

디지털 변혁의 핵심특징 이해

Key aspects of digital transformation : Vectors

박병원

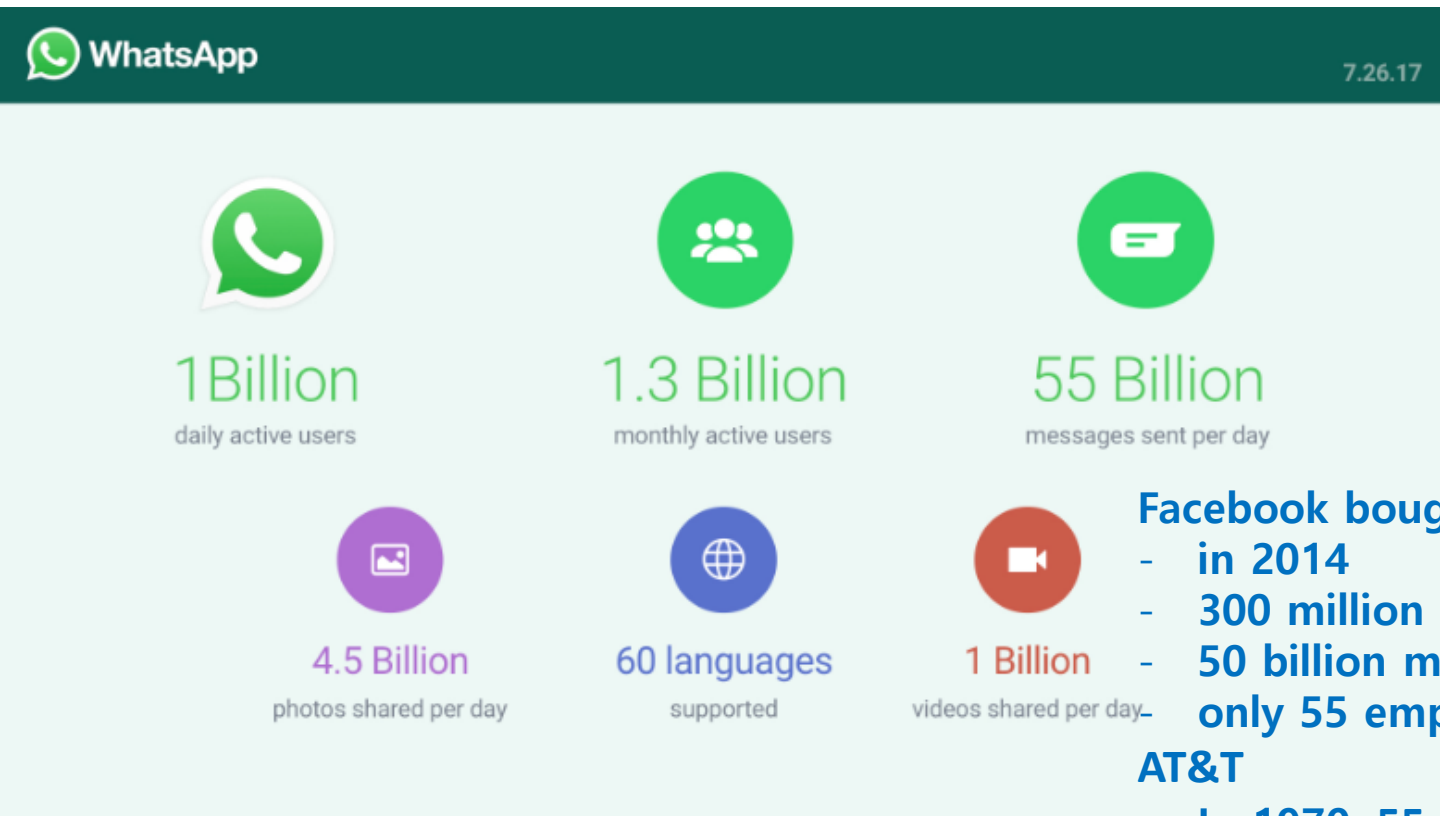
과학기술정책연구원

디지털 변혁의 핵심 특징(aspects) : 벡터(vector)

- **Scale without mass**
 - 디지털 상품은 유형자산투자 대비 적은(혹은 제로) 한계비용으로 인해 쉽고 빠르게 글로벌 수준의 시장 확보 가능
- **Panoramic scope**
 - 핵심 기능의 디지털화(데이터, S/W)은 제품 /서비스 간 결합의 장애요인을 없애서 글로벌 차원의 범위의 경제 구현 가능
- **Speed: Temporal and intertemporal dynamics**
 - 디지털화는 상호작용을 강화하고 새로운 기회 창출(단절)을 가능하게 하며, 과거 정보에 가치를 재부여하고 과거 제품이 시장에서 잊혀지지 않고 거래가 가능하게 함
- **Intangible capital and new forms of value creation**
 - 데이터 및 플랫폼을 활용해 기존 자본재의 서비스화를 가능하게 하며 특정지역에 억매이지 않는 새로운 가치 창출 가능
- **Transformation of space**
 - 무형자산의 국경 없는 유동성은 기존 유형 자산 기반의 위치/거리/법률적 제약 요인에 더 이상 유효하지 않으며, 생산/무역/소비가 일어나는 장소(space)에 대한 기존 통념의 검토 필요
- **Empowerment at the edges**
 - 인터넷의 확산과 디지털기술 발전은 종단(edge)에서의 활동이 강화되고 시장이 활성화되며 사생활보호, 보안의 책임이 탈중앙화 경향을 보임
- **Platforms and ecosystems**
 - 디지털 중개(digital intermediation, 예 : 전자상거래, 소셜네트워크, 콘텐츠 배포, 검색, 데이터 저장) 등은 관련 데이터의 유통, 관리 등은 중앙집중화시켜 전략자산으로 가치가 큼

Scale without Mass 물리적 경계를 뛰어 넘는 규모의 경제 등장

- 한계생산비용 (디지털 제품, 프로세스)
→ ZERO에 근접
- 인터넷을 통해 전세계로 규모의 확장 가능 (제품/회사/플랫폼)
- 투입 인력, 자산이 많이 필요한 것도 아니며 지역 거점이 꼭 필요하지도 않음



Facebook bought it (USD 19 billion)

- in 2014
- 300 million active users
- 50 billion messages per day
- only 55 employees

AT&T

- In 1970, 55 million households
- employed nearly a million people

Panoramic Scope

새로운 범위의 경제 도래

- 제품의 극적인 다양화/복잡화 가능(예 : long tail)
 - 서비스의 재조합 및 맞춤 가능(표준화)
- 하지만 거래비용과 조정 비용은 감소

- Combination
- Complements
- Completeness

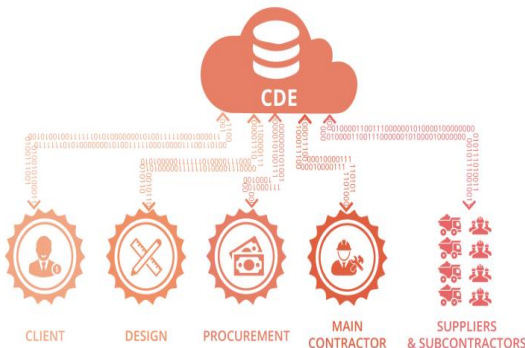


Speed: Temporal and intertemporal Dynamics

프로세스 가속화 및 과거 정보의 재활용

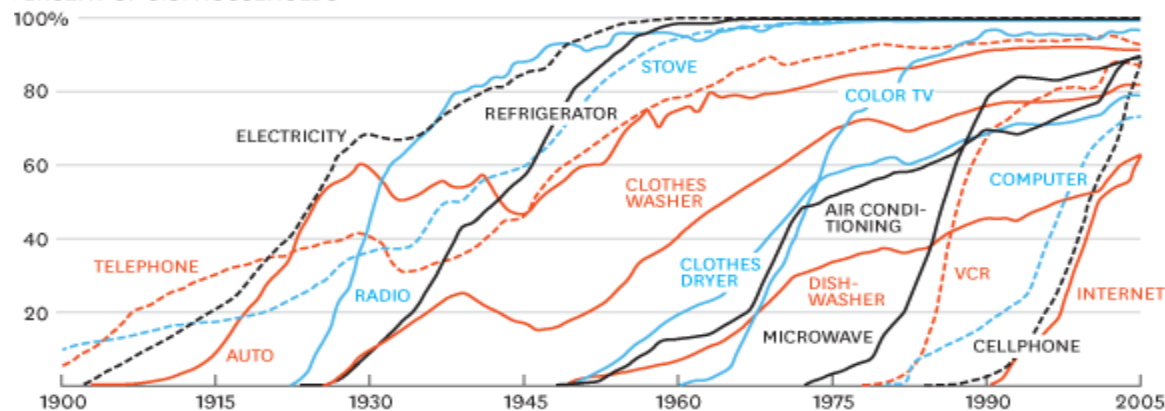
- 디지털 기술을 통한 프로세스 가속화
 - acceleration of economic and social activity
 - markets clear faster/ideas spread more quickly
 - time buffer formerly associated with distance shrinks, as has the time it takes to identify, engage and develop a community
- 과거 정보에 대한 접근/재활용 용이
 - abundance of content, capital, and advertising
- 시간의 가속화
 - 기존 관행(administrative procedures, election cycles, and reporting periods)과 갈등 예상

DIGITAL DATAFLOW



CONSUMPTION SPREADS FASTER TODAY

PERCENT OF U.S. HOUSEHOLDS



SOURCE MICHAEL FELTON, THE NEW YORK TIMES

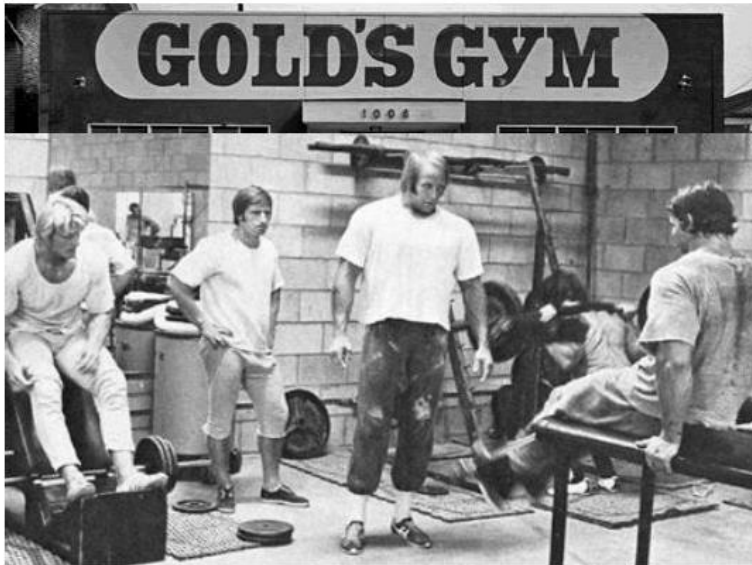
HBR.ORG

Intangible capital and new forms of value creation

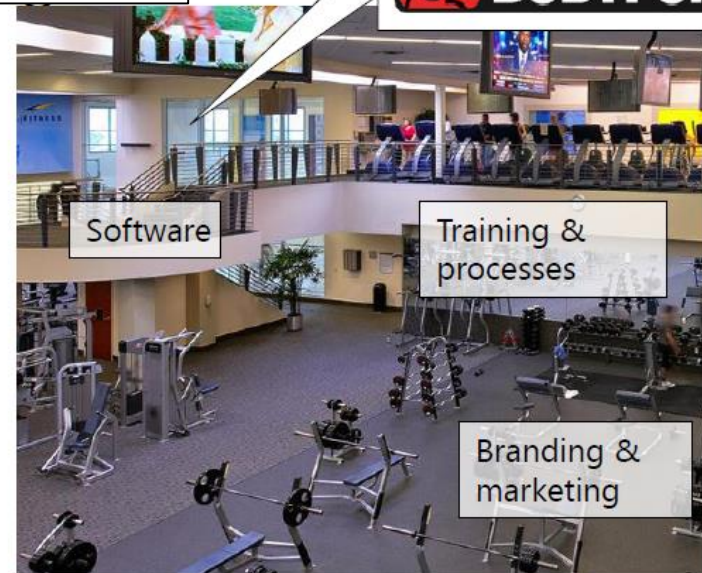
무형자산과 새로운 형태의 가치창조

- 무형자산(소프트웨어, 데이터) 중요성 및 투자 증가
 - 데이터 생산 증가
 - “소유” 개념 변화
- 기존에 물리적 위치와 긴밀하게 결합되었던 가치생산 과정이 무형의 소프트웨어/데이터로 이전, 지역적 제약이 사라짐

1977



2018



Plus: a pure intangible business



Software

Training & processes

Branding & marketing

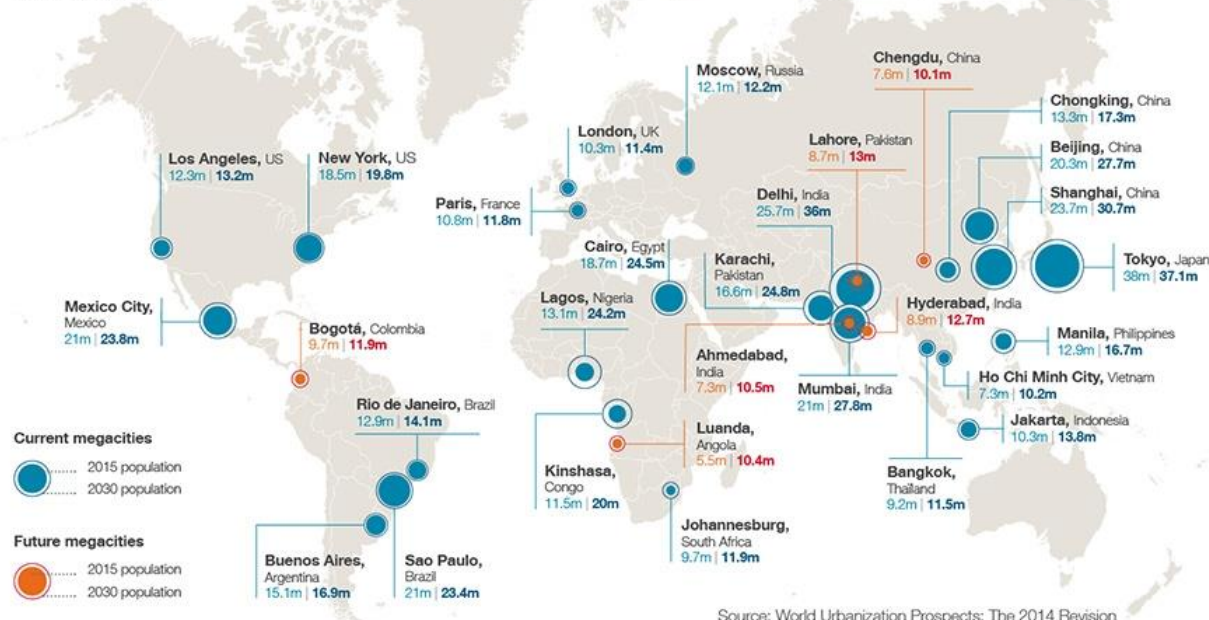
Transformation of space

장소의 의미 변화

- 가치 생산/이동이 더 이상 장소나 국경에 제한을 받지 않음
- 이는 현재의 지역 중심/영토 주권 중심의 전략에 도전 요소로 작용



CURRENT AND FUTURE MEGACITIES
2015 - 2030



Source: World Urbanization Prospects: The 2014 Revision

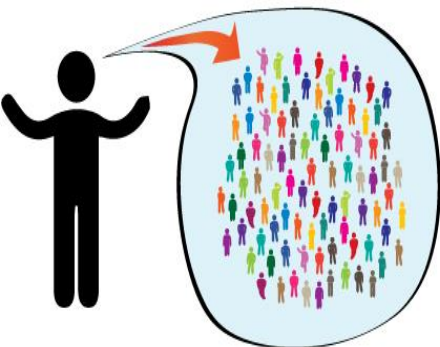
Empowerment at the edges

주변부에서 활성화되는 혁신활동

- 정보의 중심이 중심(서버, 정부, 헤드쿼터)에서 주변(개인, 유저)로 이동 → 활발한 혁신 (user-driven innovation)
- 주변부는 기존 중심부가 수행한 책무성을 공유 방식의 문제 등장
- Many to Many
- 킥 이코노미 (gig economy)

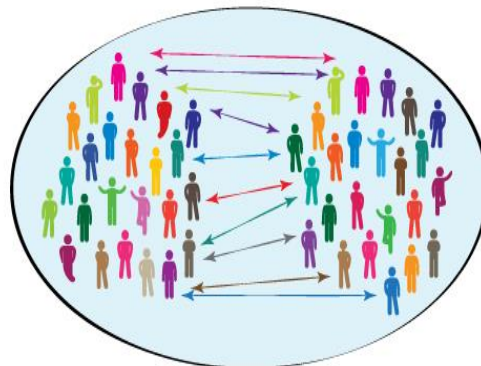
The difference between traditional media and social media...

One \rightarrow Many



vs.

Many \leftrightarrow Many



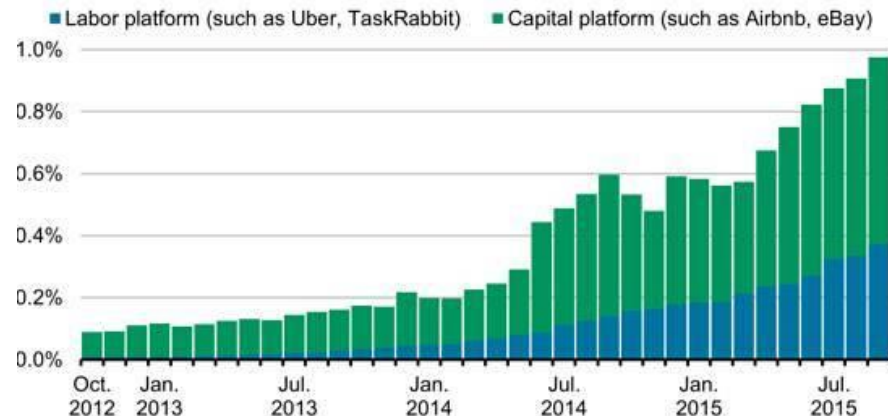
Medium: TV, Radio, Newspaper, etc.

Medium: Social Media Network

graphic by Paula Binop

Gig Growth

Share of U.S. adults earning income in a given month via online platforms, often referred to as the gig or sharing economy.



Source: JPMorgan Chase Institute | WSJ.com

Platforms and Ecosystems

플랫폼과 생태계

- 플랫폼 경제의 등장으로 인한 거래비용의 감소
- 기존 산업/기업 생태계 변화 초래
(생태계의 생태계)

PLATFORM CATEGORIES AND COMPANIES



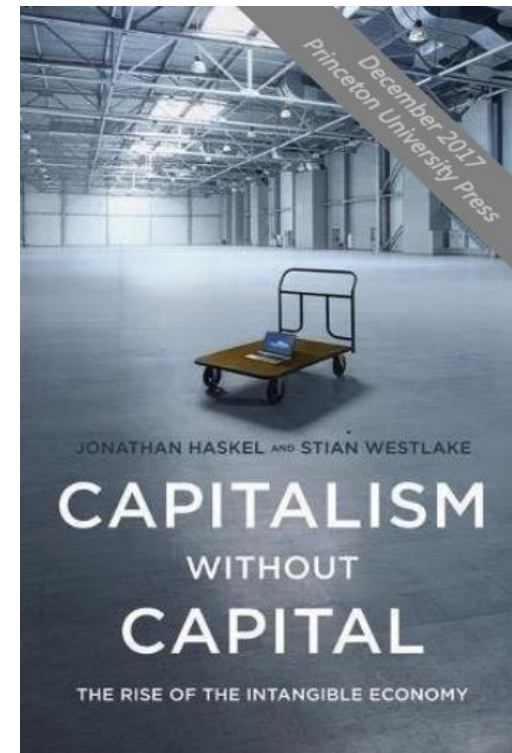
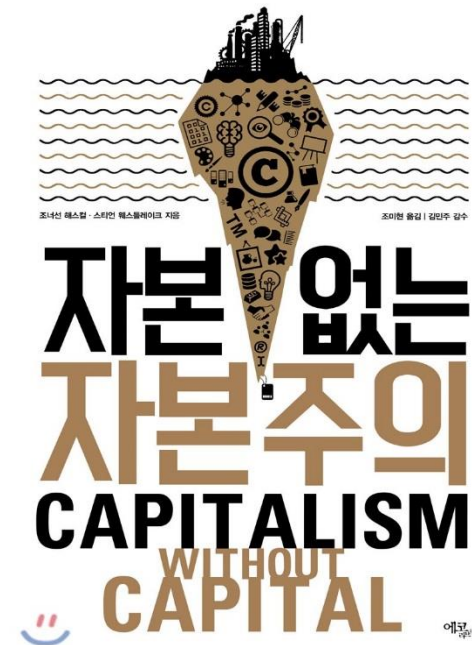
[참고 1]

Capitalism without Capital

The rise of the intangible economy

by Jonathan Haskel & Stian Westlake

© Jonathan Haskel 교수의 OECD 발표자료 일부 (2018.6.21, 파리)



The nature of investment and capital assets is changing

Tangible investments

Buildings



Computers



Plant & machinery



Vehicles



Intangible investments

R&D



Training



Design



Org
developmen



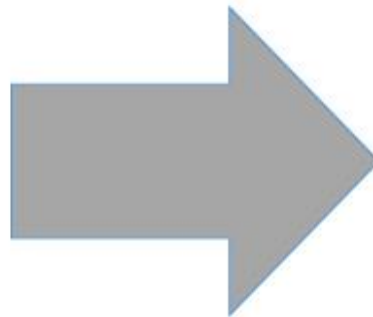
Brands &
marketing



Artistic
originals



Software &
data



But this change is hidden...

GDP still doesn't include most intangibles

Tangibles: in GDP since 1940s



Some intangibles added

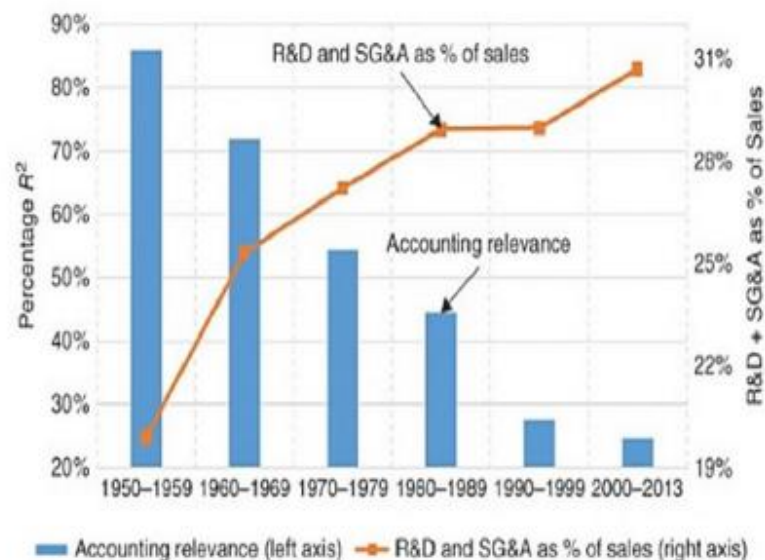


Most intangibles still missing



...neither do company accounts

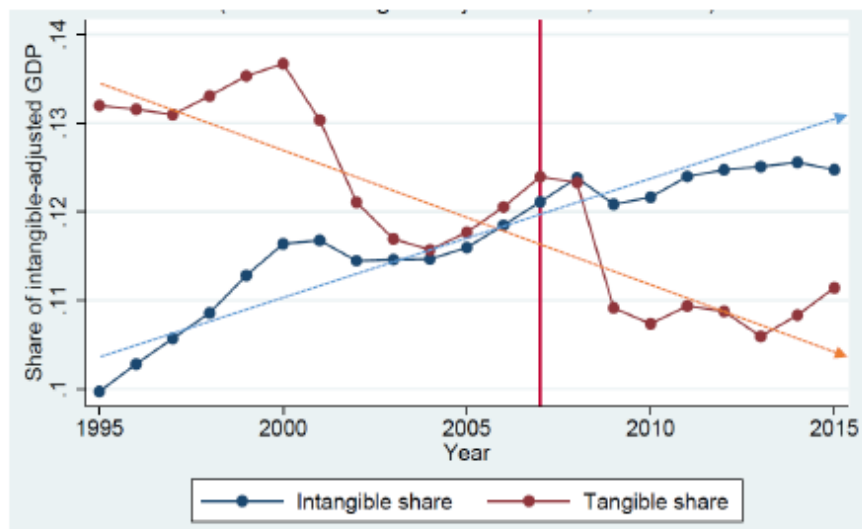
R^2 s of market values regressed on earnings and book values of companies entering the public market in successive decades, 1950–2013



Source: Lev and Gu (2016)

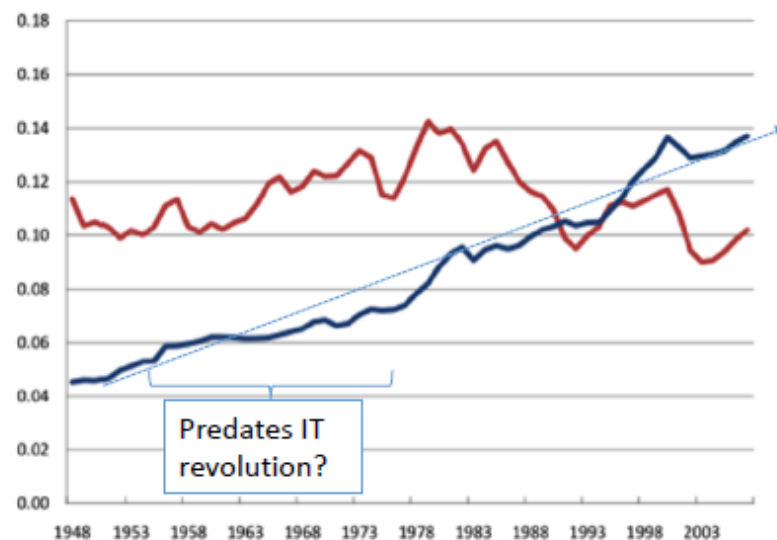
The rise of intangible investment is a long-term trend

Tangible and intangible investment share, US+EU11



From SPINTAN database

Tangible and intangible investment share, US



From Carol Corrado

Intangible capital is the capital of the 21st Century

Four economic properties of intangibles

Scalable

Intangible assets can often be used over & over, in multiple places, with little or no reinvestment.

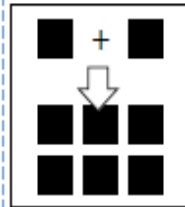
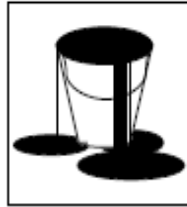


Sunk

Once a firm makes an intangible investment, hard to sell it or recover its value.

Spillovers

A firm making an intangible investment will not receive all (or perhaps any) of the returns.



Synergies

Intangible assets are often especially valuable when combined with other intangibles and human capital

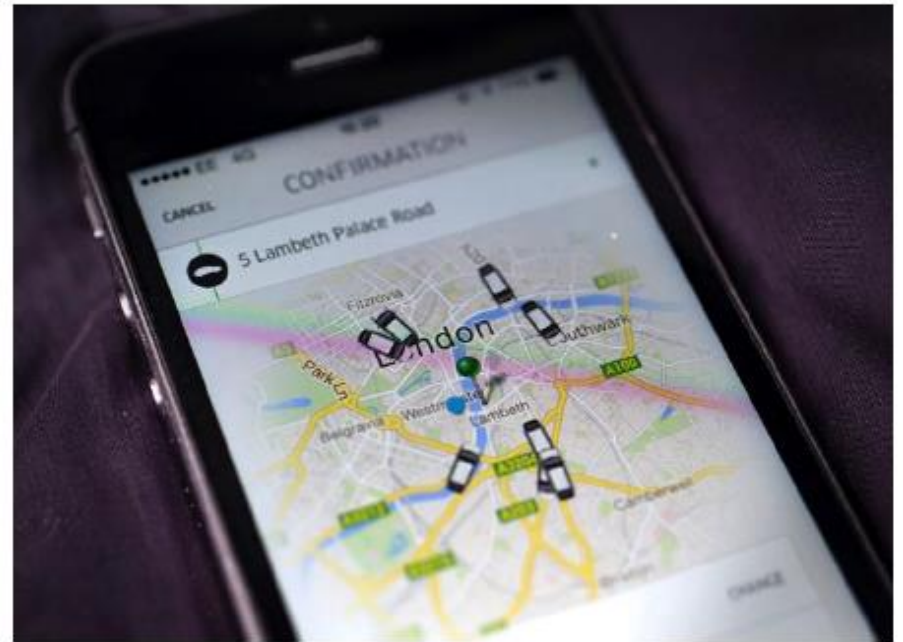
Property of intangibles 1: SCALABILITY



Minicabs: not scalable

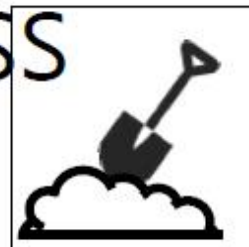


Uber algorithm: highly scalable

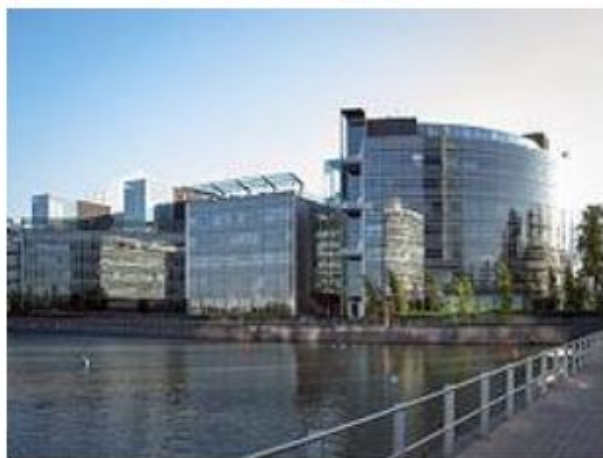


Intangible assets can often be used over & over, in multiple places, with little or no

Property of intangibles 2: SUNKENNESS



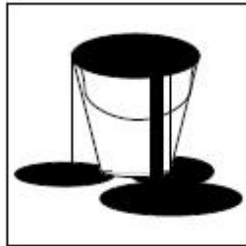
Phone company goes bust? Sell your HQ. But intangibles are harder to sell off.



Windows Mobile 6.1 Today Screen

Once a firm makes an intangible investment, it tends to be hard to sell it or recover its

Property of intangibles 3: SPILLOVERS



Tangible assets: easy to protect



Designs and software:
hard to protect



iPhone (2007)



HTC Hero
(2009)



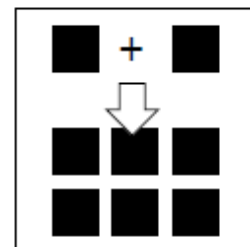
Samsun
g i8000
(2009)



Android
OS (2008)

Often, a firm making an intangible investment will not receive all (or perhaps any) of the

Property of intangibles 4: SYNERGIES



Intangible assets are often especially valuable when combined with other intangibles.

[참고 2]

OECD Going Digital 프로젝트 소개

Ref: OECD 장관급 회의(Meeting of the OECD Council at Ministerial Level Paris, 30-31 May 2018) 배포 자료 : “Going Digital in a Multilateral World : interim report to the Minister”

OECD Going Digital 프로젝트 (1)

추진배경

OECD 디지털화가 성장/생산성 /고용 등 사회 경제 전반에 미치는 영향을 측정 분석하고 회원국에게 바람직한 정책과 모범사례 제공을 위해 연간 디지털 '17-'18 에 수평적 프로젝트를 추진 (Going Digital) 를 진행

- 동 프로젝트는 4개 위원회 (CDEP, CSTP, CCP, CIIE)의 이니셔티브를 위한 최초 (2015 발표, 2016 논의)를 시작으로
- 과학기술('15.10), 고용('16.1) 디지털경제 ('16.6) 관련 장관회의 결과와 NPR 문서와 (Next Production Revolution)프로젝트를 기반으로 수립

OECD Going Digital 프로젝트 (2)

참여위원회

- **14 “core” Committees**

- **CTP**: Committee on Fiscal Affairs
- **DAF**: Competition Committee, Insurance and Private Pensions Committee, Committee on Financial Markets
- **ECO**: Economic Policy Committee
- **EDU**: Education Policy Committee
- **ELS**: Employment, Labour and Social Affairs Committee
- **GOV**: Public Governance Committee
- **STD**: Committee on Statistics and Statistics Policy
- **STI**: Committee on Consumer Policy, Committee on Digital Economy Policy (lead Committee), Committee on Industry, Innovation and Entrepreneurship, Committee on Scientific and Technological Policy
- **TAD**: Trade Committee

- **Other interested bodies actively participating**

- **CFE**: Working Party on SMEs and Entrepreneurship
- **DAF**: Investment Committee
- **ELS**: Health Committee
- **ENV**: Environment Policy Committee
- **GOV**: Regulatory Policy Committee
- International Energy Agency (**IEA**)
- International Transport Forum (**ITF**)
- **SGE**: Foresight, NAEC & Inclusive Growth

OECD Going Digital 프로젝트 (3)

연구 내용

(Pillar 1) Horizontal activities

- 디지털 변혁(digital transformation)의 다양한 차원 이해를 위한 프레임워크 제시
- 디지털발전정도 분석 및 디지털 변혁 촉진 동인(key drivers) : 디지털 영향(impact), 핵심기술(key digital technologies), 발전장애요인, 모범 사례 등
- 전략적 미래연구, 정책디자인-수행-평가 틀, 디지털 보안

(Pillar 2) Domain-specific insights

- 디지털 변혁으로 영향을 받는 특정 정책
 - (예시) 노동, 조세, 무역, 교육, 경쟁 등 분야의 심층 분석

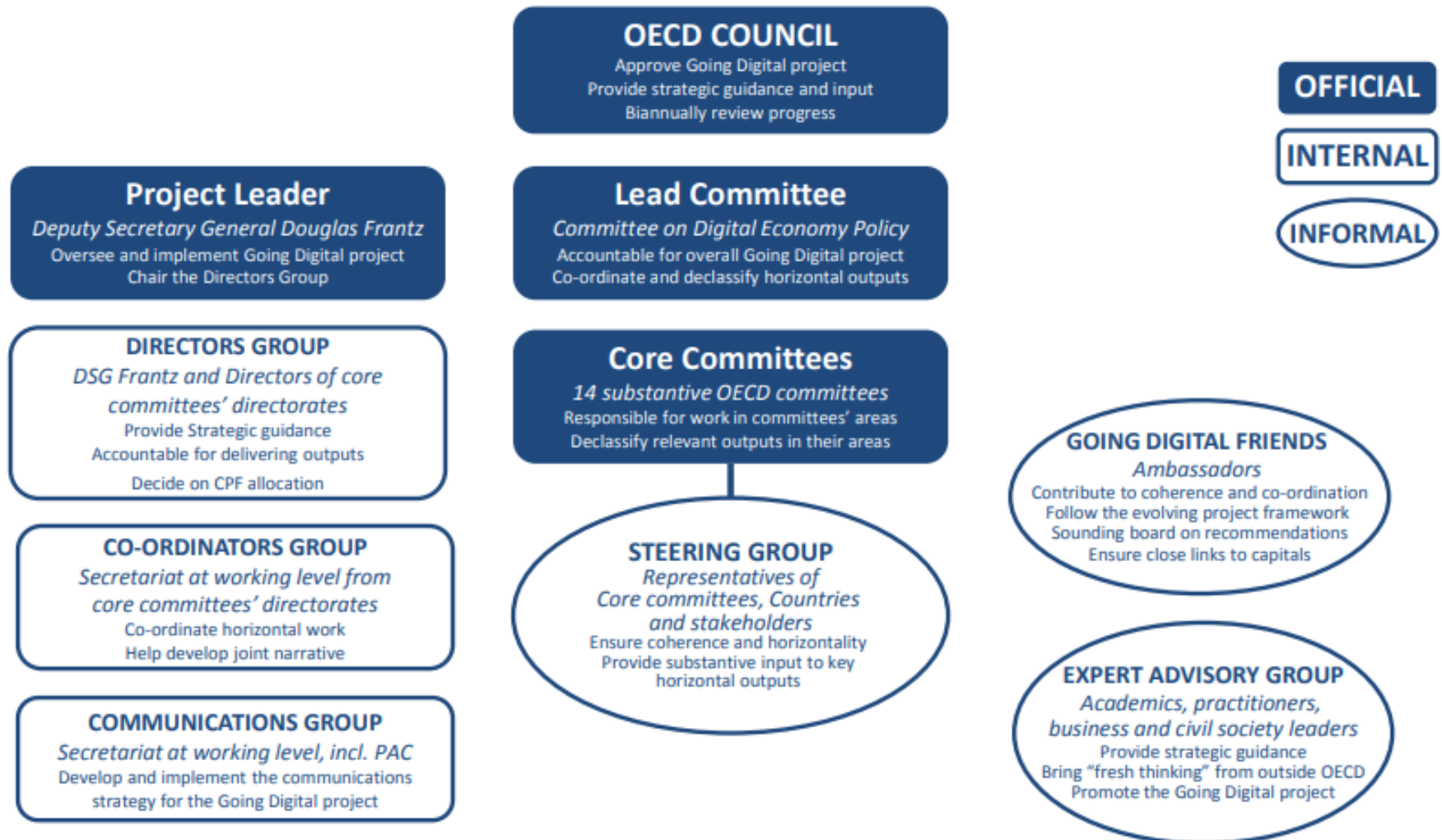
(Pillar 3) Cross-cutting analysis

- 횡단 영역의 주요 이슈 분석을 통한 디지털 (cross-cutting) 변혁의 함의 도출
 1. jobs and skills
 2. Productivity, Competition and market openness
 3. Society and well-being
 4. Measurement

Over 80 projects, resulting in more than 70 reports and over 15 workshops

OECD Going Digital 프로젝트 (4)

추진체계



Pillar 1 Horizontal activities

- Analysis of how digital technologies can be used for **better public policies** [DSTI/CIIE(2017)20].
- **Development of an integrated policy framework**, underpinned by Committee responses to the preliminary integrated policy framework questionnaire [DSTI/CDEP/GD(2017)9].
- **Identification of a set of “vectors” of digital transformation** to help policymakers understand the core aspects of the digital transformation and the implications for policy [DSTI/CDEP/GD(2017)4/REV1].
- Exploration of **policy issues related to digital security and resilience** in critical infrastructure and essential services, such as energy, transport, finance and essential government services.
- Elaboration of a set of **Going Digital Foresight Scenarios** [DSTI/CDEP/GD(2017)10], underpinned by a series of OECD-wide and external workshops.

Pillar 2 : Domain-specific insights

- Examination of **the possible impacts of AI** and how the OECD may help develop a human-centred approach to its development and application.
- Examination of the possible **impacts of digital connectivity for trade logistic chains**, including cross-border shipping and delivery
[http://www.oecdilibrary.org/content/chapter/aid_glance-2017-6-en]
- **Exploration of access to new data sources for statistics**, and the underlying business models and incentives for the corporate sector [STD/DOC(2017)6]
- Elaboration of **how to bridge the rural digital divide** [DSTI/CDEP/CISP(2017)1/REV2]
- Exploration of **business models for sustainable research data repositories** [DSTI/STP/GSF(2017)1/REV1/FINAL]
- **Examination of potential mismeasurement in GDP and productivity growth** of the digital economy in the post-crisis slowdown [STD/CSSP(2017)4/ANN1]
- **Analysis of consumer protection enforcement** in a global digital marketplace [DSTI/CP(2017)10/REV1]
- Elaboration of **consumers policy** in the smart home [DSTI/CP(2017)8/REV1]
- Analysis of the co-ordination and support of **international research data networks** [DSTI/STP/GSF(2017)5/FINAL]
- Examination and documentation of **evolutions and emerging opportunities** and challenges in the digital economy [<http://dx.doi.org/10.1787/9789264276284-en>]
- Exploration of **the impacts of digital platforms** for facilitating access to research infrastructures [DSTI/STP/GSF(2017)4/FINAL]

Pillar 2 : Domain-specific insights

- Development of a framework for analysis for **digital trade** [TAD/TC/WP(2017)4/FINAL]
- Exploration of **the impacts of digitalisation and energy**
[<https://dx.doi.org/10.1787/9789264286276-en>]
- Exploration and enhancement of the **role of insurance in cyber risk management**
[<https://dx.doi.org/10.1787/9789264282148-en>]
- Analysis of how **financial education and consumer protection** can be ensured for all in the digital age [<http://www.oecd.org/finance/g20-oecd-report-on-ensuring-financial-education-and-consumer-protection-for-all-in-the-digital-age.htm>]
- Exploration of **entrepreneurship in 2017** [http://dx.doi.org/10.1787/entrepreneur_aag-2017-en]
- Exploration of the **future of work for women**
[<http://www.oecd.org/employment/Going-Digital-the-Future-of-Work-for-Women.pdf>]
- Analysis of **how technology and globalisation are transforming the labour market**
[https://dx.doi.org/10.1787/empl_outlook-2017-7-en]
- Analysis of how **behavioural insights** can be used to improve online disclosures with
[DSTI/CP(2017)9/REV1]
- Exploration of the possible impacts of **industrial robotics** on the global organisation of production [DSTI/CIIE(2017)14]
- Analysis of **tax challenges** arising from digitalization [<http://www.oecd.org/tax/tax-challenges-arising-from-digitalisation-interimreport-9789264293083-en.htm>]

Pillar 2 : Domain-specific insights

- Examination of how to manage the transition to **driverless road freight transport**
[<https://www.itf-oecd.org/sites/default/files/docs/managing-transition-driverlessroad-freight-transport.pdf>]
- Identification and elaboration of a set of **OECD productivity indicators** in 2017
[<http://dx.doi.org/10.1787/pdtvy-2017-en>]
- Exploration of policy issues related to **open research agenda setting**
[DSTI/STP/GSF(2017)3/FINAL]
- Examination of the possible impacts of **‘robo advice’ for pensions**
[<http://www.oecd.org/pensions/Robo-Advice-for-Pensions-2017.pdf>]
- Analysis of how the **digital transformation affects science, innovation, the economy, and the way people work and live** [<http://dx.doi.org/10.1787/9789264268821-en>]
- Analysis of how to support an effective **cyber insurance market**, a report for the G7 Presidency [DAF/AS/WD(2017)17]
- Examination of the potential for **FinTech** to transform the way pensions operate and how governments are supporting its development
[<https://www.oecd.org/finance/Technology-and-Pensions-2017.pdf>]

Pillar 2 : Domain-specific insights

- Exploration of possible impacts of technology and innovation in the **insurance sector**
<http://www.oecd.org/finance/Technology-and-innovation-in-theinsurance-sector.pdf>
- Exploration of possible implications of the digital economy for **the investment policy** community [DAF/INV/WD(2017)14]
- Examination of the evolving **role of satellite networks** in rural and **remote broadband access** [DSTI/CDEP/CISP(2016)5/REV2]
- Report of a survey of **consumer trust of peer platform markets** [DSTI/CP(2017)5/REV1]
- Examination of evolutions of **open government** strategies and objectives
[https://dx.doi.org/10.1787/gov_glance-2017-en]
- Elaboration of considerations for the application of the G20/OECD high-level principles on **financial consumer protection** to digital and alternative financial services
[DAF/CMF/FCP/RD(2017)2]
- Exploration of the impacts of top R&D investors and **their industrial property strategies** in the digital economy [www.oecd.org/sti/world-top-rd-investors.pdf]
- Examination of the **skills** needed for a digital world
[<https://www.oecd.org/els/emp/Skills-for-a-Digital-World.pdf>]

Pillar 3 : Cross-cutting analysis

- Development of a **taxonomy of digitally-intensive sectors** [DSTI/CIIE/WPIA(2017)2] to support analytical modelling as well as work to assess how to best measure the digital economy in the SNA.
- Exploration of the impacts of digital transformation on **business dynamism** [DSTI/CIIE(2017)17] and a workshop to further investigate regulations that restrict competition in light of digitalisation.
- Exploration of **the impacts of algorithms and collusion, and policy issues related to competition in the digital age** [DAF/COMP(2017)4]

END