Standardointi Strategian Välineenä

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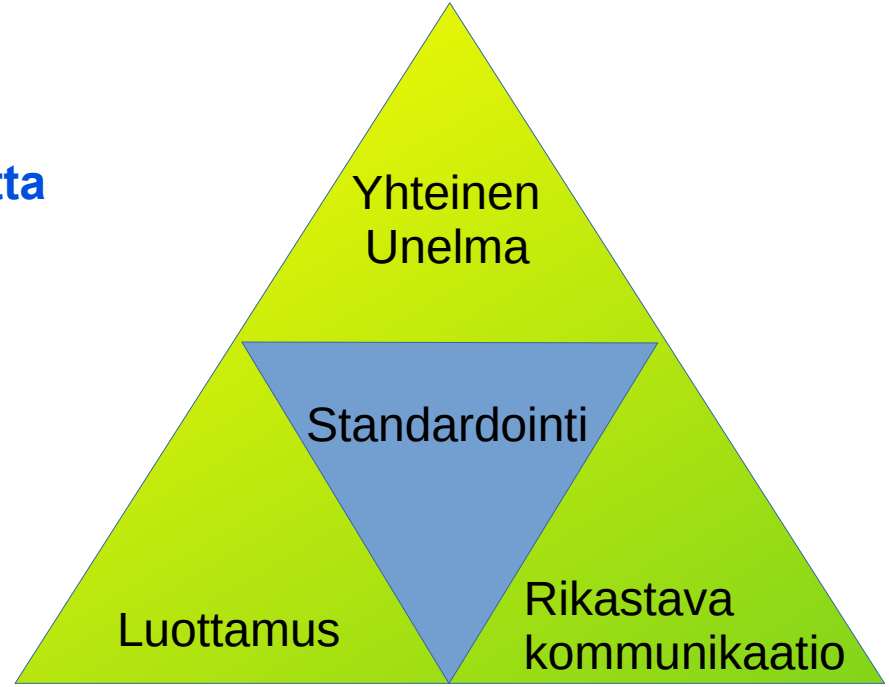
Standardointi, mihin sillä pyritään ?

”Pois epävarmuudesta kohti varmuutta
Pois epärationaalisuudesta kohti rationaalisuutta

Kohdistetaan keskustelu oleelliseen

Tarjoaa paikan ratkaista yhteiset ongelmat ja kysymykset”

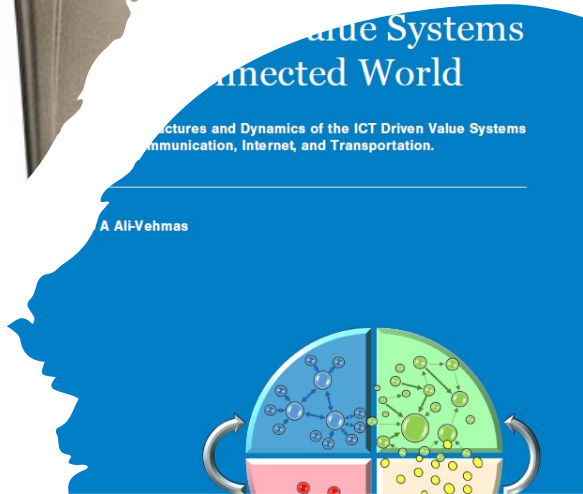


Linuksen laki

Leading Innovation and Compatibility by Standardization

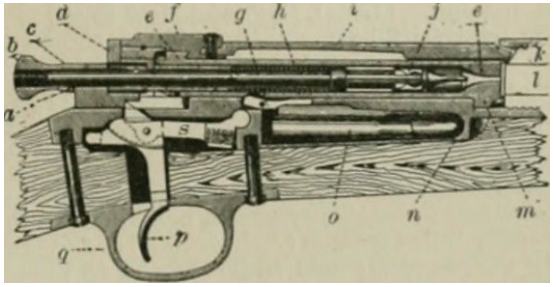
Mitä on standardeilla johtaminen ?

Tasapainoilua kilpailun ja yhteistyön välimaastossa !



Miksi ?

Standardoinnin alkuperäisiä ajatuksia



Ensimmäinen standardoinnin teollinen menestynyt sovellus oli ajatus vaihdettavista osista. (Päämääränä tuotteiden alemmat kustannukset, parempi laatu ja parempi teollinen suorituskyky)

Seuraavassa menestytarinassa syntyi ajatus komplementoivista tuotteista. (Päämääränä syntyvä lisäarvo tuotteiden välisestä yhteensopivuudesta ja verkostovaikutuksista)

- Yhden tuotteen hinnalla syntyy käänteinen vaikutus toisen tuotteen hintaan ja päinvastoin.
- Yhteensopivuus ja yhteentoiminta eri yritysten välillä tuli tarpeelliseksi, jolloin syntyi ajatus ”avoimien rajapintojen” merkityksestä kontrollipisteenä.

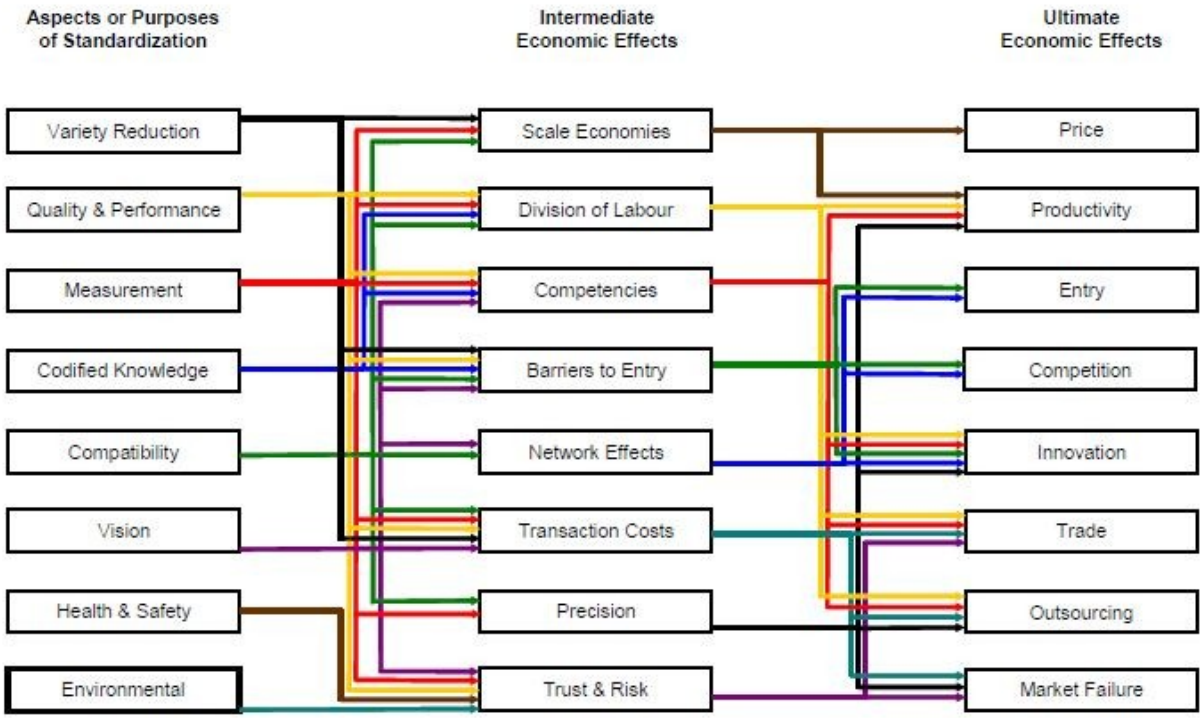
Huomattavaa on, että avoimuuden osatekijät ovat sekä **kaupallisia** että **teknisiä**. Molemmilla voidaan vaikuttaa kilpailuun sekä yhteistyöhön.

Katz and Shapiro 1985

Miksi ?

Standardointi on myös paljon muuta.
Se on ennen kaikkea tehokas työkalu !

Figure 2
Model of Economic Effects of Standardization



Peter Swann 2010

Standardointi on liiankin tehokas työkalu, jossa kaksi terää

Effects of Standards	Positive Effects	Negative Effects	Necessity for Standard to be "Public" ?
Compatibility/ Interface	**Network Externalities**	**Monopoly / Security**	**Monopolization if not Public**
Minimum Quality/ Quality Discrimination	Correction for Gresham's Law*); Reduced Transaction Costs	Regulatory Capture **) "Raising Rival's Costs"	Essentially a Public/ Co-operative Activity
Variety Reduction	Economies of Scale, Building focus and critical mass	Reduced Choice	Not Necessary
Information standards	Facilitates Trade, Reduced Transaction Costs	Regulatory Capture **)	Essentially a Public/ Co-operative Activity

*) Gresham's Law: Bad drives out Good

Peter Swann 2000, 2010

**) Regulatory capture: Some producers may lobby so skillfully that they persuade the regulator to define regulations in the interest of the producers rather than in the interest of the customer (as originally intended).

In a nutshell

- Scale of economy (Cost)
- Speed of adoption (Value)
- Network effects (Multiplier)
- Uncertainties (Discount rate)

Pähkinät eivät kasva viidakossa.

- Standardointi vaatii hyvä hallinnon ja hyvin määritellyt pelisäännöt.
- Erilaiset standardointi-hankkeet vaativat hieman erilaisia pelisääntöjä.

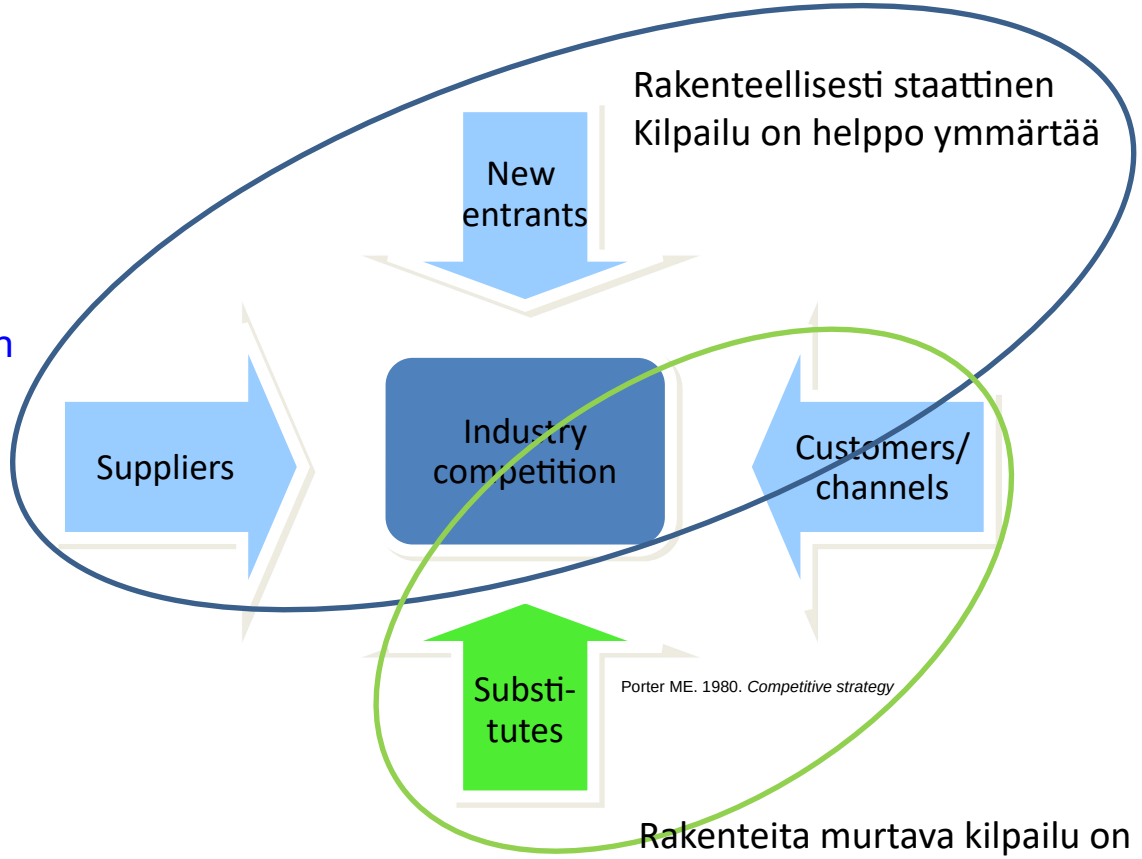
Kilpailun viisi voimaa muokkaavat liiketoiminnan rakenteita

Kilpailun voimista 4 ohjaavat asteittaista kehitystä ja kasvua

- Kilpailu olemassa olevien kilpailijoiden kesken
- Kilpailu arvoketjussa toimittajien kanssa
- Kilpailu arvoketjussa asiakkaiden kanssa
- Kilpailun jatkuminen samanlaisena uusien kilpailijoiden kanssa

1 voima johtaa murrokseen

- Kilpailu olemassa olevan liiketoiminnan korvaavan toimintamallin ja sitä edustavien kilpailijoiden kanssa, missä useimmat aikaisemmat kilpailun pelisäännöt pyritään vaihtamaan uusiin sääntöihin.



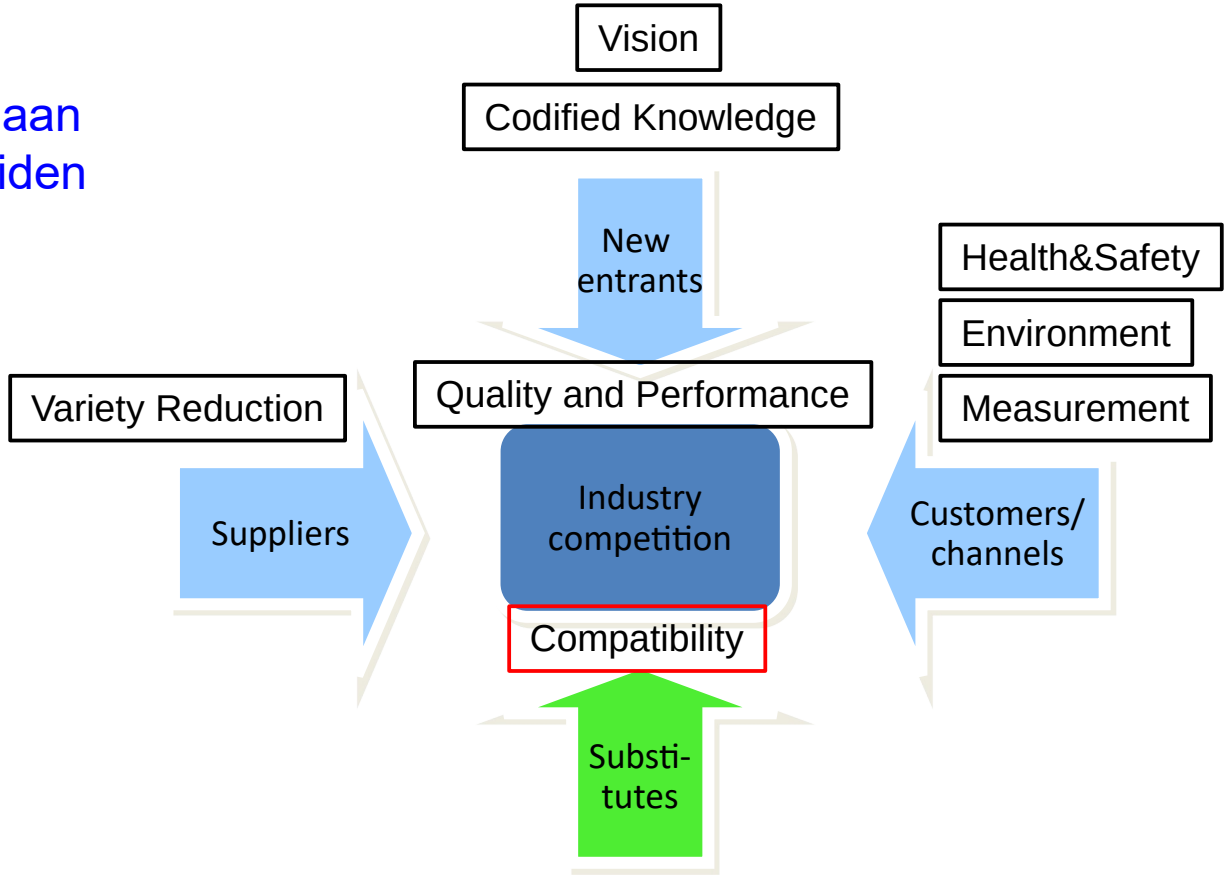
Rakenteita murtava kilpailu on
Usein hyvin VAIKEAA edes hahmottaa

Petit and Teece 2021

Kilpailun pelikirjassa on monta sivua

Kilpailussa standardeilla voidaan auttaa tai vaikeuttaa kilpailijoiden mahdollisuuksia kilpailla

Kilpailun lisäksi yhteistyöllä kilpailijoiden kesken voidaan vaikuttaa liiketoiminnan dynamiikkaan

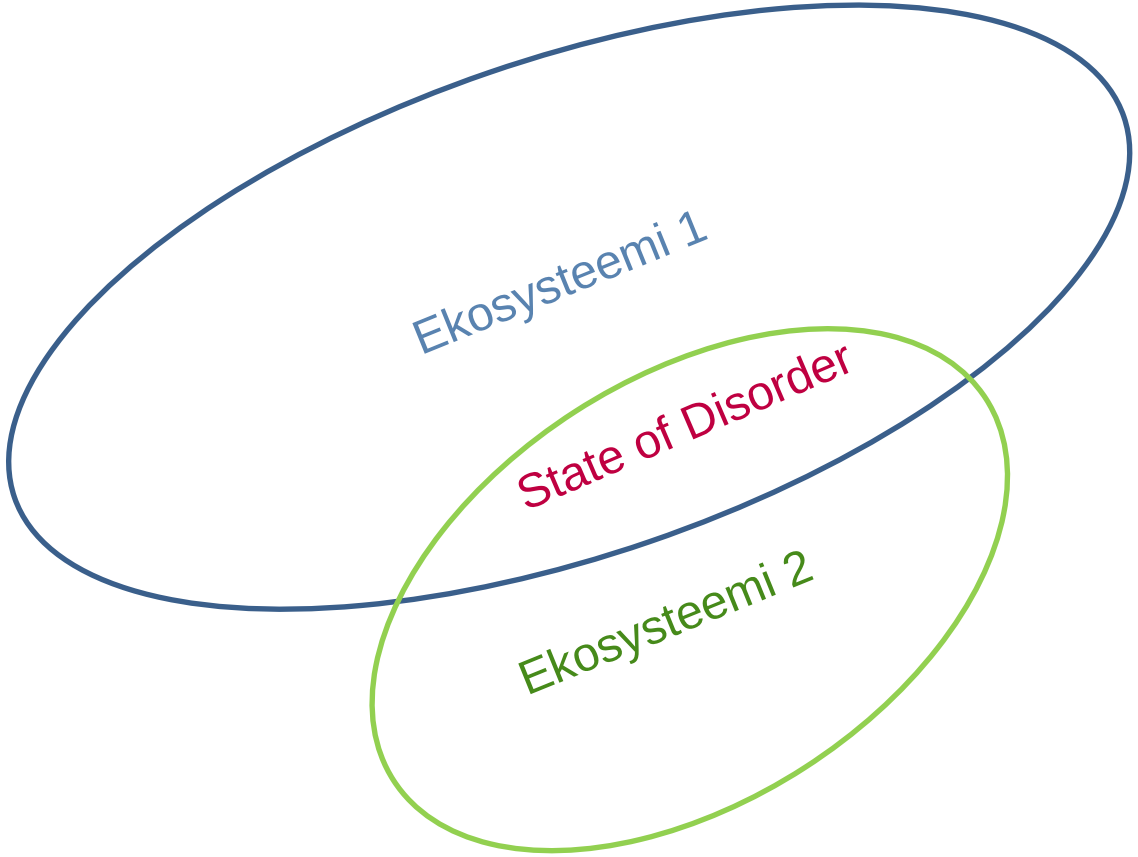


Kilpailun pelikirjassa on monta sivua, mutta tärkein niistä on yhteensopivuus

Yhteensopivuus ja syvällisemmin yhteentoiminta synnyttää, kasvattaa ja murtaa **ekosysteemejä.**

Ekosysteemeillä on omat erilaiset pelikirjat, pelisäännöt, strategiat ja taktiikat.

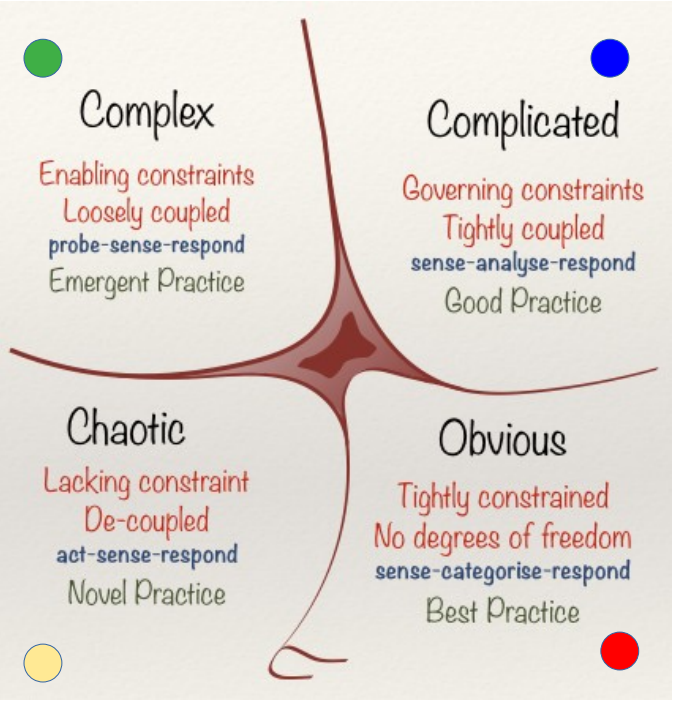
Ekosysteemit eivät yleensä ole yhteensopivia. Muuten ne olisivat vain osia samasta ekosysteemistä



We must take a deep dive into Complexity

(in Knowledge management)

Four types of knowledge management



Cynefin framework

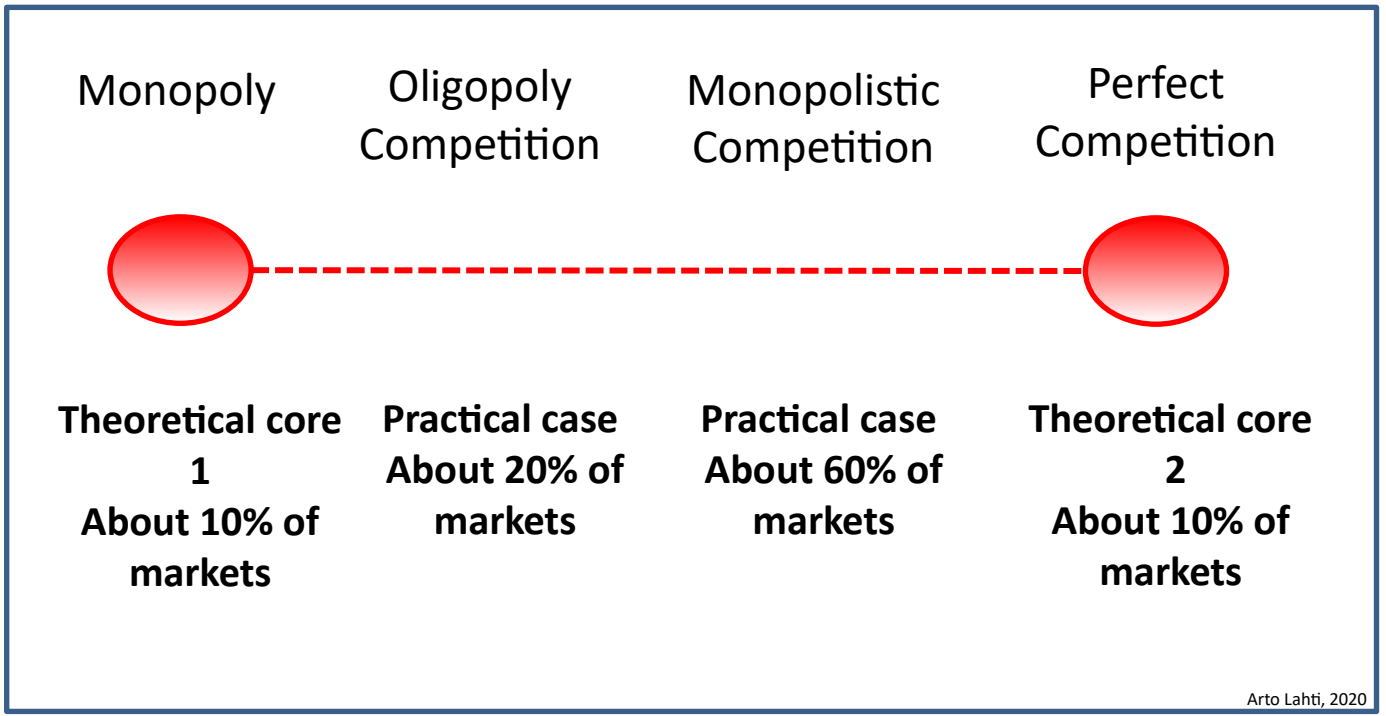
The **Cynefin framework** is a conceptual framework used to aid decision-making. Created in 1999 by Dave Snowden when he worked for IBM Global Services, it has been described as a " sense-making device".

Cynefin offers five decision-making contexts or "domains"—*obvious* (known until 2014 as *simple)*, *complicated*, *complex*, *chaotic*, and *disorder*

— that help managers to identify how they perceive situations and make sense of their own and other people's behaviour. The framework draws on research into systems theory, complexity theory, network theory and learning theories.

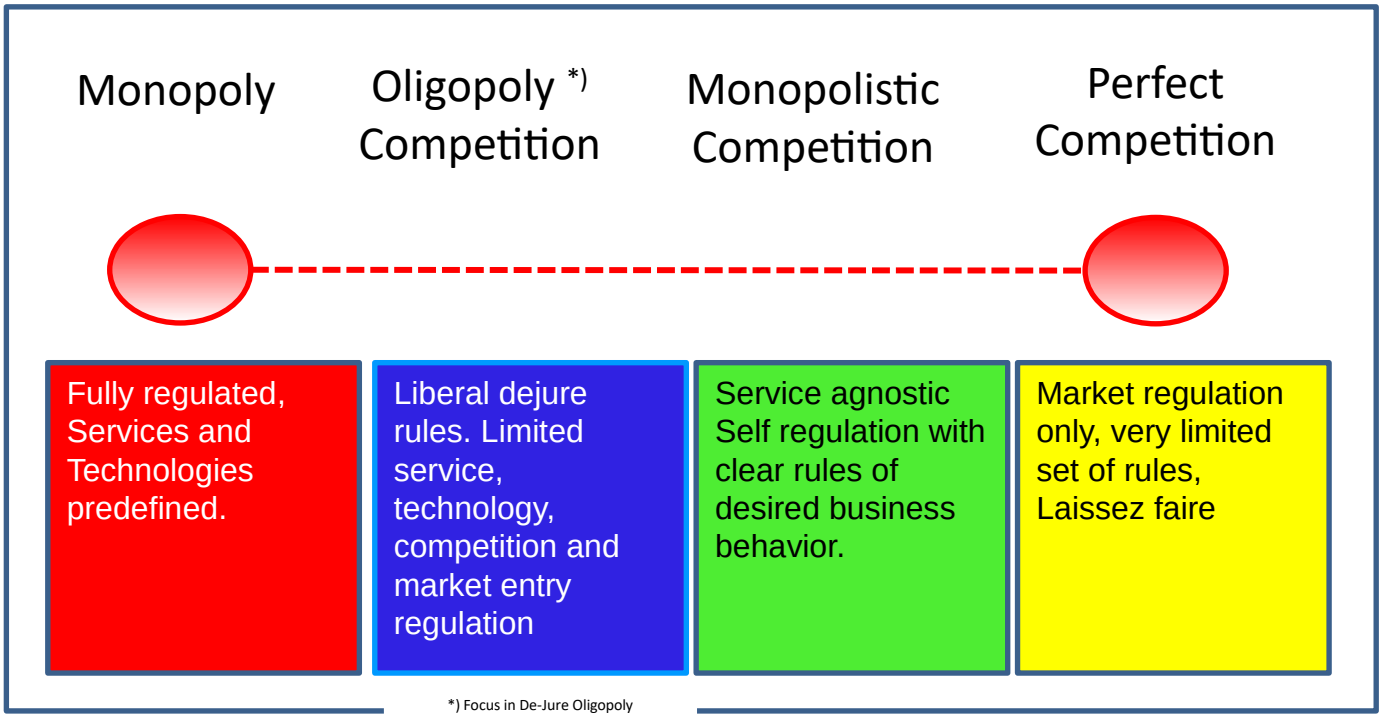
Let´s talk about Competition

Four types of Competition



We must talk about Regulation

Four styles of Regulation set the playing field for Competition and also for collaboration



System models are not static. State transitions between the models is a major force in value creating disruptions

Let´s talk about Collaboration

Four types of Competition yields multiple different forms of Collaboration

=> Triple Helix

Etzkowitz and Leydendorf 1995

Public-Private Partnership =>

=> Quad Helix

Arnkil et al 2010

Liberalized but licensed
Maximize the value creation
Using limited resources
De Jure Oligopoly

Unlicensed i.e. license exempted
Aim high, be good, not evil

De Facto Monopolistic competition

Government rules, sometimes necessary
De Jure Monopoly

PP-P => PPPP-P (YYYY-Y)

Public Private Partnership is far too limited concept
Quad Helix includes all 4 types of actor groups

Start-up Entrepreneur and other independent actors
Laissez-fairse
De Facto Perfect Competition

Aalto University
School of Science

Timo Ali-Vehmas

System States, 16-4=12 possible State transitions

- Empirical evidence
  1. Licensed mobile communication: From Red to Blue, from Blue to Blue
  2. Unlicensed Internet access: From Yellow to Green, from Green to Green
- Other personal observations
  - From Green to Red: Global data platforms have outgrown the internet utopia
  - From Blue to Red: Regulator's intervention in China to re-monopolize 3G
  - From Red to Red: New technology did not ignite system state transition
- New opportunities
  - From centralized to network in School system
  - From centralized and from fragmented to licensed traffic operators in transport
  - From centralized to licensed health operators in public health care ?
  - ....

New system states

Old system states
Real World examples discussed in Publications [and other examples in parenthesis]

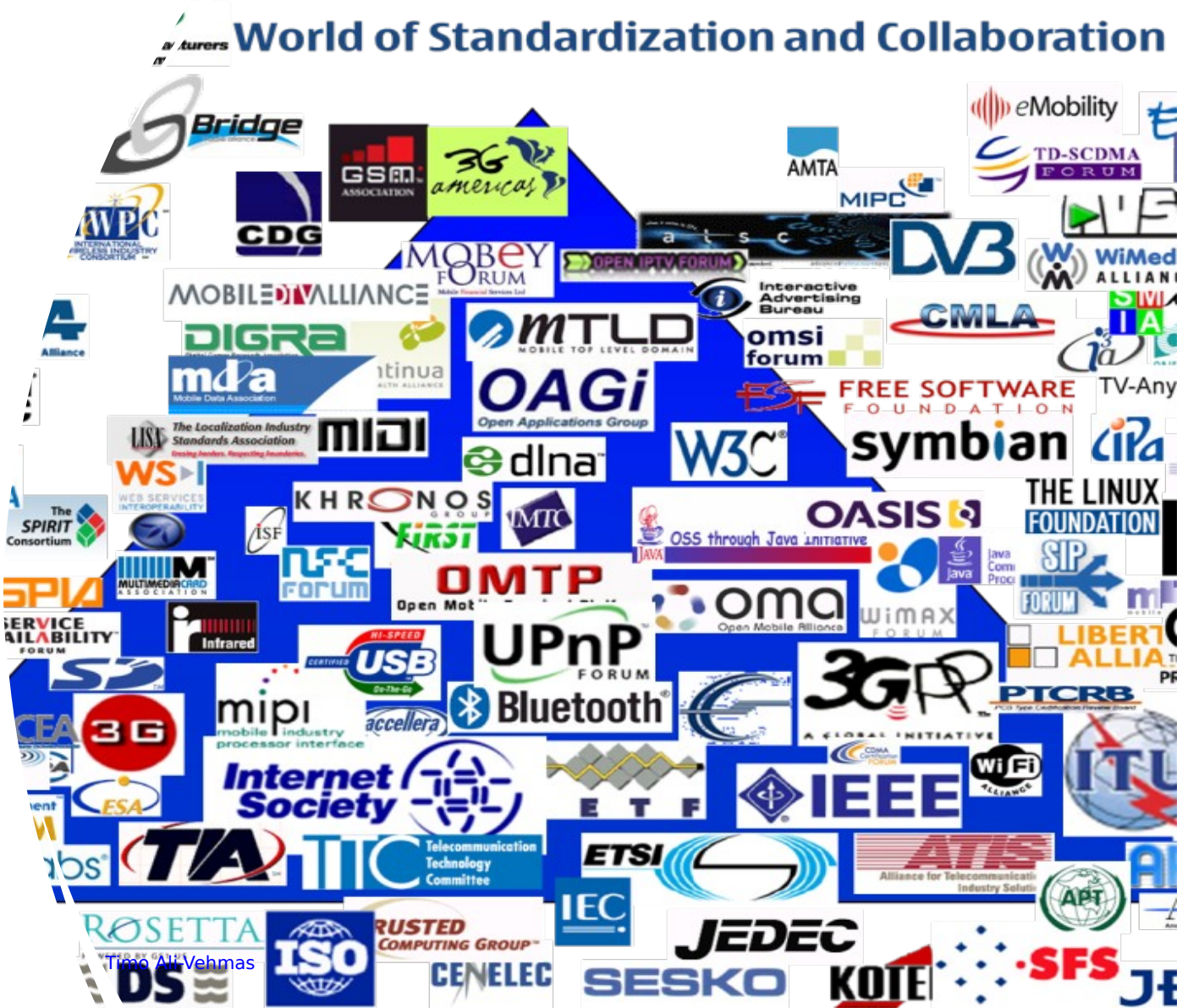
	New System state is Fixed	New System state is Limit cycle	New System state is Strange	New System State without attractor
Old System state is Fixed Analysis in Publications I and II and V/VI	**IDEN network replaced by CDMA 1x as a consequence of Sprint overtaking NEXTEL**	**1G cellular systems replaced by 2G GSM system in Europe; *Possible Licensed MaaS in Finland***	**Arpanet transition to University domain Internet**	Regulation model change from monopoly to laizzes faire (e.g. Broadcast radio liberalization in Finland)
Old System state is Limit cycle Publication II	Full consolidation of actors (e.g. 2G to 3G transition in China using TD SCMA)	**2G system evolution (GSM) to 3G (UMTS)**	Regulation change from licensed to license-exmpted (e.g. Data roaming enabling OTT Internet value system in EU)	Regulation model change from licensed to laissez faire (no good example)
Old System state is Strange Publications V/VI, Publication II	***Possible Global platform leader gaining "Winner take all" in MaaS***	Multiple platforms build federated interoperability (e.g. Facebook identity used in social networks)	**Open Internet and Web and wireless access collaboration**	Loss of common interest (e.g. Forking in open source sofware)
Old System state without attractor Analysis in Publication II and V/VI	External intervention (no good example)	External intervention (no good example)	**WLAN networking based on IEEE 802.11; *Possible License-excepted MaaS in Finland***	State transition from a random state to another random state is a meaningless case

Timo Ali-Vehmas, 2019

Where ?

Understand your own business, all and each one of them.

Rules and practises vary
Align with your own set
Choose wisely, between entrant and substitutor
Be systematic
Multimodel is possible but challenging
Avoid state of disorder



Four archetypes of Competition and Collaboration

Applies also to Standardization

FOUR TYPES OF COMPATIBILITY PURSUIT	Mandated/ Non-Collaborative	Openly Collaborative
Driven by public actors (Governments)	1: Mandated de jure standard	2: Licensed de jure standard
Driven by private actors (Companies)	4: Proprietary dominant design	3: Voluntary de facto standard

In Reality, Borderlines are blurred

Ali-Vehmas, Rissanen, Heikkilä 2020

A Quad Helix challenge

Arnkil et al 2010

Standardization worldwide 1(2)

	Electrotechnical industry	Other industries	Telecommunications industry
Global level 	IEC International Electrotechnical Commission	ISO International Organization for Standardization	ITU International Telecommunication Union
European level 	CENELEC European Committee for Electrotechnical Standardization	CEN European Committee for Standardization	ETSI European Telecommunications Standards Institute
National level 	SESKO Electrotechnical Industry	SFS Finnish Standards Association SFS with its standards writing bodies	Traficom Finnish Transport and Communications Agency

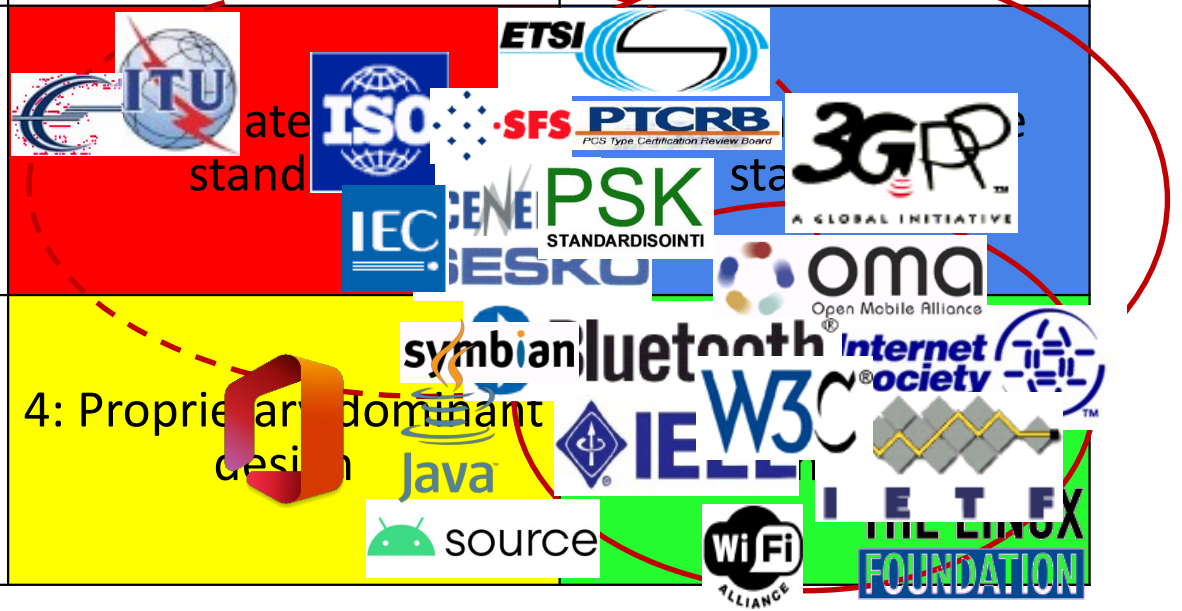
Final approximation

If you want to proceed fast, work alone -

If you want to achieve bigger thing, work together.

Illustrative positioning of some selected forums and organizations

FOUR TYPES OF COMPATIBILITY PURSUIT	Mandated/ Non-Collaborative	Openly Collaborative
Driven by a public actors (Governments)	ate stand	sta
Driven by a private actors (Companies, People)	4: Proprie ar dominant desi n	



When ?

Different purposes require different timing, specific for each technology cycle:

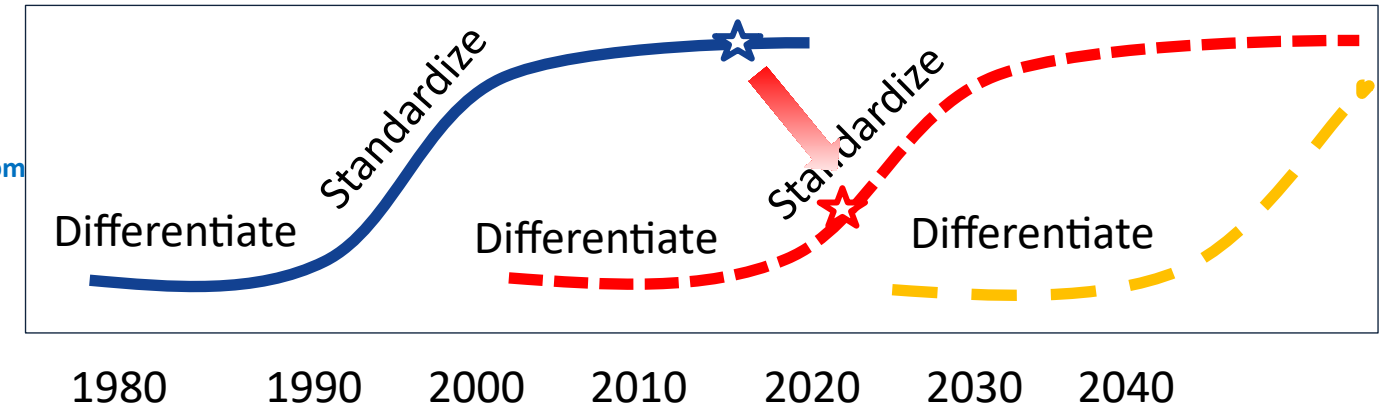
1: Vision and Requirements

2: Information standards

3: Architecture and Compatibility standards

4: Quality and Performance standards

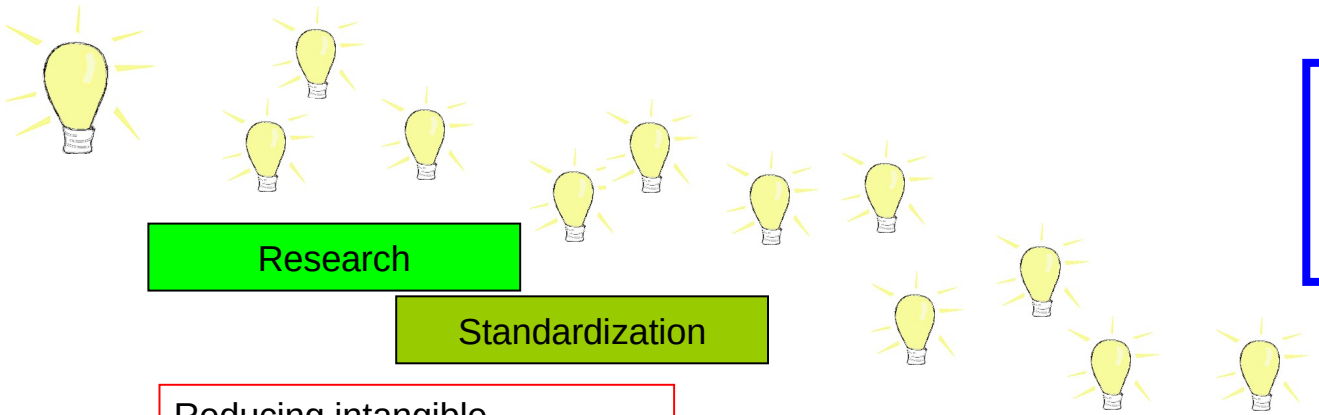
5: Measurement and Certification standards



Question for Europe today: How to repeat the success of Telecom in new and other Business and Technology Domains ?
Regional competition drives standardization in many areas. In the EU it is Green and Digital !

How ?

Innovation as a Open Process: Innovation is very very seldom a totally disconnected stand-alone break through



Optimize:
Σ Value/ Σ Cost
Risk
Time

Research

Standardization

Reducing intangible
technology uncertainty
market uncertainty

Product Creation

Sales

Reducing tangible
technology uncertainty
market uncertainty

Standardization is a formal process

Also in case of informal collaboration

Rules and Regulations defined by national laws and international agreements

- To control the ways standards are used; **Standards provide means to produce systematically products and services which fulfil the public and private requirements with known quality.**
- To control the way standards are developed; **Open, transparent, fair, and continuously evolving process.**

Standardization is a Special Case

- Exception in the competition law:
  - Pre-competitive and Pro-competition

- All the rules may not be fully aligned in all situations, in all forums, groups and projects => Ever-lasting filed of work also for law makers and law practicers.

10 C Criteria for Openness

for Standards and Collaboration for Standardization

- Criteria for "open standard"
  - Customer focused: Standards are created only for known needs and requirements in the ecosystem
  - Control: the evolution of the specification should be set in a transparent process open to all interested contributors
  - Completeness: the technical requirements of the solution should be specified completely enough to guarantee full interoperability
  - Compliance: there is a substantial standard-compliant offering promoted by proponents of the standard
  - Cost: fair reasonable and non-discriminatory access is provided to intellectual property that is unavoidably used in implementation of the standard
- Criteria for "open collaboration" in Standardization
  - Cohesion: All participants have to share quite similar vision for the future, not only in technology but also as ecosystem behavior
  - Contributions: All participants need to contribute and accept others to challenge and improve. Only the best solutions for the whole community are acceptable.
  - Consensus: Consensus is achieved when there is an agreement, and the end user benefit is provided. Consensus applies to both Standards and Standardization process
  - Compromise: When all the developing parties have given up some of their difficult issues
  - Commitment: The standard is implemented as agreed and no semi-compliant solutions break the end users' perception of full, uncompromised compatibility

Mitä ?

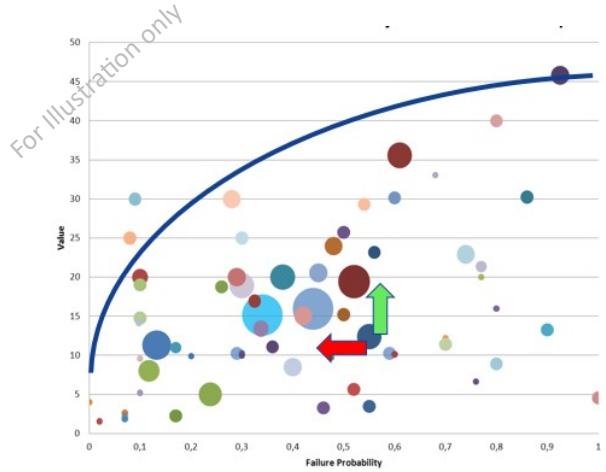
Standardointi on operatiivisen toiminnan suuntaaja

- **Sisäisessä käytössä**
  - Tuotteiden ja palveluiden laadun, kustannusten sekä toiminnan, prosessien ennustettavuuden vuoksi
  - Usein myös skaalaedut ja oleelliset markkinoille pääsyn edellytykset syntyvät standardien avulla
  - IP:n rooli ei korostu, innovaatiot pidetään salaisina

- **Reguloidussa liiketoiminnassa, missä avoimuus on keskinäistä ja tasapainoista**
  - Regulaation vaatimukset, kuten rajapintojen avoimuus ja kilpailukentän erikoispiirteet tärkeitä.
  - Verkostovaikutukset synnyttävät hallitusti lisäarvoa, joka jakautuu suhteellisesti.
  - Oleellisten standardien ja rajapintojen vaatimukset ovat käytännössä pakollisia myynnin edellytyksiä.
  - FRAND pohjainen IP hallinta jakaa arvoa suhteellisesti sekä teknologian tuottajille että käyttäjille.

- **Kun haetaan suuria tuottoja korkealla riskillä**
  - Omille asiakkaille, teknologioille ja arkkitehtuureille sopivien rajapintojen määrittely pyrkimyksenä pysyvä kilpailuetu usein hajota ja hallitse rakenteilla ja useiden standardointihankkeiden koordinaatiolla.
  - Tavoitteena alusta- ja ekosysteemi kilpailun voittaminen, mikä on mahdollista vain kun regulaatio on riittävän kevyttä. Äärimmäiset verkostovaikutukset tuovat lähes rajattoman kasvun ja vaurauden.
  - Tavoitetta varten luodaan usein useampia aluksi avoimia ja muodollisesti itse-organisoituvia yhteisöitä, joiden kautta verkostojen voima saadaan hallintaan.
  - Arvoa jaetaan ekosysteemiin osallistuvien kesken alustan omistajan päätösten mukaisesti. Vaatii useimmiten hyvin syvät taskut, useammassakin mielessä.

- **Yhteisen hyvä luomiseksi**
  - Toiminnassa syntyviä ideoita, keksintöjä, teknologioita voidaan jakaa avoimesti kun niitä ei voida hyödyntää suoraan omassa kilpailulle alttiissa toiminnassa. Näin voidaan edullisesti poistaa kilpailun edellytyksiä muiltakin.
  - Luodaan hyvää tahtoa yhteisöön ja yritykseen.
  - Muokataan markkinoita edullisemmaksi toimintaympäristöksi.



Toppila, Liesiö, Salo et al 2011

Standardoinnin ja yhteistyön kokonaisportfolio on usein laaja.

Hankkeiden priorisointi ja resurssointi kannattaa tehdä portfoliona vaikka hankkeilla on usein merkittävä keskinäisriippuvuus.

Hankkeiden ajoitus on oleellisen tärkeää.

Be the Force with You:
Network effects of Platform Business

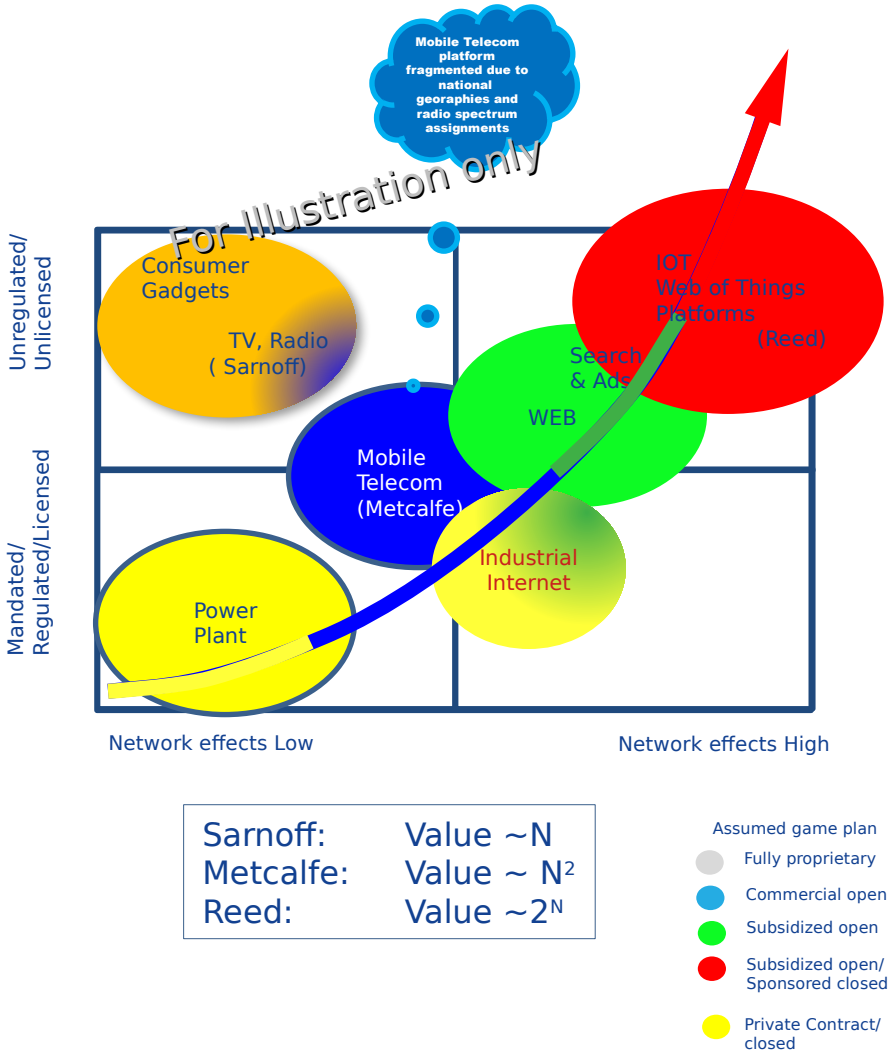
Network effects depend on

- Internal factors: Collaborative actions of the stakeholders, network structures, internal open API's, and characteristics (information, throughput and delay) of resulting feedback loops
- External factors: Available resources, technologies and regulations

Network effects influence the dynamics of competition and value creation

Bundling over clusters can maximize the Network effects!

Therefore: Expected Network effects drive Platform leaders and their game plan: *Deeper pockets enable higher stakes, to gain the Winner's position at costs. And then Winner takes all.*

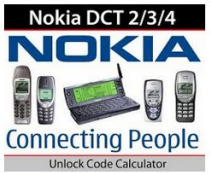


Four generations of platforms

for ever stronger network effects

Generation 1: In House Technology Platform (dominant until mid 1990's)

- Developed to enable re-use of common parts of the design
- One directional: Platform owner provides the platform as "common good"
- Examples: DCT - Nokia Mobile Phone's internal product platform, Open public data (Kansalaisen Karttapaikka)



Generation 2: Internal platform converted for external use (dominant until 2005)

- Developed by "platform leader" for competing product companies (Katz, Shapiro, Cusumano, Gawer...)
- Two directional: Platform owner develops the platform in co-operation with platform users on commercial basis
- Required business model change, platform leader to divest all competing product offerings
- Examples: Cellular chip sets, Windows SW, WinTel dual platform

Generation 3: Two (multi) sided platform (dominant today)

- Developed specifically to connect two independent sides of the business through fully controlled information platform (Tirole, Parker, van Alstyne, ... also Zysman, ...)
- Platform leader combines the network effects of demand and supply side to archive exponential power gain
- New roles for developers and end users, Subsidized services
- Example: Search – Platform – Advertiser

Generation 4: Multiple Multi-sided markets on one platform (emerging)

- Developed to connect multiple independent sectors of business into one platform
- Combining multiple two and multi-sided platform businesses ion one data based platform (....)
- Examples: Alphabet, Amazon platforms including services for most of the sectors of society
- Challenging the structures and services of national states

Generation 5: What next ?

- Converging of clusters through edge computing
- Diluting Open standard interfaces by open source software (Androindization G2)

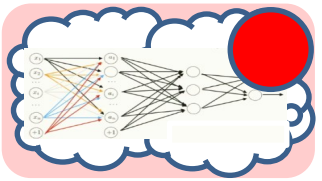
CASE Study
ICT System Architecture

Three Regulated Interfaces
=> Four Clusters

Regulation based interfaces disconnect the systemic dependences between the clusters

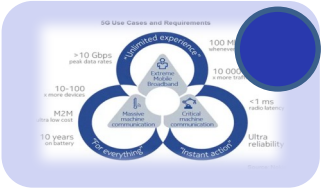
Regulation based interfaces limit the network effects that the multi-cluster actor can gain

Content ~
Cloud ~ AI
Big data



Open Internet
Net Neutrality

Network ~ 4G, 5G
Mobile network,
Internet



Industry

Open Air Interface
Device Neutrality,
Roaming

User Interface ~
Mobile Device,
AR/VR,
Local Connectivity

Things ~ Sensors
and Actuators,
End Users' DATA

Open Device
e.g. User ID/Security/Data
(+Lock/Unlock etc).

M Fransman 2010

Consumer

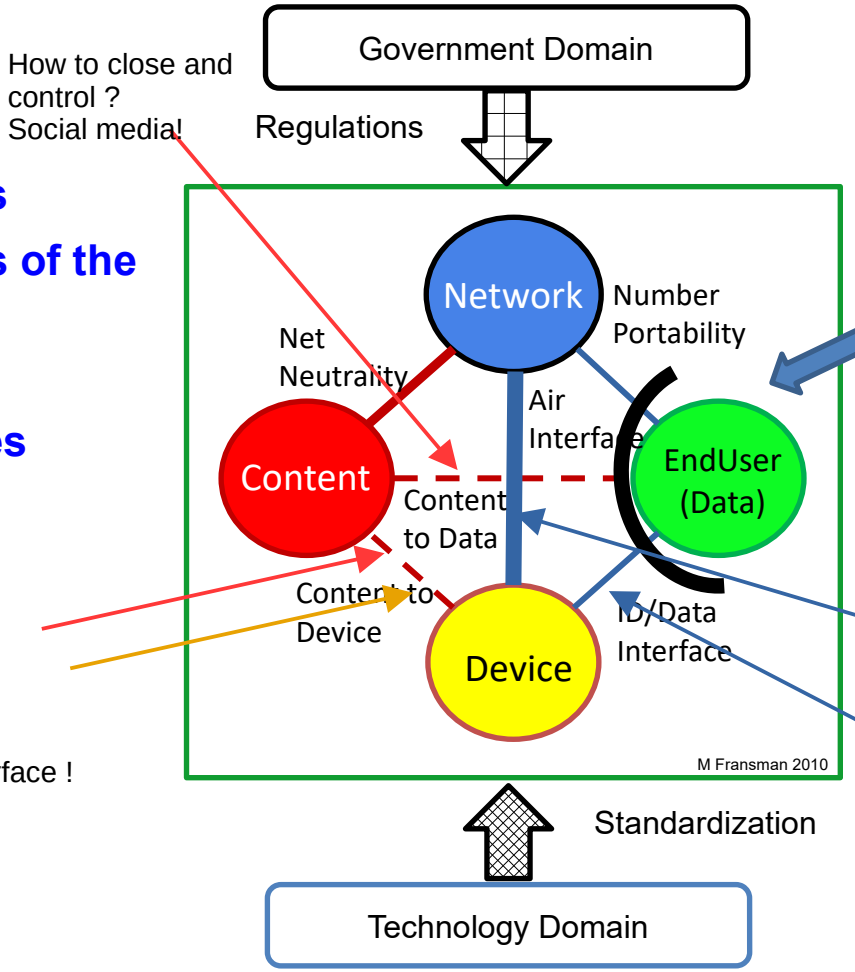
CASE Study
ICT System Architecture

Four Clusters =>

Six Essential Interfaces

that drive the dynamics of the ecosystem

Multiple strategic issues



How to close and control ?
Social media!

Critical Question today:
How to protect the Consumer/ Citizen in data age ? = How to equalize the asymmetry in knowledge?

Role for a new actor type:
Data operator!

How to close and control ?
All applications stores !
All Device specific Clouds !

How to close and control ?
Physical local interface !

How to control ?
Lead the Open interface !

How to close and control ?
Avoid regulation !

Bonus Slides

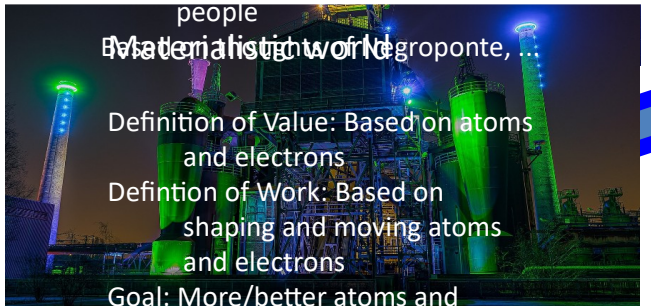
Bonus slide - Life of a Standards fellow

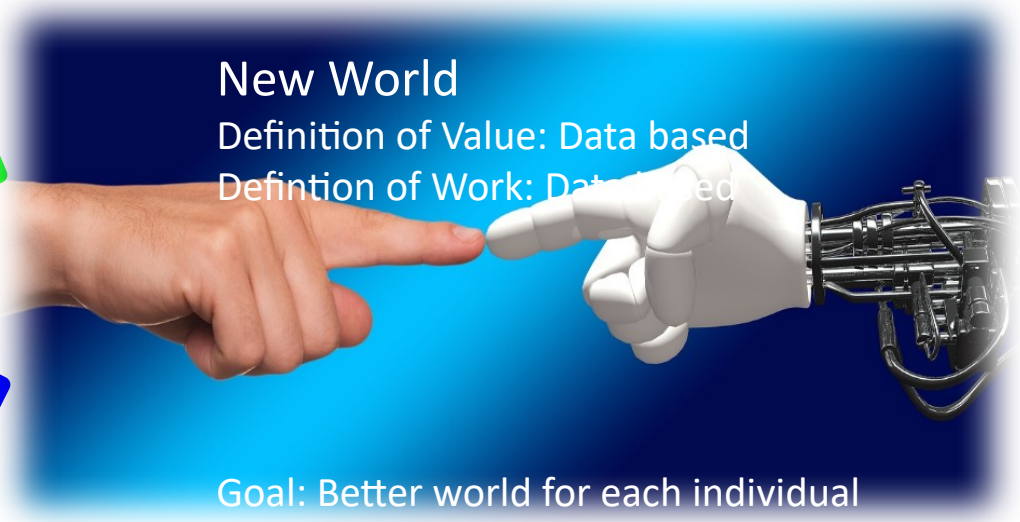
Aalto University
School of Science

They all are right…to a Certain extend

Kiitos !

Data economy will drive all sectors of society





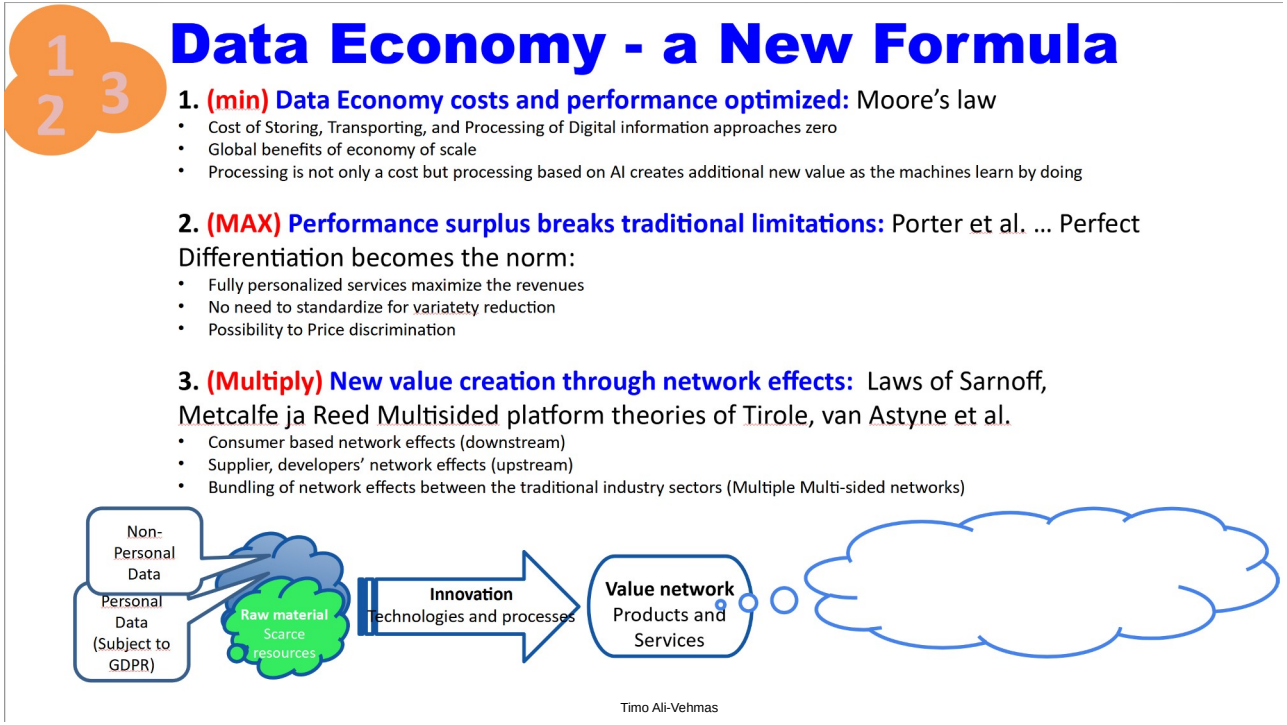
Bits connect atoms and electrons,
Who defines the rules?

Tuottavuus palveluissa

Teknologian aiheuttama luova tuho perustuu uudenlaiseen tapaan järjestää toiminta.

Datatalous on kolme asiaa

1) Teknologiat, etenkin ICT
2) Data
3) Toimintamalli, usein monen puoleinen alusta



Teknologia muuttaa yhteiskuntaa, yhä uudelleen, yhä nopeammin

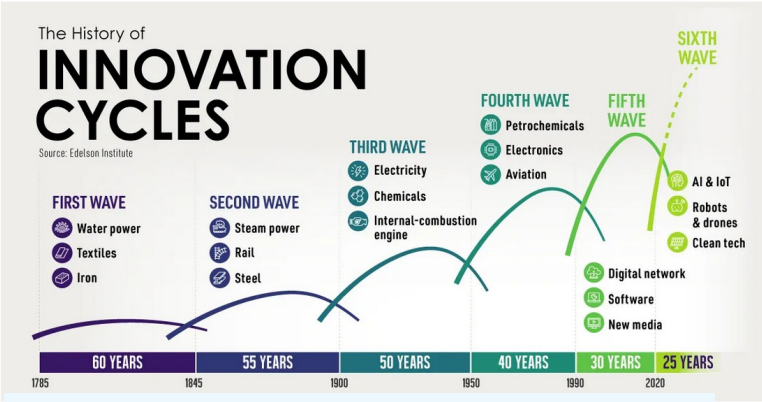
Yleiskäyttöisen teknologian syklit

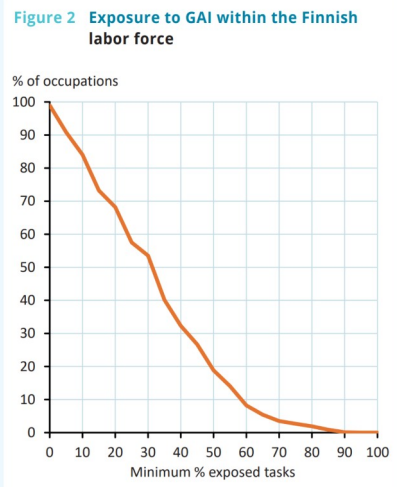
Auttaa ihmisiä tekemään tarvittavat asiat tehokkaammin, vähemmällä vaivalla.

Myös työelämä ja työtehtävät muuttuvat merkittävästi ja peruuttamattomasti.

Muutos kohdistuu lähes kaikkiin, mutta merkittävästi eri tavoin

Huoli on, että olemme jäämässä jälkijoukkoon keskeisimmässä kehityksessä maailmassa.





Tekoäly tarvitsee valjaat

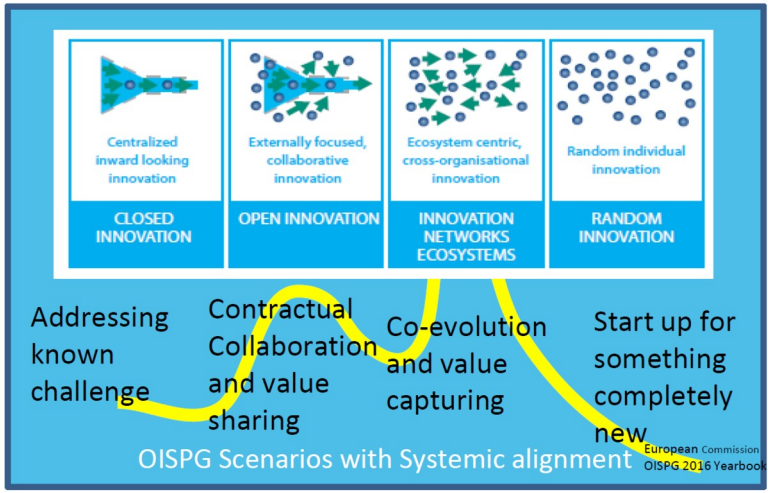
Valjailla ohjataan ja rajoitetaan mitä teknologialla saa, voi ja pitää tehdä. Kekseliäisyydellä ei oleteta olevan rajoja, Teknologiat ovat neutraaleita, **ekosysteemien dynamiikka** on oleellinen sääntelyn kohde.

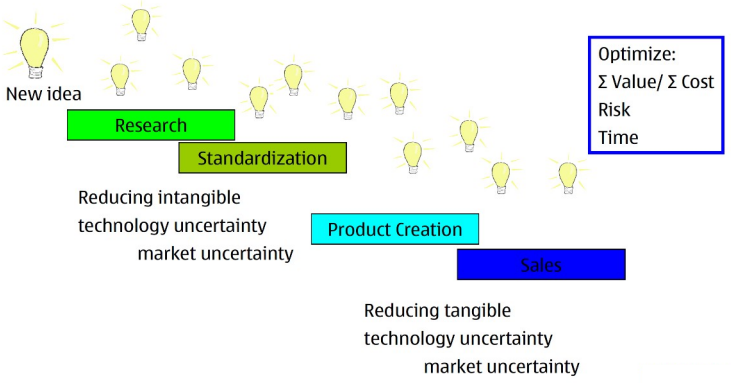
Keskeiset valjaiden osat:

- Pääsy ja käyttöoikeudet resursseihin, kuten data
- Kilpailun ehdot ja velvollisuudet, kuten lisenssit
- Yhteensopivuus, kuten rajapintakuvaukset
- Kuluttajan valinta, kuten laitteet ja palvelut

Standardoinnin keinoilla poliittiset vaatimukset muuttuvat teknisiksi raporteiksi ja standardoiduiksi ratkaisuiksi.

- Yhteentoiminta ja rajapintamäärittelyt
- Laadun ja määrän mittaaminen
- Tarpeellisimpien vaihtoehtojen määrittelyt
- Sanastot ja selitykset



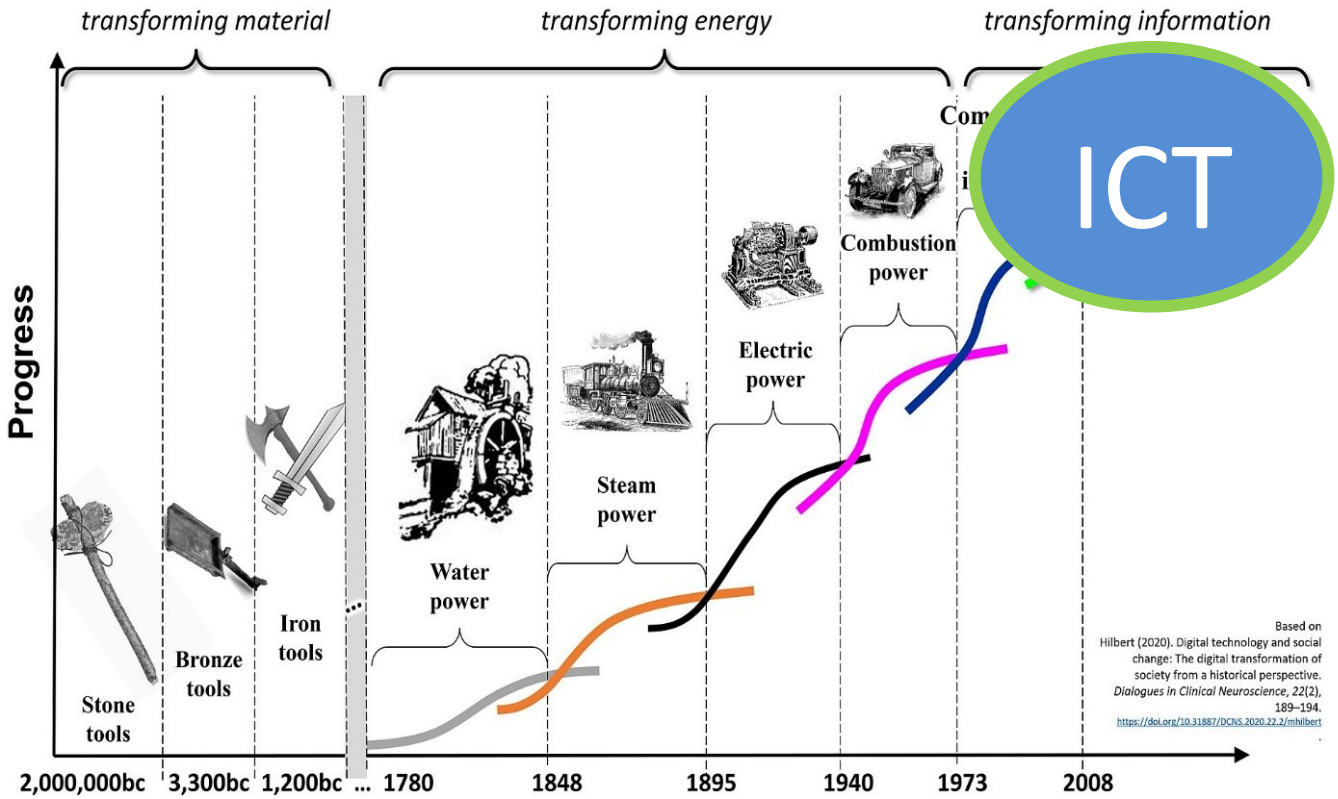


1

Need to look at General Purpose Technologies

K- waves of GPTs

= Focus areas of Standardization



Let´s Look at some history

Technology (Piston engine)




Operative Mode (Assembly line)




Enabling raw material and Process (Oil & refinery

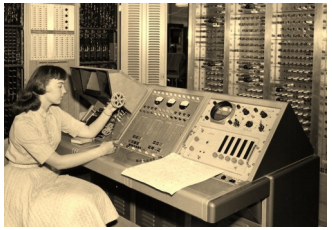


Copy Best Operative

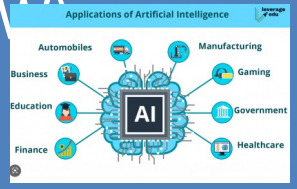


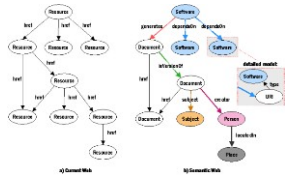
A?

What can we learn ?

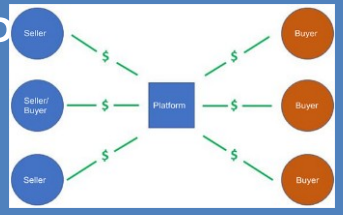


Technology (AI&SW)

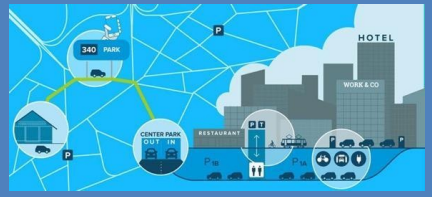




Operative Mode (Multisided P



Enabling raw material and Process (Dat IoT)



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Aalto University
School of Science

Example: Licensed Multisided Platform For Health and Well-Being ?!

Service providers (Public actors)

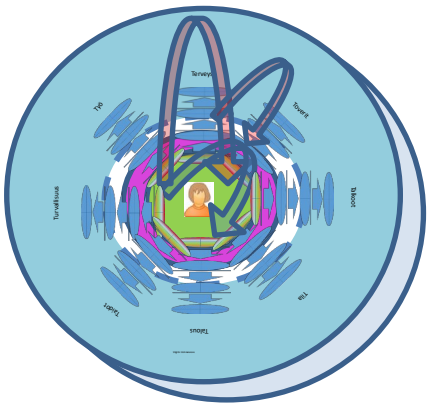
Service providers (Private actors)

Service Providers (Third sector)

Secondary use of Data (DIKW)

Neutral Controlling Authorities

WB platforms on every WB geography (SOTE alue) <=> "Wisdom Management"

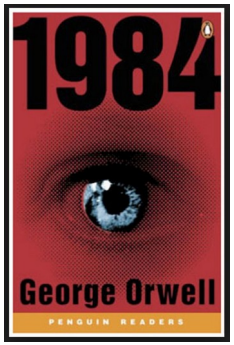


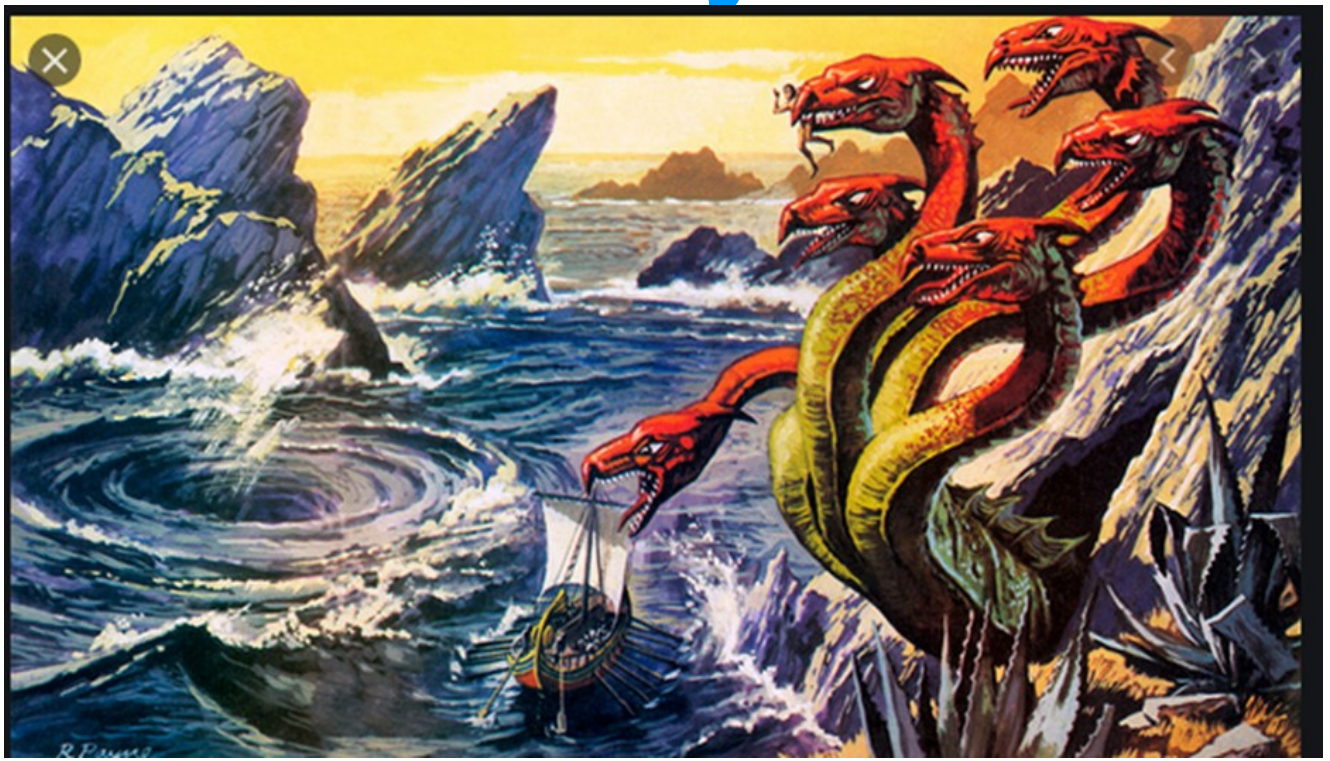
Lisensed Data operators acting on behalf of people

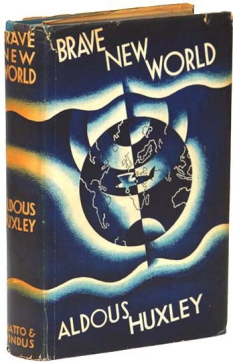
Customer/ Citizen and his data

Service and technology developers and providers

Between Charybdis and Scylla







Timo Harakka: ”Kasarmi, Kasino vai Kansankoti”

After thought...

Daron Acemoglu: Narrow Corridor

- **A description how the optimum systemic balance is between monopoly and perfect competition.**

This research

- **...shows more details, i.e. two parallel lanes of traffic in the narrow corridor**
- **..and the deep factors separating all these from each other.**