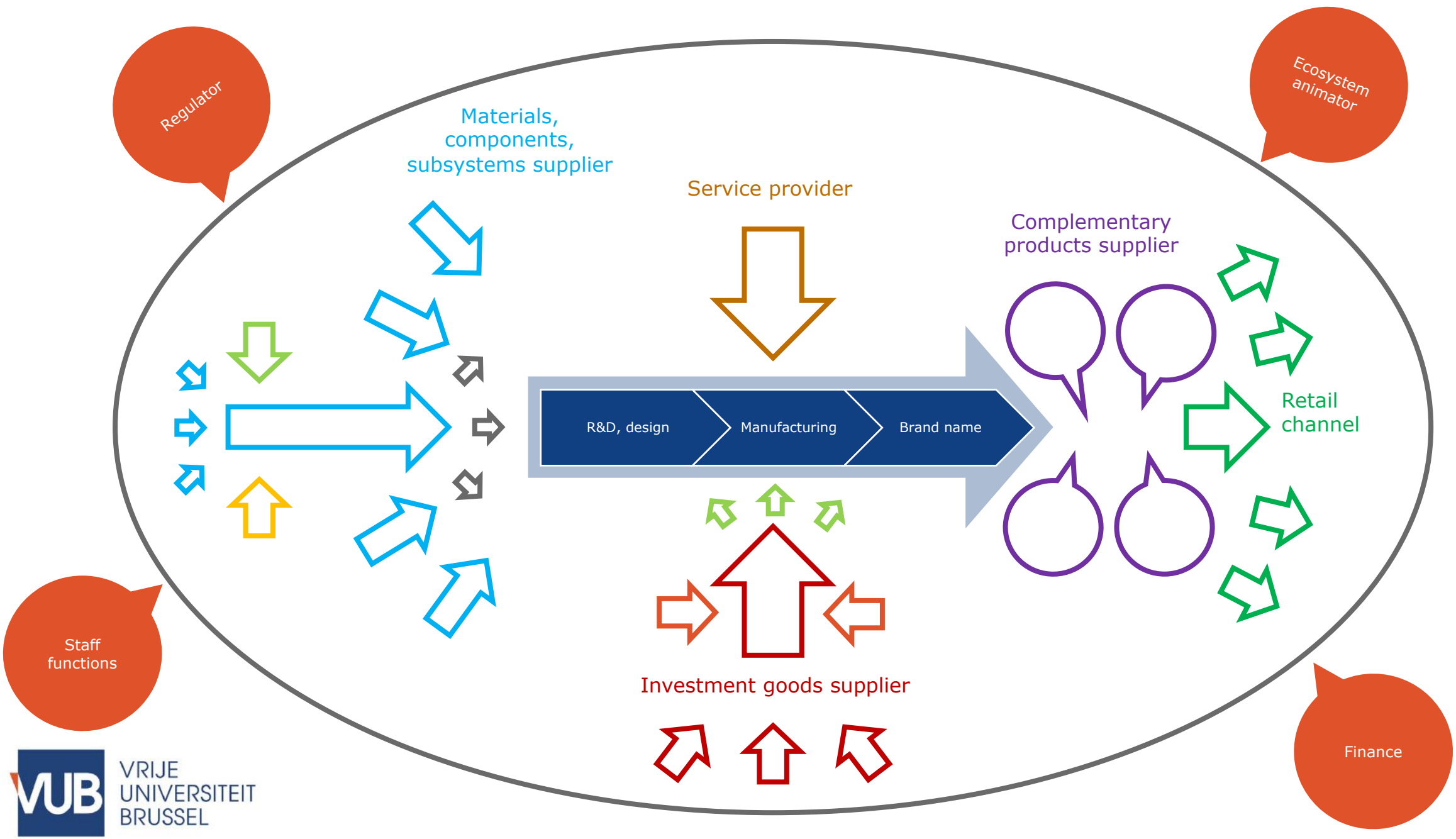
Business ecosystem actors

Regional clusters

> A business ecosystem is the alignment structure of the multilateral set of partners that need to **interact** in order for a focal **value** proposition to materialize.

Adner

2017



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BUSINESS ECOSYSTEM ACTORS

OVERVIEW OF ACTORS

- Materials, Components, subsystems
  - ExxonMobil Chemicals, Intel, Softkinetic...
  - Excellence; value proposition; permanent innovation
  - Recurring business;
  - Can be critical cost element
- R&D/Design, Manufacturing, Brand name
  - Are the end-user product suppliers
  - Can outsource part of activity

    Pharma & Biotech, Apple & Foxconn
- Investment goods supplier
  - Trinean, BEST sorting, IBM...
  - Integrators: width of expertise
  - Innovation, value proposition, service & support
  - Long sales cycle
- Services supplier
  - Banks, shops, consultants, transport...
  - Some services are recurring , others are project-based -> impact on sales effort
  - People-related, therefore hard to scale
  - Often low startup costs
- Retail channel
  - Final steps to end-user
  - Many ways to fulfill this function
- Complementary products suppliers
  - Apple: software/apps, digital content,...
- Ecosystem animator
  - Microsoft & Windows community
- Regulator
  - Governments, standards bodies
  - Gov't plays variety of roles in ecosystem: lawmaker, policymaker, investor, ...
- Staff functions
  - Consultants
  - Trade shows, conferences & seminars...
  - Professional press, journalists, industry experts, opinion leaders
  - Standarisation bodies
- Finance
  - Banks, investors, subsidies...

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BUSINESS ECOSYSTEM ACTORS

GOVERNMENT

- Governments can play key enabling and/or inhibiting roles in ecosystems
- Guarantor/supplier of core societal functions
  - Rule of law
  - Education
  - Financial stability
  - Mobility
  - Infrastructure
  - ...
- Regulator
  - Genetically modified organisms
  - Patent regulation
  - Standards
  - ...
- Initiator
  - VIB, IMEC, GIMV
  - GSM standard
  - Military
  - Support for Venture Capital
  - Support for Research and Development
  - ...
- The Belgian situation…
  - Flanders
  - Brussels
  - Wallonia
  - Federal
  - Europe

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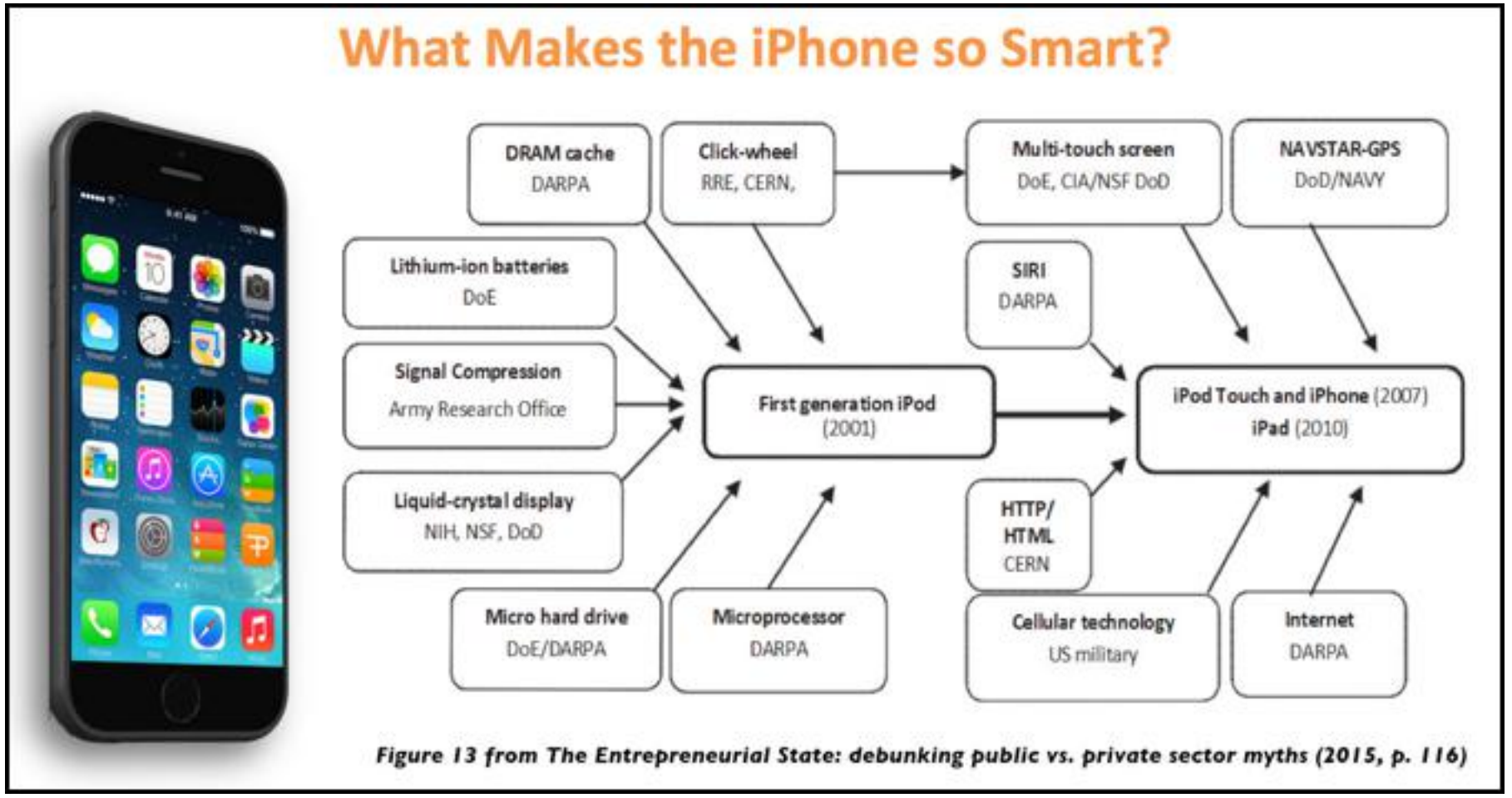
BUSINESS ECOSYSTEM ACTORS

REGULATOR EXAMPLE



The (often) paramount role of Government.

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BUSINESS ECOSYSTEM ACTORS

FLEMISH GOVERNMENT BEFORE 2016…

- Elk jaar zet het **Agentschap Ondernemen** meer dan 200 miljoen euro aan subsidies in voor de versterking van het economisch weefsel en duurzame tewerkstelling.
  - http://www.agentschapondernemen.be/themas/subsidies
- **IWT**, het agentschap voor innovatie van de Vlaamse overheid, Stimuleert door financiële steun, advies en coördinatie, Kennisopbouw in bedrijven, onderzoeksinstellingen, overheid en overige organisaties, Voor meer innovatie, meer nieuwe producten, processen, diensten en concepten, Met toegevoegde economische en maatschappelijke waarde.
  - http://www.iwt.be/
- **FWO** Fonds voor Wetenschappelijk Onderzoek ondersteunt fundamenteel wetenschappelijk onderzoek, stimuleert internationale samenwerking en pleit voor gelijke kansen.
  - http://www.fwo.be/nl/
- **PMV** investeert in het economische weefsel van Vlaanderen. Het bedrijf verleent ook financiële hefbomen wanneer de markt ondersteuning nodig heeft en noodzakelijke privé-initiatieven achterwege blijven. De klemtoon lig daarbij in het bijzonder op duurzame energie, biotech, cleantech, levenswetenschappen en infrastructuur voor de toekomst.
  - http://www.pmv.eu/nl

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BUSINESS ECOSYSTEM ACTORS

FLEMISH GOVERNMENT AFTER 2016…

AGENTSCHAP INNOVEREN & ONDERNEMEN

Vlaanderen is ondernemen

- **Agentschap Innoveren & Ondernemen** is hét aanspreekpunt van de Vlaamse overheid voor alle ondernemers in Vlaanderen.
- We stimuleren en ondersteunen innovatie en ondernemerschap en dragen bij aan een gunstig ondernemersklimaat.
- Focus op:
  - stimuleren van groei en innovatie, door ondernemingen financieel te ondersteunen via subsidies om te kunnen groeien, transformeren of innoveren.
  - het bevorderen van ondernemerschap. We werken samen met sterke partners die kmo's kunnen begeleiden van (pre)start tot overname. We ondersteunen ook netwerking gericht op groeibedrijven.
  - het ondersteunen van clusters .We steunen organisaties die samenwerking en dynamiek op gang brengen binnen een groep van ondernemingen en kennisinstellingen.
  - en het bevorderen van omgevingsfactoren; We faciliteren o.a. de ontwikkeling van bedrijventerreinen en het voorzien van adequate bedrijfshuisvesting.
  - Via één geïntegreerd loket leggen we de brug naar sterker ondernemerschap.
- Wie onderneemt moet elke dag een beetje innoveren en elke bedenker van een idee weet dat een ondernemende houding onontbeerlijk. **Daarom bundelden Agentschap Ondernemen en IWT de krachten voor bedrijven in Vlaanderen**.
- subsidie databank Vlaamse overheid
  - http://www.vlaio.be/subsidiedatabank

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BUSINESS ECOSYSTEM ACTORS

FLEMISH GOVERNMENT AFTER 2016…

- Het FWO ondersteunt fundamenteel en strategisch wetenschappelijk onderzoek
  - Het FWO financiert excellente en beloftevolle onderzoekers en onderzoeksprojecten na een interuniversitaire competitie. Binnen- en buitenlandse experten staan in voor de evaluatie.
  - De selectie gebeurt volgens een bottom-up principe en verloopt interuniversitair.
- Het FWO stimuleert internationale samenwerking en pleit voor gelijke kansen
  - Het FWO stimuleert internationale samenwerking en bevordert internationale mobiliteit door onderzoekers de kans te geven ervaring op te doen te midden van of samen te werken met internationale onderzoeksgroepen of door onderzoekers uit het buitenland aan te trekken.
- Vanaf begin 2016 neemt het FWO de fakkel over van het IWT voor de oproepen Strategisch Basisonderzoek (SBO) en Toegepast Biomedisch onderzoek met primair maatschappelijke finaliteit (TBM).

fwo Opening new horizons

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BUSINESS ECOSYSTEM ACTORS

REGULATOR EXAMPLE BRUSSELS

- Wat doen we? Wij informeren, oriënteren en begeleiden u in een hele reeks domeinen zoals de opstart van een bedrijf, de financiering, innovatie, stedenbouw, milieu, internationale partnerships... en dat via nieuwsbrieven, portaalsites, seminaries of individuele coaching.
- Kortom, wij stellen u een heel ecosysteem voor waarin u als ondernemer kan groeien !
- http://www.abe-bao.be/nl
- subsidiedatabank www.ecosubsibru.be/index.cfm?language=NL
- Innoviris is het Brussels Instituut voor wetenschappelijk onderzoek. Het instituut heeft als taak onderzoek, ontwikkeling en innovatie te ondersteunen en te stimuleren via de financiering van vernieuwende projecten van Brusselse ondernemingen en onderzoekscentra.

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impulse.brussels never stop asking

innoviris.brussels empowering research

BUSINESS ECOSYSTEM ACTORS

STAFF FUNCTIONS EXAMPLE BIOTECH

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Biotech staff functions.

BUSINESS ECOSYSTEM ACTORS

YOUR PLACE IN THE ECOSYSTEM

- You almost never can provide the whole product on your own
  - There are exceptions...
    - *Google, Facebook, eBay... (Don't underestimate their core assets! (see later))*
    - *Standard Oil, IBM in the 60's came very close*
  - Full vertical integration = covering the full supply chain
    - *From raw material to customer services*
- Different roles are possible
  - Architect or module in the supply chain or ecosystem? Both can be realistic strategies, much depends on sector. Some examples:
    - *Trinean: Full solution for biomedical lab analysis instead of just the reader component ('it's better to sell one copy at 100,000 euro than 1,000 at 100')*
    - *Intel: component -> subsystem*
  - Alternatives must be considered closely
  - We will see later that keeping your options open might be a sensible approach
- Role in ecosystem generally impacts many aspects:
  - Competitive position; capital needs; minimum size; scalability...

BUSINESS ECOSYSTEMS

Sectors, industries, & markets

Supply chains & value chains

Standards

Network effects & economies of scale

Business ecosystem actors

Regional clusters

REGIONAL CLUSTERS

EXAMPLES

- Mythical
  - Silicon Valley
  - Hollywood
- Massive
  - a narrow belt in the US. northeast and the eastern part of the midwest dominated US manufacturing up until the mid fifties
  - 64 percent share of manufacturing employment
- Unnoticed
  - Sialkot's stainless steel cluster in Pakistan, together with Tuttlingen in Germany dominate the world surgical instrument market
  - 30 export oriented clusters in Portugal
    - *Ranging from ornamental stones in Evora to horticulture in Faro*
- In Belgium
  - Biotech and pharma
  - Petrochemical
  - Diamond trade
  - Car manufacturing
  - Government…

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“Regional clusters are subsets of a business ecosystem connected to a specific region or area.”

REGIONAL CLUSTERS

ABOUT REGIONAL CLUSTERS

- Factors that trigger the emergence of clusters
  - local demand
  - prior existence of supplier industries
  - natural resources
  - innovative firms
  - chance events.
- Once a cluster is formed a self-reinforcing cycle promotes its growth
  - support of local public and private institutions
  - initial transitory advantages get "locked in" within the cluster
  - Tipping point
  - agglomeration economies attracting new specialized firms to locate within the cluster and gain from increasing returns to scale

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REGIONAL CLUSTERS

CHARACTER-ISTICS

- Critical mass
  - The existence of a large pool of individuals with specialized skills
    - *reduced search and hiring costs*
    - *requisite quality skill set is easily available*
    - *individuals with skills are attracted to the cluster*
  - The existence of firms providing specialized inputs
- Dynamics
  - High levels of technological spillovers and innovation due to proximity
    - *since information flows are easier locally than over distances.*
  - existence of sophisticated buyers
  - access to specialized suppliers gives high levels of flexibility and are able to implement innovations more rapidly
  - high levels of competition and peer pressure within the cluster act as an important stimulus for innovation.
- Trust and the related concept of social capital
  - deals in valuable diamonds are sealed by a handshake on the diamond exchange
  - when trust breaks down, unwritten rules must be codified and third parties brought in to resolve differences.
- Under certain conditions clusters slow technological innovation
  - resource diseconomies
  - insular competitive practices
  - lock-in in ageing technology

REGIONAL CLUSTERS

BIOTECH CLUSTERS

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REGIONAL CLUSTERS

BIOTECH CLUSTERS

Scientific excellence

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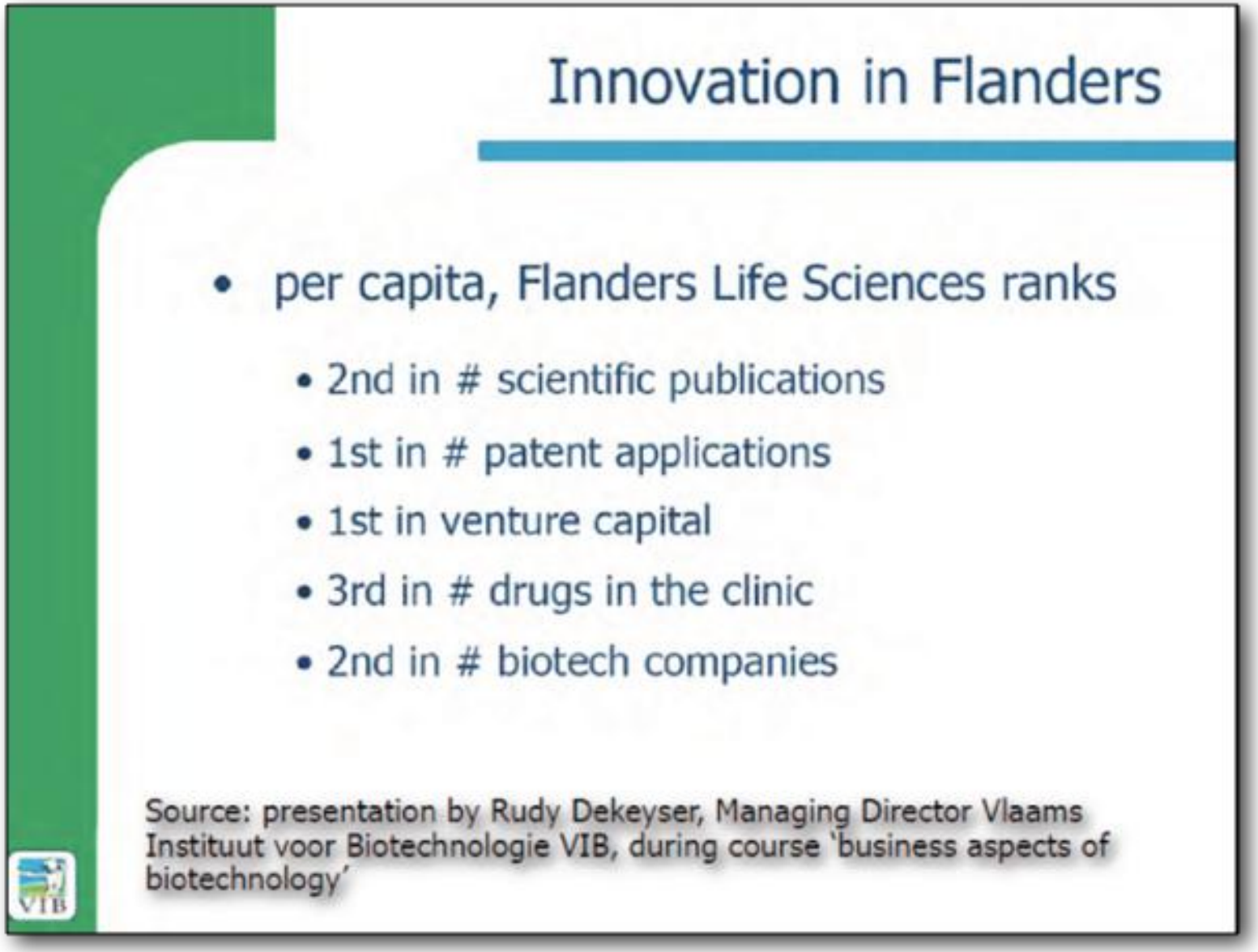
BIOTECH CLUSTERS



REGIONAL CLUSTERS

BIOTECH CLUSTERS

Life Sciences Companies

3WIN, Ablynx, ActoGenix, Agristeps, Alco Bio Fuel, Algist Bruggeman, Alphastemcource, AlzProtect, Amakem, Amgen, AnaBioTec, Anaïs, apDia, Apitope International, Applied Maths, Aptec Diagnostics, Aquafin, Arcarios, Arcom Scientific, Arenco Pharmaceutica, arGEN-X, Artelis, Astra Zeneca, Avecom, Barry Callebaut, Bayer BioScience, Becton Dickinson Benelux, Beljot, BENEO, Beta-Cell, Better3Fruit, Bio-line, Bio-Merieux Benelux, Bio-Plus services, BioActor, Biocartis, Biochem-Europe/Enzybel International, Biogastec, Biogazelle, Biogen Belgium, BioMARIC, Bioremediation Europe, Bioro, Biotech Tools, Brabant Biotech, Bruvitro, BSC, Buckman, Cargill R&D Centre Europe (Haubourdin SAS), Cartagenia, Chemcom, Citrique Belge, Cochlear Technology Centre Belgium, Complix, CropDesign, Cryo-Save Labs (Life Sciences), Cypress Diagnostics, D.E.C., Datra Pharma R&D, DCILABS, Deroose Plants, Devgen, Digilab Maia Scientific, EcoSynth, Ecover, EggCentric, Enprotech, Envisan, EPAS, Euroscreen, FersPro, Flen Pharma, FluidDa, FORMAC Pharmaceuticals, Fugeia, Galactic, Galapagos, Genencor international, Genohm, Gentec, Genzyme, Histogenex, Icometrix, Idrabel, In Vitro Plants, InCT, Innogenetics, Innovative Microbial BioProcess, Integrated DNA Technologies, Intellicrops, InvenTox, IVLV, IXSyS, Jalima Pharma, Janssen Pharmaceutica, JSR Micro, Kemin Europe, Kemin Pharma, Kingfisher Healthcare, Landen Pharmachem, Mabcure, MDxHealth PharmacoDx, Medicim, Microfor, Molmo Services, MSD, MUbio, Okapi Sciences, Oleon, Omrix biopharmaceuticals, Oprins Plant, Organic Waste Systems, Oto Therapeutics, Ovizio, Oxyrane Belgium, Peira, Pepric, Pfizer, PharmaDiagnostics, PharmaNeuroBoost, PharmaVize, Previan, ProDigest, Promethera Biosciences, Prometa, Proviron, Puratos, QUINVITA, R.E.D. Laboratories, R.I.C., ReGenesys, reMYND, Roche Diagnostics Belgium, SBAE Industries, SEPS Pharma, SESVanderHave, Shire-Movetis, Silicos, Sita Remediation, SkyScan, Spinnovation Analytical, Syral, Tessenderlo Group, Therabel Pharma, TheraSolve, ThromboGenics, Tibotec, Tiense suikerraffinaderij, TiGenix, Trinean, UCB Pharma, Union Biometrica, Virco, Waterleau Global Water Technology, Wolfsberg, Yakult Honsha European Research Center for Microbiology, Ziscoat

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Flanders biotech clusters…

BELGIAN CHEMICAL INDUSTRY

- Strengths
  - Attractive location at the heart of industrial Europe and the Western European pipeline network
  - Easy access to raw materials and export markets via three seaports: Antwerp, Ghent and Zeebrugge
  - A unique integrated cluster of chemical companies covering the whole value chain
  - Competitive logistical platform with tailor-made storage terminals and distribution platforms
  - Highly-skilled workforce ensures world-class technical expertise for some key products
  - Operational excellence and high safety standards
  - World-class energy efficiency
  - Strong collaboration with universities
  - Unique network between companies, authorities, and customers to implement REACH and CLP
  - Excellence in industrial and academic research and a unique academic and industrial collaborative network
  - A wide choice of science parks with incubation and innovation centres
- **Weaknesses**
  - High energy costs due to cost pass through of public green energy strategies
  - Relatively high labour costs
  - Ageing workforce and quest for new talent

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“

On a per capita basis Belgium is the world’s number one in the sales of chemicals and plastics.

”

cefic

REGIONAL CLUSTERS

SILICON VALLEY

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REGIONAL CLUSTERS

SILICON VALLEY

- Silicon valley stretches over about 100 kilometer between San José and San Francisco
  - “Core” Silicon Valley does not include ssan Francisco
  - Culturally and economically both are closely linked
- Mediterranean climate
- Inhabitants:
  - Silicon Valley 2.44 million
  - San Francisco 750.000
  - Bay Area around 4 million.
- In size and population the greater bay area is in the same order of magnitude as Flanders.

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1800 1850 1900 1950 1970

THE Castro

STANFORD UNIVERSITY
REAL ESTATE
a department of LAND, BUILDINGS & REAL ESTATE

LOCKHEED

IBM

XEROX

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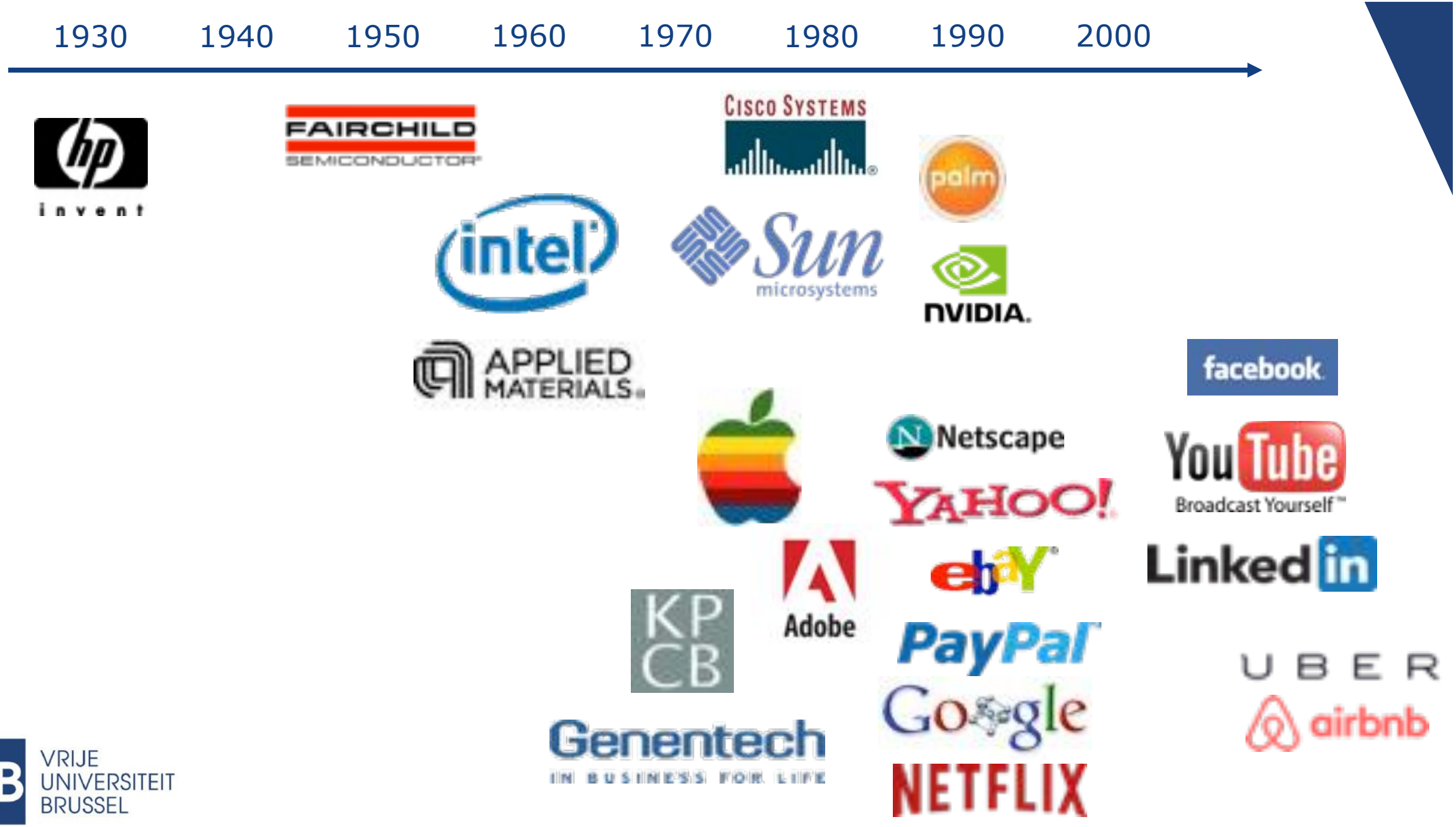

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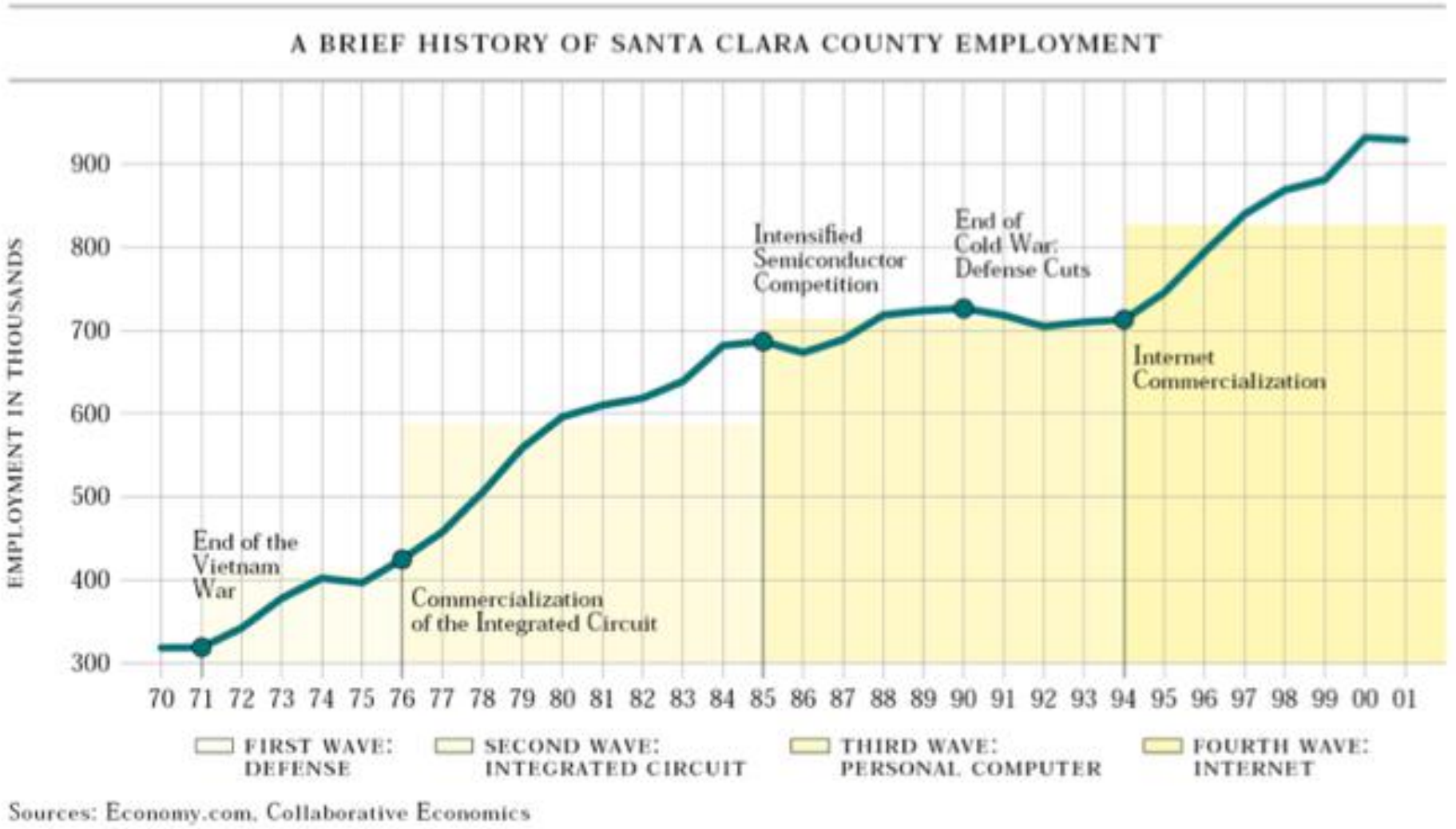
REGIONAL CLUSTERS

SILICON VALLEY



Silicon valley employment.

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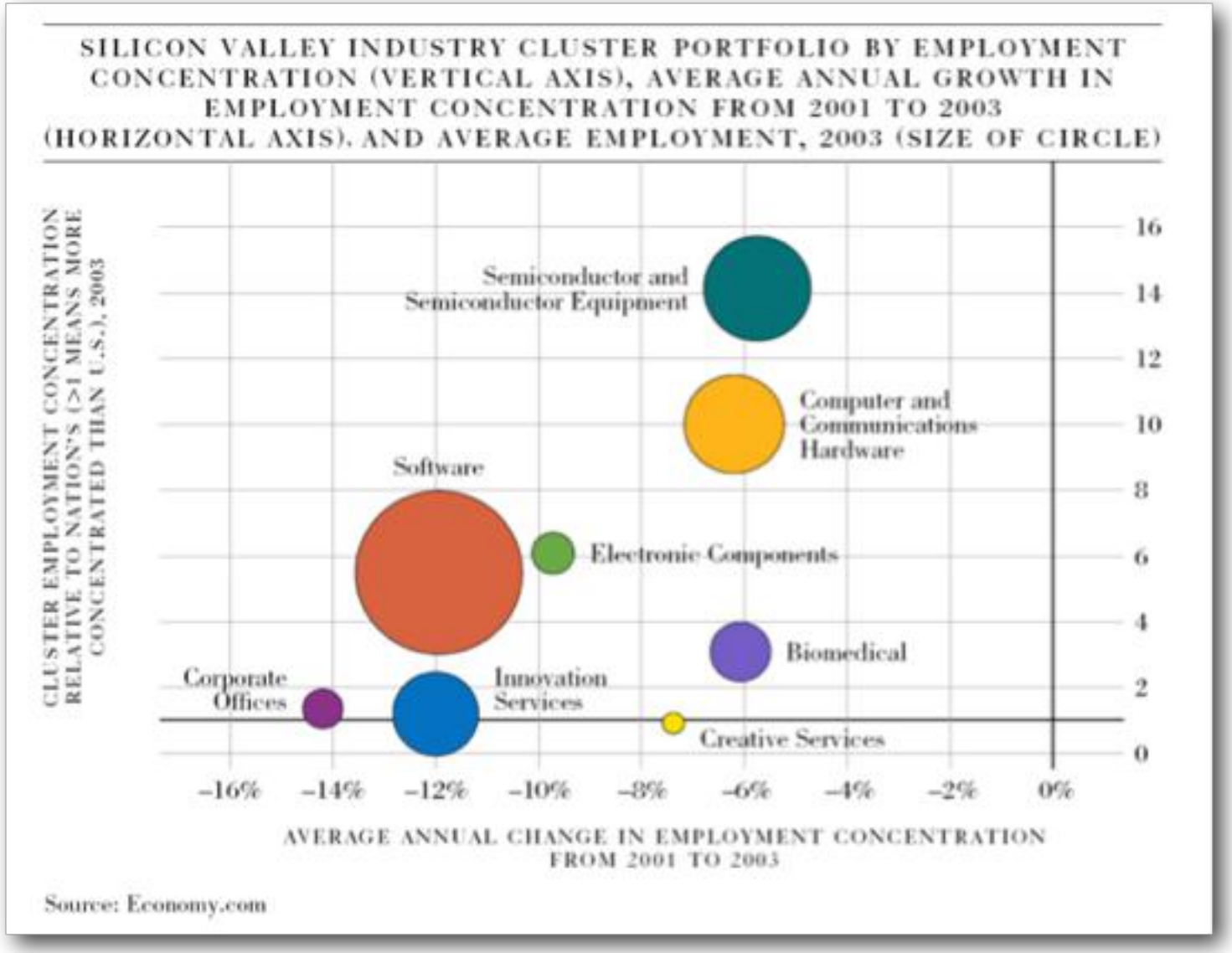
REGIONAL CLUSTERS

SILICON VALLEY



Industry concentration

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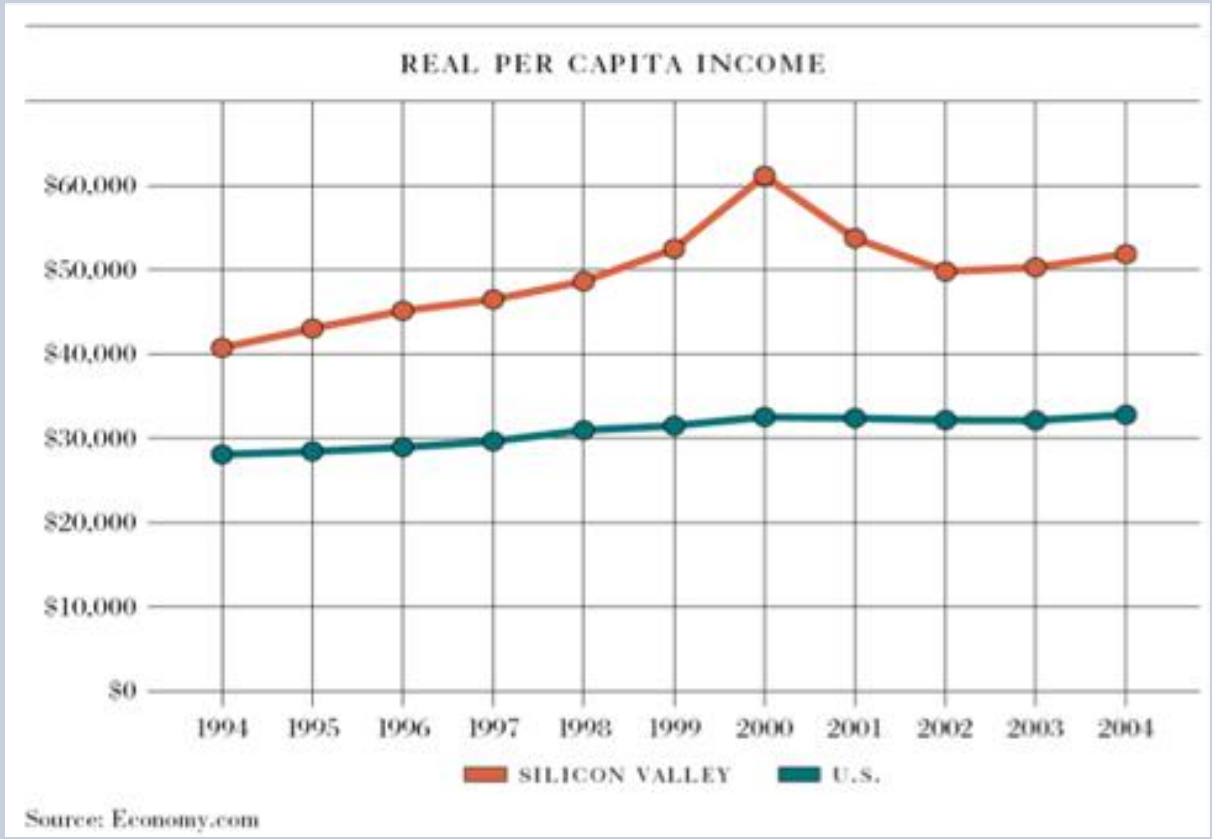
- According to the United States Census Bureau, of the 280 defined metropolitan areas, the San Francisco Bay Area has the highest median household income in the nation with $62,024 (40% above national average).



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- Value added per employee in Silicon Valley's industry clusters is $326,100.
- In 2004, the region's value added is $224,200 per employee
- This is more than two-and-half times US value added per employee

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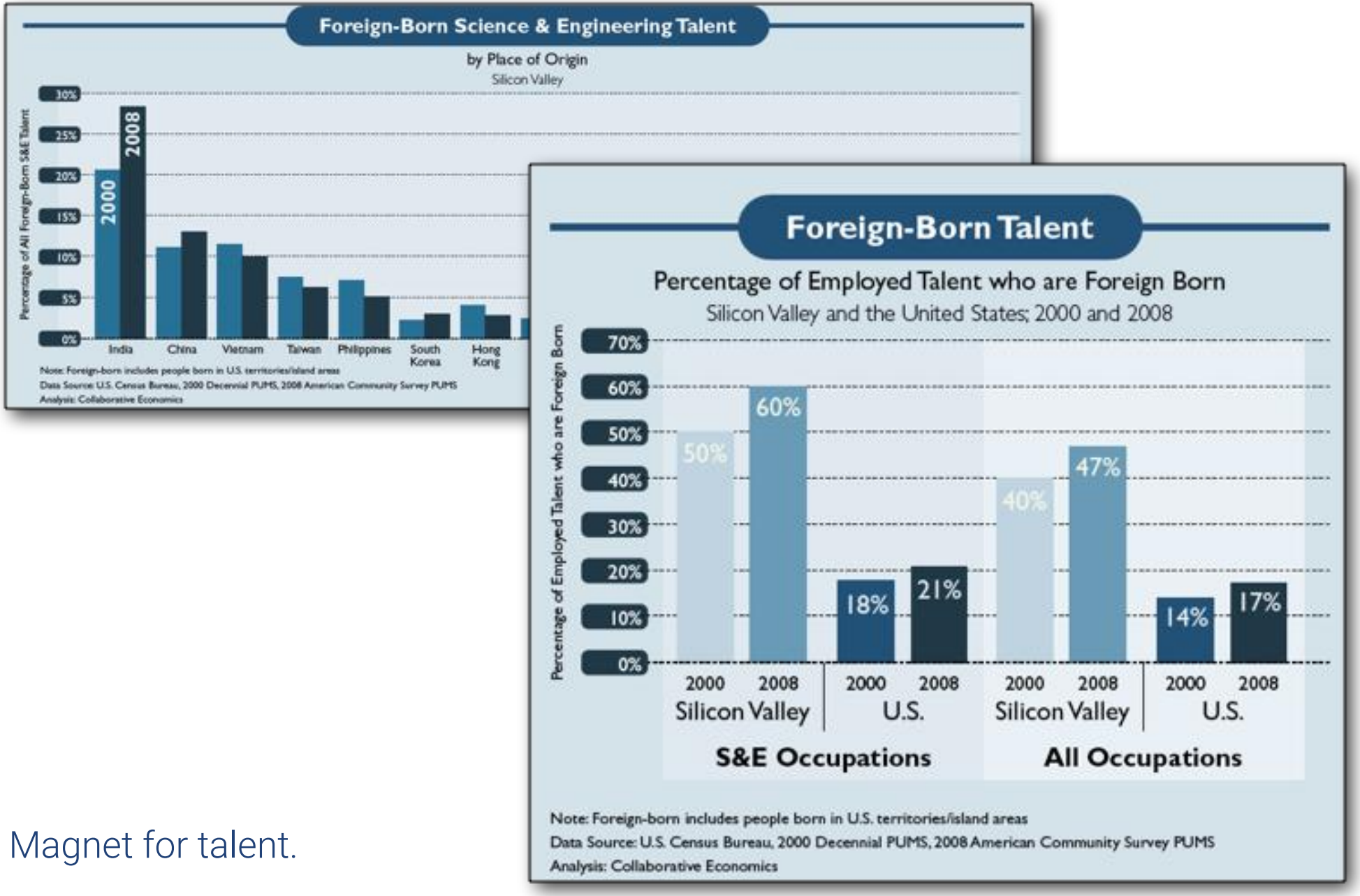
REGIONAL CLUSTERS

SILICON VALLEY



Magnet for talent.

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PERCENTAGE OF THE TOTAL POPULATION WHO ARE FOREIGN BORN

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> Slightly more than 70 percent of men who work in computer, mathematical, architectural, and engineering occupations were born outside of the U.S., mostly in Asia.
>
> Nearly 75% of Silicon Valley women in those professions are foreign born.

IEEE SPECTRUM

Tekla S. Perry

05 Mar 2018

QUESTIONS?

marc.goldchstein@vub.be

Offices

Building M, Room 327

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