

CALLING THE SHOTS

..... STANDARDIZATION FOR EU COMPETITIVENESS IN A DIGITAL ERA



A report from an expert panel chaired by Carl Bildt

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FOREWORD

Europe stands before an interesting challenge. It must work out how to promote open and fair trade and investment globally, whilst at the same time ensuring that it maintains competitiveness in a world where protective tariff and non-tariff barriers are being created. The digital economy is a prominent case in point. The EU's trading partners and competitors skilfully employ a multitude of tactics to gain a lead in the race to supply high value-added technologies to the global marketplace, in order to secure sustainable growth and employment.

Research and innovation funding, procurement, intellectual property protection, state aid, competition and trade policy, investment screening and regulation of the digital economy are all key instruments that major economies use in their industrial strategies to confer a competitive advantage on their companies. Standardization is another essential tool in this endeavour, and this report looks at whether Europe is fully utilizing and developing its competitive potential here.

It is my pleasure to present this report, which reflects the work and thoughts of a panel of experts I have had the honour to chair over the past eight months. We hope it will contribute to raising, at a political level, awareness of and enthusiasm for a strategic approach to promoting Europe's competitiveness in the digital economy. On the one hand Europe has an impressive track record in calling the shots in the development of our global digital village, such as in the development and proliferation of GSM worldwide. On the other hand, we will not sustain this privileged position without a high-level political commitment to leading in the design of new technological solutions that win acceptance on all continents. We call on policy makers in Europe to turn their attention to this matter, and to give it the appropriate prioritization in their upcoming mandates. A lead once lost is seldom regained.

> **Carl Bildt**



ACKNOWLEDGMENTS

A panel composed of high-profile professionals from a variety of horizons gathered throughout the first semester of 2019 to debate *Standardization for EU competitiveness in a digital era*.

This report reflects the active engagement of the members of the panel, their insights and the discussions that took place during the meetings. We wish to express our heartfelt thanks to the members of the panel for those invaluable moments of “being smarter together”.

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DISCLAIMER

ETSI requested consultancy Kreab to assemble an independent panel of experts in order to gather insights and experience from industry, politics and academia. The task of the panel was to discuss the role of standardization in promoting European competitiveness within the sphere of digital transformation.

This report is a synthesis of the discussions over a nine-month period. Its objective is to contribute to the thinking and to stimulate debate amongst European policy makers regarding this important matter.

The report reflects neither the official policy of the ETSI, nor its governing bodies and members. It represents only a realization by ETSI that the questions addressed in the report need to be considered as a matter of political priority, at a time of leadership transition in the European institutions.

Moreover, the participation of the individuals in the panel was in their personal capacities, and the report does not reflect the views of the organizations with which the panel members are currently affiliated.

EXECUTIVE SUMMARY

Europe is engaged in the global technological race between digital superpowers, and the EU's strategic approach will determine whether it maintains its leadership position and strategic autonomy in the digital era. If it fails, it will become over-reliant on imports of goods, services, innovations and ideas, a has-been technological powerhouse that must satisfy itself with cast-off products and solutions from global systemic competitors who set the rules; the very same who will create the most value-added jobs, which in turn spur growth and competitiveness.

The EU and its member states have many cards in their hands to be serious contenders in that race: an

increasingly integrated market of 500 million citizens, high-speed broadband infrastructures, connectivity and digital services, competitive industries in many domains, a buoyant SME and start-ups scene, a track record in standardization, and values such as rule of law, privacy and data protection that are becoming strong differentiators in today's world.

But digitalization and all-out connectivity are game changers, and when considering global competitiveness in the digital economy, Europe stands before significant challenges:



HOW TO SET priorities and develop a comprehensive industrial strategy that stimulates European competitiveness in the digital economy, based on a trusted partnership between the private sector and government.



HOW TO COMBINE different policy dimensions such as trade, security, innovation, digital and industrial policy to shape a global digital policy.



HOW TO ENGINEER an effective toolbox to support research, technology development and innovation.



HOW TO REGAIN the EU's leadership and performance in standardization, which have somewhat withered compared with past prowess and with the ambitions of its competitors in that domain. Indeed, the current lack of cohesion in EU standard-setting, both in terms of strategic priorities and in terms of implementation, is particularly dangerous as competitors are very serious about leadership in setting global standards for technology, and are well organized to be able to assume that leadership.

In view of these challenges, lawmakers in the EU find themselves at the onset of a new legislative period. This report identifies several tracks and recommendations in terms of policy coherence, resources, concepts and toolbox.

INTRODUCTION

The digital era is not a new frontier, it is the world we live in. It is embedded in all domestic, business, industrial and economic activities – in micro or mega transactions, and in the creation and provision of goods and services, including public services. What was first considered a new media (online), then a sector (ICT), is today so pervasive that the expression “digital transformation” has been coined.

“The digitalization of the economic activity can be broadly defined as the incorporation of data and the Internet into production processes and products, new forms of household and government consumption, fixed-capital formation, cross-border flows, and finance.”¹

A key game changer in digitalization is “global connectivity”. Globalization may not be a new phenomenon in history, but global connectivity triggers new challenges for policy makers and societies. With it comes the blurring of categories that used to be distinct, e.g. products and services, networks and content, news and advertising, industrial and societal matters. Digitalization also transforms the conceptual grounds on which policies are built.

As it diffuses into all social and economic activities and to a large extent shapes them, the digital transformation has become a high priority on leadership agendas. EU policy makers are laying out ambitious plans for Europe’s proficiency and competitiveness in the global digital economy. These plans either address directly the question of the organization of standardization or assign a specific supporting role to it, e.g. Digital Single Market Strategy, Digitization of European Industry, High-Level Group on AI.

In the last two decades of the 20th century Europe took the lead globally in mobile communications, inducing the vast creation of value, jobs and innovation – and quite some political gain. The reasons for this success

story are deeply rooted in the European industrial landscape of that time, the economic and political context and investment in R&D – both public and private.

But the key ingredients of this success were first and foremost:

- > The vision that a common standard in Europe would boost internal market cohesion and the competitiveness of the bloc,
- > The EU’s capacity to enthuse and coordinate the actors of the ecosystem, including national administrations,
- > And indeed, the creation of a proper standardization engine to put this idea into action.

Of course, the landscape in 2019 is completely different and history does not repeat itself. Nonetheless, as lawmakers aim to make Europe a leader in the global digital economy, the question arises as to how the EU can build on its strengths and know-how to sustain its ambitions in the digital economy, what assets to call upon, and what calls for a conceptual refresh.

To reflect on this and nourish the debate amongst policy makers in Europe, the group agreed to frame its debate with the following premises:

- > Standardization is a strategic lever of policy making when it comes to innovation, competitiveness, consumer protection and industrial strategy; it cannot be taken in isolation.
- > Standards create market opportunities and contribute to shaping markets.
- > Sometimes standards can be regulatory, either from the onset or with hindsight.
- > Europe’s trade partners, such as the United States, Japan and China, use standardization policy to increase their national industry competitiveness and facilitate trade on a global scale.

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^{1/} Measuring the digital economy, IMF report, February 2018

> Whilst standardization is essentially an industry-driven, bottom-up discipline, a top-down, regulatory-driven approach can lead to success stories, e.g. safety or energy efficiency of cars.

> Standards and standard-development processes also reflect the values prevalent in society. In the EU, standard development is inclusive and industry driven, and standards are voluntary in their development and application.

> The EU needs an approach to standardization that will advance economic gains, growth, sustainability and competitiveness, as well as enabling people and society to benefit from digitalization.

> The EU needs to act fast given the speed of digital developments and global shifts. At stake are Europe's values and future.

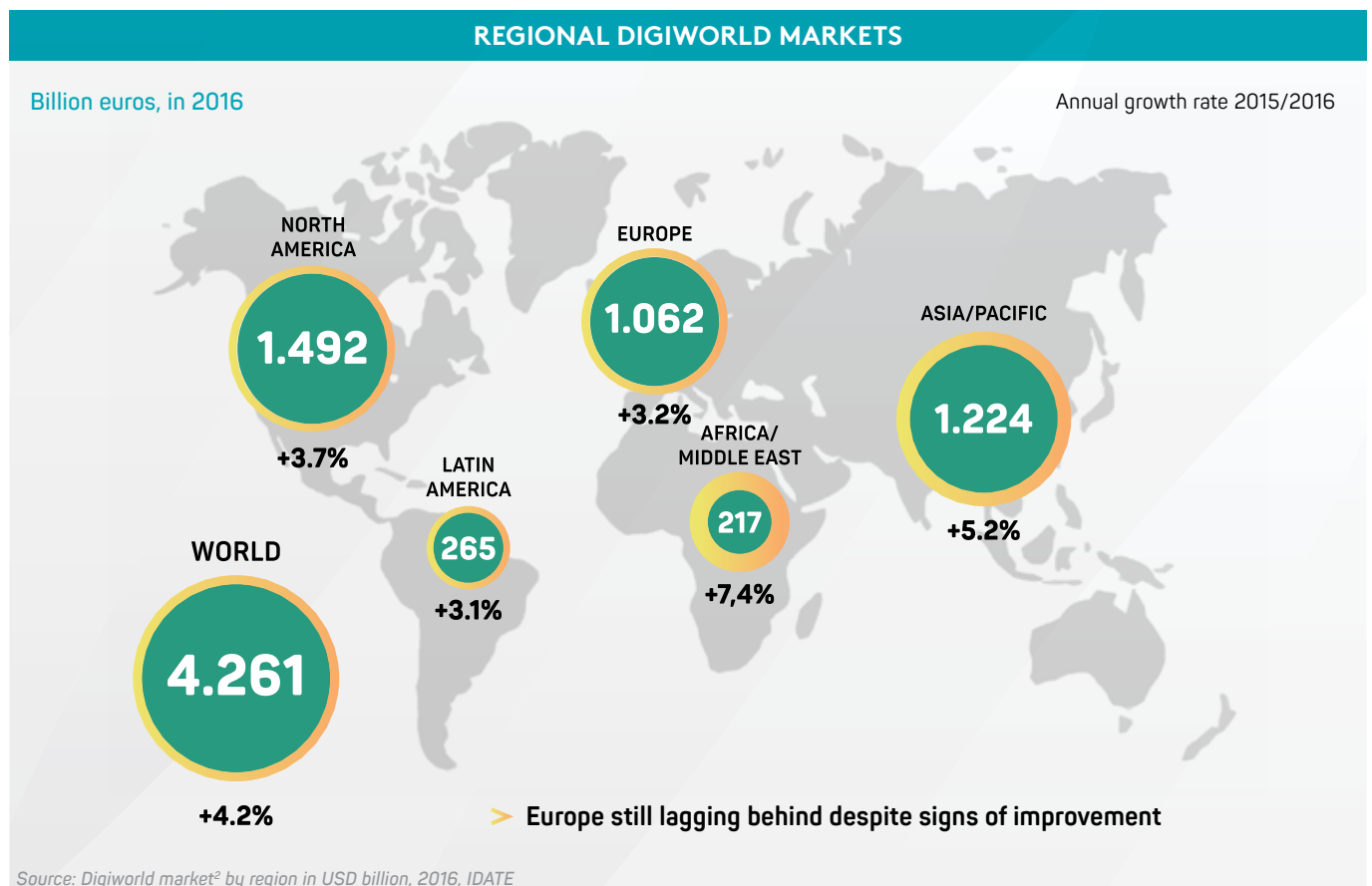
This document presents the findings and strategic directions arising from the work of this group that took place throughout the first semester of 2019.



1.1. THE EU IN THE WORLD

1.1.1. EUROPE'S INFLUENCE WANING

The notion of "market share" is difficult to define in the tech sector, especially where many services are provided to users free of charge and revenue is generated by connected value propositions or third parties. One can argue, however, that once a leader in the tech sector thanks to its leverage in mobile communications, the EU is now losing ground to the US and Asia.



2/ Digiworld is defined by IDATE as technologies for infrastructure, access, services and content

11.2. THE PLATFORM ECONOMY, NOT THE EU'S STRONG SUIT

Digital platforms are today's dominant business model in the creation and provision of products and services worldwide. Platforms aggregate consumers and producers through ecosystems that can open and substantially disrupt markets.

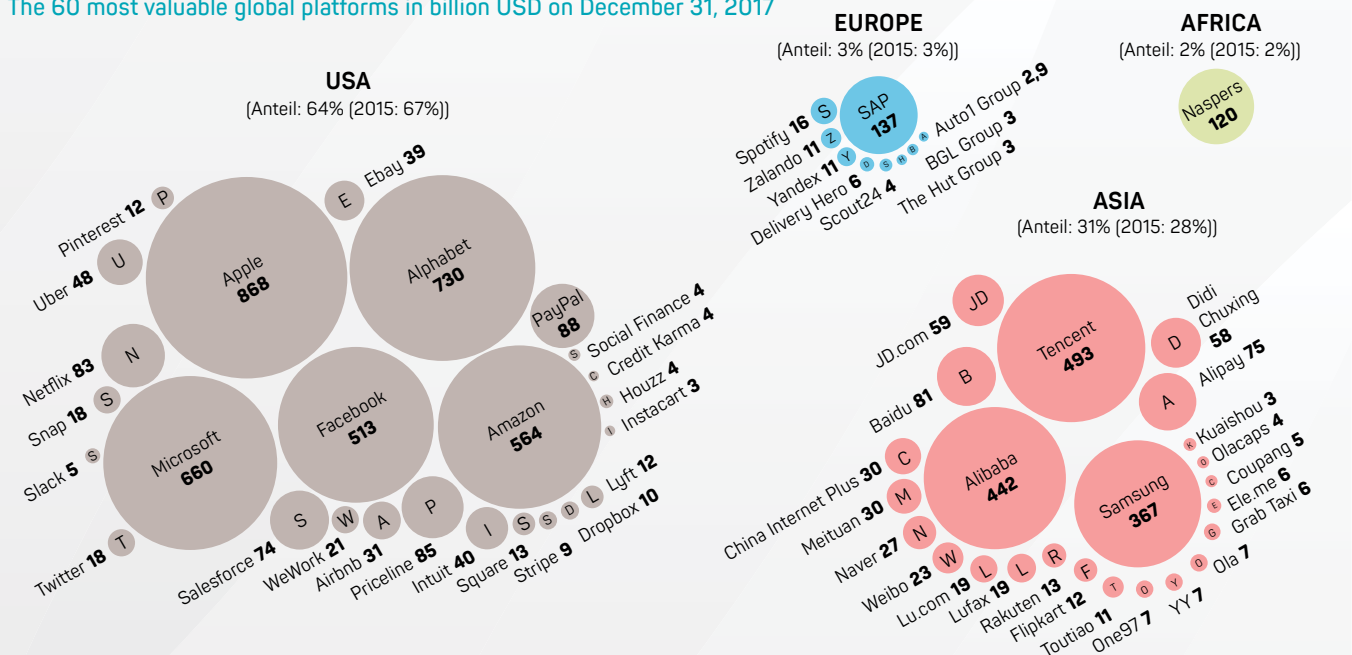
Today, the platform economy is dominated by US and Asian firms. 46% of platforms with a revenue above USD 1 billion are based in the US and 35% in Asia (mostly in China). Only 18% are based in the EU and 10% in Latin America.

These platforms establish their own, sometimes closed, ecosystems, with their own specific rules and requirements.

On the other hand, standard setting is an open, consensus-driven process, open to large and small actors alike, as well as to societal stakeholders. Should Europe continue to lose points of competitiveness in global standard-setting, as well as in strategic areas of the digital economy, it will rapidly become a follower and a rule-taker in the digital economy, as has happened in today's platform economy.

THE IMBALANCE OF PLATFORM ECONOMY

The 60 most valuable global platforms in billion USD on December 31, 2017



Dr. Holger Schmidt | Netzoekonom.de | Handelsblatt | TU Darmstadt | Ecodynamics.io | Plattformenconomy.com
Quelle: Netzoekonom.de / Idee: Peter Evans

THE US AND CHINA

1.1.3. FOR EU COMPETITORS, STANDARDIZATION IS A STRATEGIC DISCIPLINE

"We must clearly understand the fundamental law of standard development which is that standards are never neutral. They reflect the strength and innovations of those who offer them to the committees. Not participating in standardization abdicates the decision-making to the competition, whether it be by company or nation."³

Trade is global, supply chains are global and so should be standards. Experience proves that success stories in standardization occur when standards attain global reach, as was the case for Internet protocols, mobile communications and digital television.

Yet, standardization is driven by the strategic agendas of market players - including governments. Standards are never economically neutral. They are a tool in global competition.

All partners that Europe trades with assign to standardization a high strategic value - and deal with it accordingly. This might be expressed in five-year plans or in national standardization strategies, but it is always explicitly connected to and in support of the national industry's competitiveness.

A specific feature of new entrants' strategy is the quest for more influence in the formal international system (i.e. positions in the ISO and IEC). But whether new entrants or established standard-setters, the objective to lead in global standardization always translates into significant investment in a powerful local standardization arsenal and internationalizing ex-post the output if needed. No trade partner of Europe goes to compete globally without a strong domestic standards production machinery.

It is almost impossible to compare different national standardization systems. We can see, however, that the US has identified standardization as a key strategic priority for competitiveness. The US Telecommunications Industry Association (TIA) operates nine engineering committees establishing standards for private radio equipment, cellular towers, Voice over Internet Protocol (VOIP) equipment, structured cabling, satellites, telephone terminal equipment, accessibility, data centres, mobile device communications, vehicular telematics, smart device communications and smart utility mesh networks. Over 1 000 individuals from service providers, network equipment manufacturers, government bodies and end users participate in these committees. It is a clear objective of the TIA, in collaboration with the American National Standards Institute (ANSI) to have its standards established at the global level at the International Telecommunication Union (ITU), International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC). This process is supported by government agencies such as the National Institute of Standards and Technology (NIST) and its Standards Coordination Office (SCO), and the Interagency Committee on Standards Policy (ICSP), mandated by the National Technology Transfer and Advancement Act (1995).

China is actively increasing its influence in international technical standardization, and has identified standards as a key area to project economic power in the world. According to a report by the Swedish Institute of International Affairs, between 2011 and 2018 China doubled and at some levels tripled its participation in secretariats of technical, sub-technical and working group committees of International Standardization Organizations.

With a domestic market soon to reach 1.5 billion consumers, combined with heavy support and protection from state entities and ambitious projects such as the Belt and Road initiative to support the exportation of home-grown technologies and standards, the Chinese market represents a fantastic laboratory to develop, innovate and commercialize technologies. Employing a dual system of government- and market-issued standards, Chinese technologies can remain incubated and protected until they have achieved the necessary critical mass to break out into the global marketplace.

.....
3/ W. J. Hudson, CEO of Amp Inc. at the World Standards Day, 1995

*"How do standards impact our ability to compete internationally? What is needed is that our domestic standards experts aggressively participate in international standards development to get domestic standards accepted. The first to propose a standard for adoption at the international level will most likely succeed. Thus, it is necessary to get to the international arena ahead of standards experts from other countries."*⁴

So indeed, the global nature of the digital economy calls for openness and collaboration, but compared with its competitors, does the EU grant "domestic" standardization the same strategic influence? Does it set coherent strategic objectives? Does it equip itself with a governance of the system that allows it to "have all of its ducks in a row" to compete globally? As long as the EU does not consider it a strategic priority to have standards "made in the EU for global use" and allot sufficient budget to that end, it is depriving itself of a key asset in competing globally.

The current context is yet another compelling reason why the EU must list standardization amongst its strategic priorities.

*"After three decades of moving toward a single global market governed by the rules of the WTO, the international order has undergone a fundamental change (...) an open, unified global market (may) indeed become a thing of the past."*⁵

Should this (re)fragmentation occur and the world gets back to an archipelago of antagonistic trade blocs, Europe will more than ever need a robust, efficient and autonomous standardization strategy in support of its policy objectives. Otherwise it risks being outmanoeuvred in the global race for leadership in digital.

STRATEGIC DIRECTIONS:

- > The EU must put standardization as a political and strategic priority, both within the bloc and in its global trade dialogues.
- > Standardization must be connected to industrial strategy and corresponding policies: innovation, competitiveness and digitalization.
- > The EU must allot a budget and resources in standardization that correspond to its ambitions in the digital economy.

.....
4/ M. Ritterbusch, SAE and ISO, cited in "The new global rulers, the privatization of regulation in the world economy", Princeton University Press, 2011
5/ Op-ed by Joschka Fischer in Project Syndicate, 3 June 2019

1.2. THE EU INSIDE: INTRINSIC WEAKNESSES

1.2.1. THINKING IN SILOS

Digital transformation is essentially about the use of digital technologies (high-speed broadband, IoT, AI, data analytics, etc.) to gain productivity, efficiency and sustainability by connecting “horizontally” sectors that used to operate separately. Smart cities, smart manufacturing and connected vehicles epitomize this transversality. However, this disruption to existing business, markets and social models requires the right policies and institutional steps, including pulling together good analysis and evidence to support the development of digital policy responses.

To this date, in the EU, policy and law-making remain very much organized in silos and “sectoral thinking”. To each sector its DG and “may the best win”. This has sometimes led to costly inconsistencies and the need for market players to reconcile ex-post legal obligations and technical specifications.

Naturally, what happened at the top trickled down, and the organization of the relevant departments of the Commission into sectoral units has had tendency to aggravate this in-sectoral view of the world.

Recent policy initiatives aim to amend this silo-thinking. The objectives of ventures such as Industry 2030, Key Strategic Value Chains or IPCEI⁶ to have a coordinated approach and investment strategy in domains such as connected, clean and autonomous vehicles or industrial IoT should be praised. What remains to be explicitly inserted into those new policy endeavours is the standardization dimension (see “Standards matter”).

“We need to upgrade, modernize and fully implement the single market in all its aspects, removing any artificial distinction between traditional “bricks-and-mortar” and digital markets.”⁷

In this context it is important that with the new Commission, standardization benefits from a “breaking silos view from the top” and coordination at the highest political level, as was the case for competitiveness in the previous mandate.

STRATEGIC DIRECTIONS:

> The EU needs to de-silo its approach to standardization and ensure coordination at the highest political level.



6/ Important Projects of Common European Interest, currently semi-conductors, batteries and HPC

7/ Jyrki Katainen, European Commission Vice President in EY “Attractiveness Survey Europe”, June 2019

1.2.2. STANDARDIZATION: MANY COOKS IN THE KITCHEN, NOT A CHEF IN SIGHT

Despite, or maybe because of, the deficit of a unified strategic perspective on standardization, the EU has in the recent past taken a variety of steps to evolve the standardization machinery: Reform of the standardization system and Multi Stakeholder Platform (2012), Joint Initiative on Standardization (2016), creation of coordination platforms, and initiatives with a standardization component, e.g. Alliance for the Internet of Things Innovation (AIOTI), Digitization of European Industry, and so on.

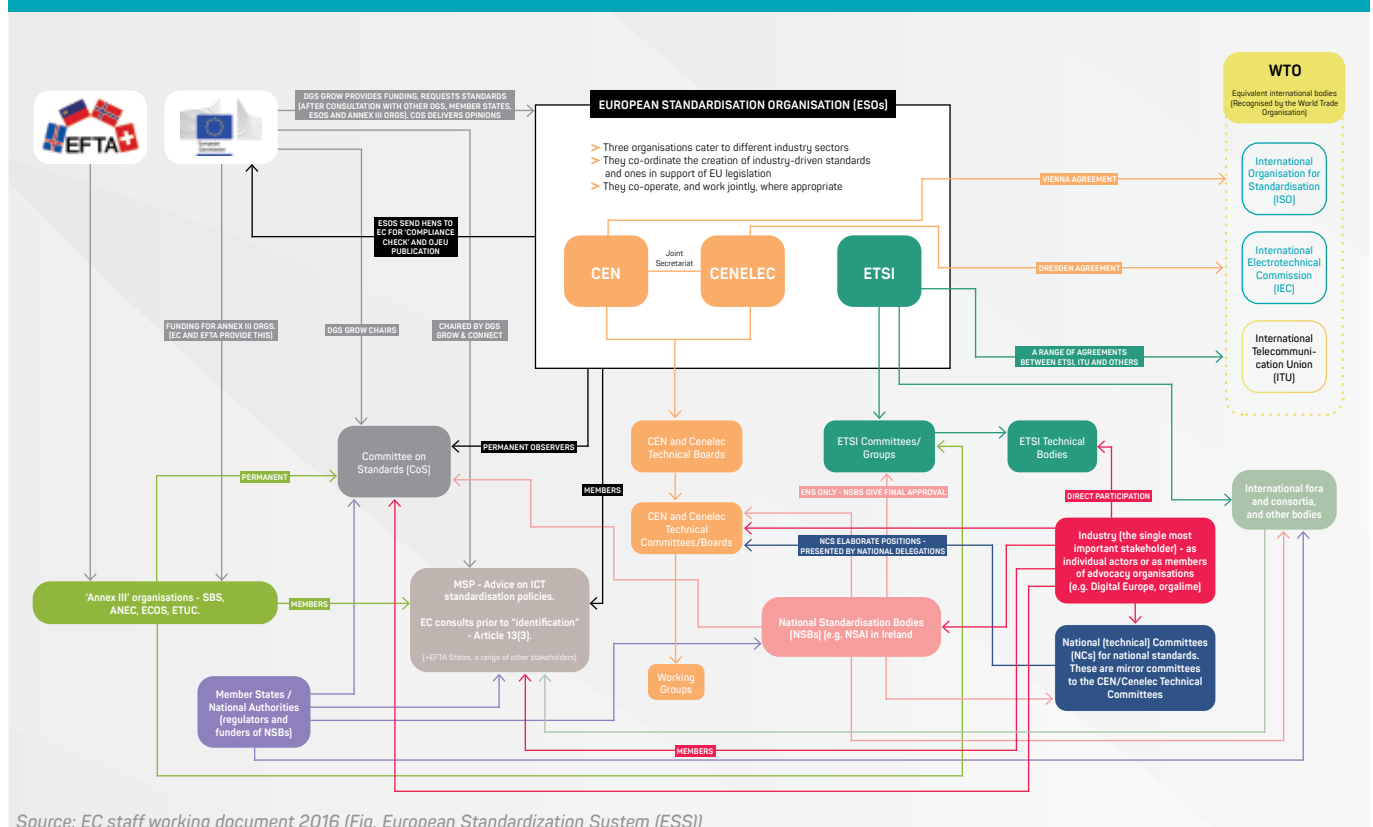
As a result, the system has grown quite cryptic and entropic, to the extent that nobody to date can have a holistic view of the machinery, the interactions between the different parts and the overall output,

and even fewer can exert a steering function over it or “get all the ducks in a row” when industrial competitiveness is at stake. The problem is not the individual ingredients, it is the lack of direction, cohesion and governance.

STRATEGIC DIRECTIONS:

> In line with a unified political direction, the EU needs to streamline, adapt, clean up and manage the standardization apparatus and the processes that govern it.

THIS DIAGRAM SHOWS HOW COMPLICATED THE EUROPEAN STANDARDIZATION SYSTEM IS



THE NEW APPROACH, BIRD'S-EYE VIEW

1.2.3. THE NEW APPROACH: A UNIQUE ASSET UNDER STRESS

The New Approach has enabled since its inception the production of standards in support of legislation in a swift, efficient and open manner in a variety of domains, hereby making standardization a critical resource in building the internal market.

Presumption of conformity in particular has been a key asset for SMEs. Enshrining self-declaration of conformity in law is a tremendous time and cost saver for industry, in particular for SMEs, who do not need to overcome the hurdles of third-party testing and certification.

Today this regulatory technique is under such stress that some call for its repeal. It is true that in the recent past, the system has choked on a set of high-profile cases (radio equipment, medical devices, construction products). Its inability to deliver on time the harmonized standards (hENs) required by legislation and needed by industry and consumers has provided ammunition to those who claim it is a thing of the past.

It is also true that a series of decisions of the Court of Justice of the European Union, emphasizing the legal effects of hENs and the liability of the European Commission that green-lights the publication of these in the Official Journal, has had dramatic consequences on the chain of production of hENs. Consequently, tensions between the Commission and ESO members have severed the trust between parties that must underpin the smooth functioning of the New Approach, and ultimately of the European Standardization System (ESS) altogether.

To combat the overly detailed methods of legislative harmonization, the delays and the “cost of non-Europe”, in the late 1980s EU lawmakers took a more pragmatic approach to removing trade barriers: the internal market. As part of this endeavour, the “New Approach to technical harmonization and standards” was laid down in a Council Resolution in May 1985, with the following principles:



Legislative harmonization is limited to the adoption, by means of Directives, of the essential safety requirements (or other requirements for the general interest) to which products put on the market must conform. Products conforming to those requirements will have the benefit of free movement throughout the territory of the European Union.



The task of drawing up the technical specifications needed for the production and placing on the market of products conforming to the essential requirements established by the Directives is entrusted to the European Standards Organizations (ESOs). These technical specifications (Harmonized Standards) are not mandatory and maintain their status of voluntary standards.



Once the European Commission has cited a Harmonized Standard in the Official Journal of the European Union, it grants to the suppliers the right to self-declare that their product is in conformity with the essential legal requirements referred to in the corresponding standard, hence the right to place products on the EU market. National authorities have the obligation to recognize that products manufactured in conformity with Harmonized Standards are presumed to conform to the Directive.

Nevertheless, industry, governments, trade associations and ESOs believe the New Approach remains a critical resource to the internal market as well as EU competitiveness. What is most probably needed is a rejuvenation of the system, but certainly not repealing a legal technique that has contributed greatly and continues to contribute - notwithstanding the current struggles - to EU's strategic objectives.

As highlighted by the Ministry of Foreign Affairs of the Netherlands, "harmonized standards make up only 20% of all European standards, and standardization is essentially a well-functioning private system". It is crucial to get smart together to fix what needs adjustment and restore the great asset of the European Standardization System.

STRATEGIC DIRECTIONS:

➤ Adjust New Approach to market dynamics and health check the system, but do not alter the fundamentals.

1.2.4. THE WHOLE IS GREATER THAN THE SUM OF ITS PARTS

National standards organizations and member state administrations in charge of standardization are repositories of an immense wealth of diverse expertise reflecting the specific strengths and capabilities of the economies in which they operate. In this domain too, diversity is a strength that can be better exploited.

However, as is the case at the EU level, we claim that in most EU member states, national lawmakers and decision makers do not sufficiently assign a strategic value to standardization. Building a dynamic and genuinely shared vision among all actors of the European Standardization System is key to reaping the benefits of this strength. Moreover, it is important that all member states be associated in a coordinated manner, regardless of their size and economic or political clout. Without this, Europe's competitors will keep playing "divide and conquer" and pick off countries one by one to impose their competitive agenda at the global level.

STRATEGIC DIRECTIONS:

➤ Identify means to coordinate EU and member state's approach to standardization as a strategic discipline.



There is no single definition of what a standard is, but in general terms standards can be described as formally agreed specifications for products, processes and services that facilitate access to markets.

Standardization is not “l’art pour l’art” and standards are triggered and respond to market needs. However, take any conference, or business event, and standards will typically be perceived as a dry and tedious discipline for nerds, or worse, an innovation inhibitor or a cost generator. In reality, as stated in the New York Times, standards are “the silent and often forgotten foundations of technological societies”.⁸

2.1. SUSTAINABILITY AND SAFETY: STANDARDS HELP PROTECT PEOPLE AND ENVIRONMENT

Standards play a critical role in ensuring a safe and trustworthy world:

- > Protecting consumers from physical harm.
- > Protecting infrastructures that connect people.
- > Safeguarding people’s privacy and personal data.
- > Developing safe and energy-efficient products and systems (eco-design) and providing a common basis for measuring energy efficiency, hence supporting the policy objectives of sustainability and a greener Europe.

2.2. STANDARDS HAVE A SPECIAL FUNCTION IN EUROPE: MAKING THE SINGLE MARKET REAL

Standards are a vital tool for policy makers to create and enable the free movement of goods, services, capital and persons within the single market and the digital single market. This in turn ensures a market of sufficient size and power to support job creation in Europe and competitiveness in the global marketplace.

Without common standards to support market integration, European companies would be constrained by the size of their domestic markets. US, Chinese or Indian competitors, by comparison, would often benefit from a “single market” of hundreds of millions of consumers, with a single national standard ensuring seamless conformity across the board.

2.3. STANDARDS EMPOWER DIGITAL TRANSFORMATION FOR ALL

Digitalization and its success require a series of preconditions: broadband networks, connectivity, interoperability and security, which themselves are powered by standardization. As stated in the recent briefing of the European Parliamentary Research Service:

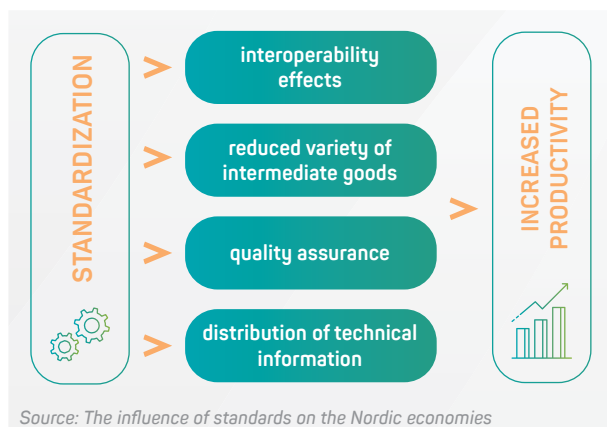
“IoT, big data, robotics, AI etc., all (the technologies enabling digital transformation) rest on an interconnected “smart world”. (...) In this context, proprietary closed systems may generate competitive advantages for individual companies but are likely to limit opportunities for broader growth (and) may also generate risks for users.”⁹

8/ <https://www.nytimes.com/2019/02/16/opinion/sunday/standardization.html>

9/ [http://www.europarl.europa.eu/RegData/etudes/BRIE/2019/635608/EPRS_BRI\(2019\)635608_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2019/635608/EPRS_BRI(2019)635608_EN.pdf)

2.4. STANDARDS BOLSTER MARKET DEVELOPMENT

Studies carried out in France, Germany, the United Kingdom and more recently in the Nordic countries¹⁰ confirm the positive impact of standardization on growth, GDP and productivity. By defining a minimum set of common requirements that economic agents can refer to trustfully, by facilitating the interoperability of products and processes, and by ensuring quality and safety, standards are a key element of the induction of network effects and the development of cost-effective new products and services. This network effect is even more relevant to ICT and digital technologies, which are the foundational bricks of the digital economy.



2.5. STANDARDIZATION EVENS UP THE GAME

In Europe, SMEs and innovators sit at the same table as corporations and can have influence by contributing their innovations to the standardization process.¹¹

Standards and open interfaces are critical to building open ecosystems in which all market players will “plug in” their innovations. This is where the political decision to mandate open interfaces has played a key role in the past (see box on GSM). This incredibly powerful policy

^{10/} https://www.stadlar.is/media/45210/the_influence_of_standards_on_the_nordic_economies.pdf

^{11/} In ETSI only, 28% of companies are SMEs, representing 40% of total technical contributions

tool can also be deployed in the digital economy and contribute to equalizing the game and ultimately creating virtuous and profitable ecosystems.

Standard-setting reflects societal values, for instance by giving a voice to consumers and societal stakeholders. It empowers consumers who then know what to expect from a product or service, hence creating a trusted relationship with their supplier, or allowing them to select another supplier if they so wish.

2.6. STANDARDS SUPPORT REGULATION

Whilst standard-making in the EU is essentially an industry-led, private system, the Commission can request the European Standards Organizations (CEN, CENELEC and ETSI) to develop harmonized standards (hENs) to implement regulations in the public interest, as is the case for radio or medical devices. Today, hENs make up about 20% of the ESOs’ total output.

2.7. STANDARDS SUPPORT POLICIES

Even when they are not produced in direct support of regulation, many standards support policy objectives. Think IoT, 5G, security indicators, semantic interoperability and data formats, or quantum-safe cryptography. All of the standardization work in those areas contributes to EU policy objectives, as well as to reinforcing the single market, boosting competitiveness, facilitating global trade, improving citizens’ welfare and protecting the environment.

Despite a waning sense of self-confidence, Europe has many assets to lead in the digital economy: economic and industrial strengths, talent, education and an integrated market of more than 500 million consumers. In addition, strong democratic values, fair competition, regulatory predictability and rule of law are distinctive strengths in the global market.

3.1. INDUSTRY AND SERVICES

Furthermore, three European network operators are in the top 10 telecom companies worldwide.¹² With massive fibre network rollouts, the EU is on track to provide all citizens with fast broadband (over 30 Mbps), and ensure take-up by 50% or more of European households of ultra-fast broadband (over 100 Mbps) by 2020. However, EU competitiveness in the digital economy cannot rely on competitive connectivity alone or the strengths of the telco or ICT industry.

First and foremost, Europe's competitiveness in the digital market will actually result from its ability

to embed digital capabilities (e.g. IoT and AI) in the operations of competitive industries and services in order to increase their performance. This is known as digital transformation and is entirely dependent on being enabled by standards that support interoperability.

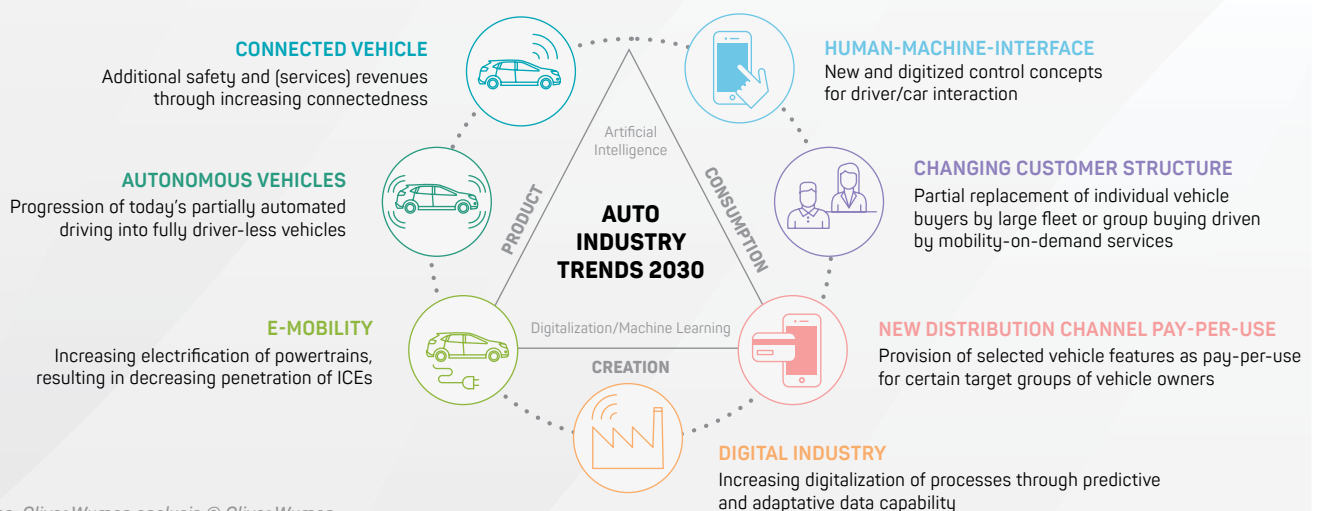
3.1.1. AUTOMOTIVE

The European automotive industry exported 5.9 million motor vehicles in 2017, generating a trade surplus of €90.3 billion. The sector represents the largest private investor in R&D. In addition, it has an important multiplier effect on the economy; for upstream industries such as steel, chemicals and textiles, and for downstream industries such as ICT, repair, mobility and engineering services.

The automotive industry relies on and will continue to invest in digitalization. At the nexus between connectivity, security, safety and the environment are standards that ensure trust and interoperability.

THE MIGHTY SEVEN

Seven fundamental trends drive the automotive industry until 2030, enabled and accelerated by Digitalization, AI and Machine Learning



Source: Oliver Wyman analysis © Oliver Wyman

12/ Telefonica, Vodafone and Deutsche Telekom

3.1.2. RETAIL

Both high street and e-commerce retailers depend increasingly on the optimization of supply chains, accurate stock visibility, workforce management, secure payment transactions, analytics and marketing, loyalty and customer retention. All of these are empowered by digital solutions that are backed by reliable standards and specifications.

RETAIL REVENUE, 2016 (source Deloitte)

EUROPE	33.8%
NORTH AMERICA	47.8%
ASIA PACIFIC	15.4%
MIDDLE EAST AND AFRICA	1.5%
LATIN AMERICA	1.4%

3.1.3. THE SERVICE SECTOR

In both the public and private sector, digitalization is increasingly at the core of the creation and delivery of services. Services represent a great variety of economic activities, including trade, hotels and catering, transport, storage, communications, finance, insurance, business services and community, social and personal services, and account for more than 70% of the GDP in the EU.

As noted in a CEN-CENELEC report:

*"This might be an area where standards could promote better levels of transparency, disclosure and minimum requirements for data quality and protection. In doing so, service standardization can take advantage of the experience gained so far with product standards."*¹³

13/ https://www.cenelec.eu/News/Publications/Publications/services_strategy-Final-2017-08-30.pdf

3.1.4. SMART CITIES

Smart cities rely on the meshing of networks (communications, transport and energy) to connect people, homes, workplaces, things, utilities and public services, and improve sustainably and securely the urban areas where 78% of Europeans live today.

*"Smart cities are a growth market expected to be worth around USD 1.5 trillion globally by 2020. Of the total market value created by this time, around 38% is predicted to emanate from smart education and smart energy technology."*¹⁴

In many areas Europe is leading this transformation, very much entwined with the "green agenda" as European cities have begun to implement an efficient ecosystem of information, as well as introducing physical goods designed to minimize waste and consumption of energy (i.e. circular economy).

This is an activity where SMEs and local governments are at the forefront of developing innovative solutions to meet societal needs. But without standards to enable interoperability, stability, security and privacy, they will have neither the confidence nor the means to make the necessary investments to make it happen, and consumers and citizens will not adopt the innovations.

3.1.5. FACTORY AUTOMATION

The industrial control and factory automation market is expected to reach USD 269.5 billion by 2024, up from USD 160 billion in 2018. Key market players include ABB (SE/CH), Siemens (DE), Bosch (DE), Schneider (FR), Endress+Hauser (CH), Progea (IT), Vega (DE), Danfoss (DK), Tegan Innovations (IE) and Krohne (DE).¹⁵

14/ *Cities Today*, 8 February 2017

15/ <https://www.marketsandmarkets.com>

This is also an area where a few European countries have the lead and sometimes tend to go directly to international standardization bodies. It is important, however, that ESOs continue to champion innovation at global level whilst providing a European growth-bed for smaller and new entrants to build the capability to compete at global level.

3.1.6. EGOVERNMENT AND DIGITAL PUBLIC SERVICES

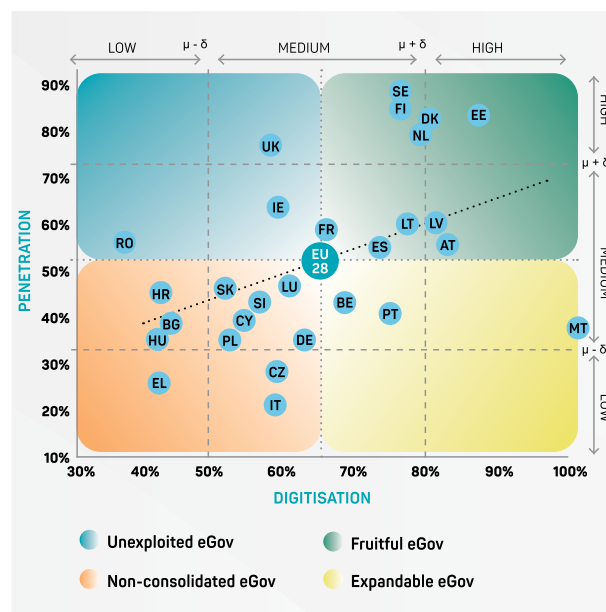
ICT is already widely used by government bodies, and cross-border digital public services are an essential piece to achieve the digital single market. The 2018 benchmark of DG Connect shows the performance of EU countries, and assesses progress made against the principles set forth in the EU eGovernment Action Plan 2016-2020 and the Tallinn Declaration on eGovernment:

- > Digital-by-default
- > Trustworthiness and security
- > Openness and transparency

The EU is quite advanced in the creation and provision of digital public services, and differences between member states should not obliterate the fact that:

- > Having to provide cross-border services in countries with different cultures and legacy systems is probably part of the reason for this advance.
- > The advent of cross-border eGovernment and digital public services shows the power of legislation and corresponding tools (e.g. ISA2) to create and shape markets.

As public services and governments' interactions with citizens become more and more digital, new kinds of challenges are appearing, relating notably to security (vulnerability of the supply chain), data protection and privacy.



3.1.7. THE POWER OF START-UPS, SMES AND INNOVATION INITIATIVES

SMEs represent 99% of all businesses in the EU. Over the period 2012-2017, SMEs created around 85% of new jobs and provided two-thirds of the total private sector employment in the EU.

With 828 982 companies in the EU, a total revenue of €426 billion, 4.5 million employees and total funding of €36 billion,¹⁶ start-ups represent collectively an incredibly dynamic innovation scene.

"Digitalization is breaking entry barriers (lower investments required), causing this explosion of (fintech) start-ups. They focus on niche needs and provide great customer experience to create a difference and gain traction. They prioritize growth rather than short-term profitability."¹⁷

16/ www.startuphubs.eu

17/ Head of Retail at ING Bank Romania

Many cities in the EU have become start-up hubs, facilitating the creation of tech companies that will compete on a global scale. This was the case for Skype, Criteo, Spotify, Supercell, Zalando and Soundcloud to name a few. Notably, the free movement of labour is a key asset of the internal market in this endeavour.

“Europe’s start-up culture is rapidly changing for the better. Most importantly entrepreneurs need no longer be lonely in Europe. In Europe’s tech clusters, they are sharing their journey and sharing experience with bigger and tighter networks of founders and investors.”¹⁸

A similar dynamic applies to the innovation clusters in member states, such as French Tech, Catapult (UK) Go-cluster (DE) and Danish Health-tech.

3.2. R&D INVESTMENTS

While the EU and Member States do not appear at first sight to be among the highest investors in R&D compared to other regions, R&D is an area where the multiplier effect of national and European level, public and private is the most striking.

In addition to investments at national level (average R&D spending in EU countries is 2.03% of GDP compared to 2.8% in the US and 2.1% in China) many programmes raise the level of R&D investment in the EU. To name a few:

- > Horizon Europe – €100 billion for research and innovation.
- > Public-private partnerships with over €6 billion of public investments expected to trigger additional investments.
- > Public funding of €1 billion (half financed by the EU) to invest in at least four supercomputers by 2020.

What is missing in this landscape, however, is an explicit and “organic” link between research and standardization, as exists in other regions. Many efforts have been made recently at EU level to better connect the two and ensure that the output of research projects is channelled to standardization to set in motion the virtuous cycle of R&D/standards/market deployment.

The European Commission in general and the Joint Research Centre are applying considerable focus on the strategic character of this link between research and standards¹⁹. ESOs are also developing awareness programmes towards academia and research bodies to advocate for standardization as a step to spread and secure research output. This remains to be further developed to ensure that the multiplier benefit of the EU’s investments in R&D occurs first and foremost in the EU.

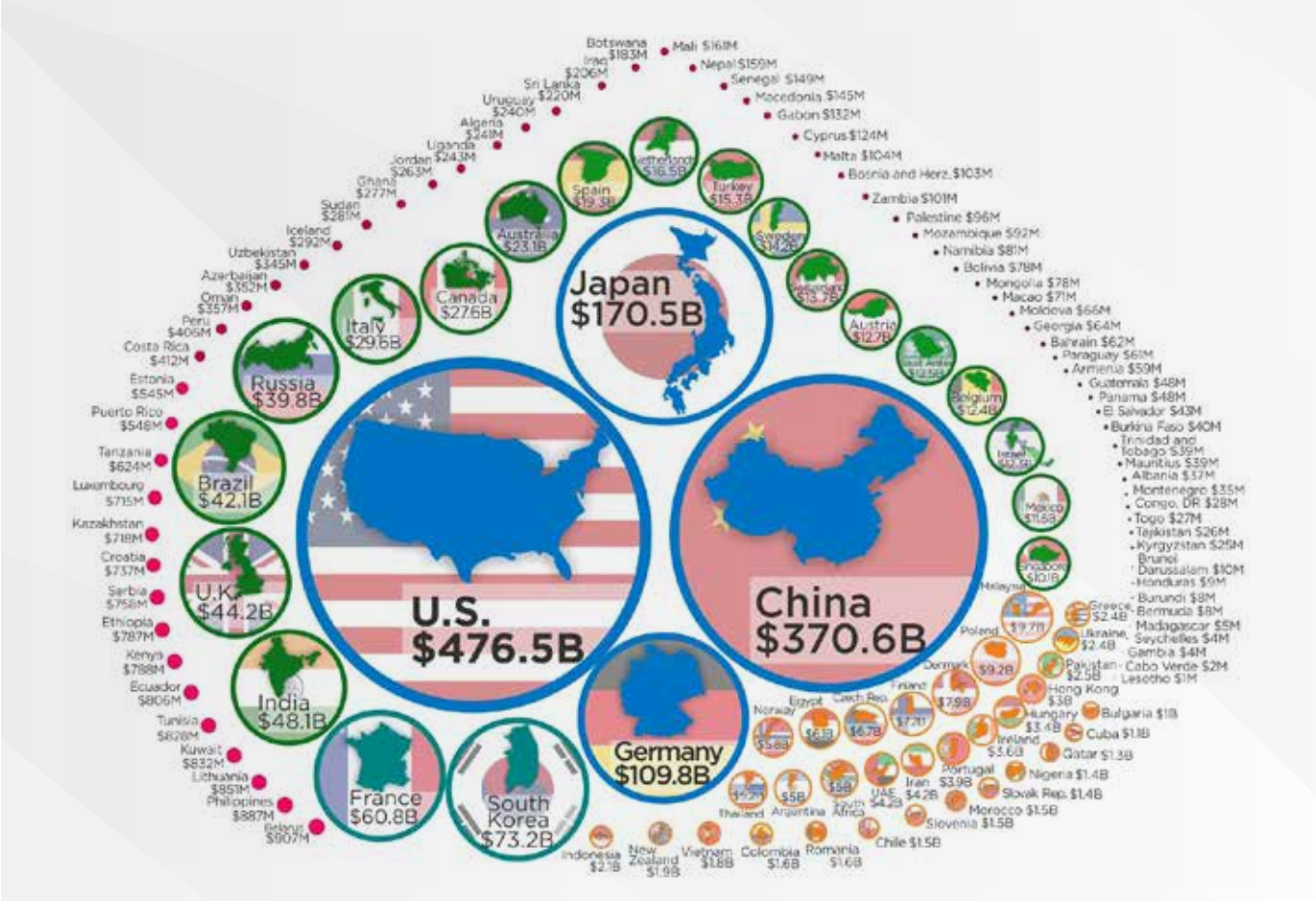
STRATEGIC DIRECTIONS:

- > Connect “by design” research to standardization, e.g. in Horizon Europe programmes.

^{18/} www.indexventures.com

^{19/} <https://ec.europa.eu/digital-single-market/en/research-standards>

HOW MUCH COUNTRIES INVEST IN RESEARCH & DEVELOPMENT



R&D SPENDING BY COUNTRY (IN PPP\$)

More than \$100B
\$50B - \$100B
\$10B - \$50B
\$1B - \$10B
\$500M - \$1B
\$100M - \$500M
Less than \$100M

Article & Source: <https://howmuch.net/articles/research-development-spending-by-country>
<http://uis.unesco.org>

3.3. POLITICAL AND SOCIETAL ASSETS

In addition to its industrial and intellectual assets, the EU has a number of political and societal assets and differentiators to build on in the digital economy.

Above all, it is a region governed by rule of law and democratic values, where fundamental civil rights such as privacy and data protection cannot be tampered with.

In translating these values into legislation such as the General Data Protection Regulation (GDPR), the EU has set a standard with which every firm having customers or employees in EU countries must comply. This may be construed by some as a hindrance or a disincentive to invest in the EU, but it is interesting to note that since the adoption of the GDPR, many countries, e.g. Japan and Canada, have mirrored the GDPR in their legislation. This power to create “value-based” legislation has also proven economically efficient more than once in the past.

Being the first to enshrine in regulation consumer safety, security, privacy or environmental objectives means securing the first-mover advantage for standard-setting and industry developments to support those legal objectives.

"Since the Paris Agreement, businesses and regional governments (in the EU) have shown unprecedented international leadership in setting long-term decarbonization targets and driving the transition to clean, healthy energy systems."²⁰

The EU is also a region where the market economy and liberal order do not equate to "might is right". With programmes such as cohesion funds, regional policies or initiatives targeting SMEs, the EU is managing to translate the objectives of equity and inclusiveness into action, hence making a strength of its diversity.

Whilst often being portrayed as a fragmented and hence weak economic space, the EU's diversity, and the political construction derived from it, have proven to be a powerful economic and competitiveness lever when mobilizing resources around common objectives. The construction of the internal market illustrates this perfectly. A recent study on Quantifying the Economic Effects of the Single Market²¹ estimated that direct trade effects of the economic benefits of the single market are between 8% and 9% higher GDP on average for the EU.

3.4. THINKING OUTSIDE THE BOX, LITERALLY

Europe is bigger than EU28. This is a point that EU lawmakers should utilize better.

Of course, the jurisdiction of the single market encompasses the 28 EU member states plus EFTA countries.

However, until the liberalization of the telecom market in the late 1980s and the advent of GSM that commanded that standardization be transferred to a private entity (see box on GSM in page 25), the CEPT²² used to be in charge of interconnection between national networks.

Today, for all radio spectrum matters, which are quite central to the digital economy - think 5G and IoT - and the "European" coordination to prepare for the ITU's World Radio Conference, the playing field has the dimensions of the CEPT (48 countries in "geographical Europe").

Reinstating a dose of "EU48" on all digital issues beyond radio matters, and carving the corresponding tools to increase political cooperation with the CEPT, would increase substantially the weight of EU policies and narrative on the global stage.

STRATEGIC DIRECTIONS:

- > Devise a transversal approach to EU Industrial and digital policy, building on EU assets and de-siloing them.
- > Increase political and strategic coordination with the CEPT beyond radio matters to expand the outreach of EU policy making in standardization.

20/ www.theclimategroup.org

21/ https://ec.europa.eu/info/publications/economic-and-financial-affairs-publications_en

22/ European Conference of Postal and Telecommunications Administrations, <https://www.cept.org/>

LEARNING FROM THE PAST, LOOKING TO THE FUTURE

EU *savoir-faire* in standardization goes well beyond the 20% of European standards developed in direct support of regulation, i.e. following a standardization request from the European Commission. In fact, this *savoir-faire* has resulted in putting Europe on the global industrial and technological map to a degree that often exceeds its industrial clout.

When global standards originate in Europe, European actors, private or public, large or small, have guaranteed access to the shaping of them and do not have to play catch up with foreign competitors. Making global standards happen first in Europe is a competitive asset that must be preserved and developed.

This being said, the current EU perspective on standardization as a technical and somewhat secondary exercise, whilst competitors are putting it at the top of their strategic agendas, constitutes a threat and is contradictory to EU ambitions to lead in the digital economy.

DIGITAL VIDEO BROADCASTING (DVB)

Until late 1990, digital TV broadcasting to the home was thought to be impractical and costly to implement. During 1991, broadcasters and consumer equipment manufacturers discussed how to form a concerted pan-European platform to develop digital terrestrial TV. Soon, the major European media interest groups (both public and private), consumer electronics manufacturers, common carriers and regulators were included in the group.

The concept meant that commercial competitors needed to appreciate their common requirements and agendas. A Memorandum of Understanding was signed by all participants in September 1993, and the group named itself the Digital Video Broadcasting Project (DVB). Development work in digital television, already underway in Europe, moved into top gear.

The DVB-S system was agreed in 1994, and the first DVB services in Europe were launched in spring 1995 by pay TV operator Canalplus in France. The DVB-T system was agreed later, in 1997, and the first DVB-T broadcasts began in Sweden and the UK in 1998. DVB-T services started in parts of Germany in 2002, and 2003 saw Europe's first analogue switch off in Berlin.

Today, services using DVB standards are available on every continent, with over 1.5 billion DVB receivers deployed. DVB-S and DVB-S2 are used in virtually every country in the world. DVB-C is also widely used. At least 149 countries have adopted and/or deployed either DVB-T or DVB-T2.



MP3

The world-renowned format for audio coding, MP3, initially evolved from a codex called Optimum Coding in the Frequency Domain, or OCF algorithm, which was part of German student Karlheinz Brandenburg's 1988 doctoral thesis. At the same time, developers at Germany's Fraunhofer Institute joined forces in a research alliance as part of the EU-sponsored EU147 EUREKA project, working on OCF technology that allowed for real-time encoding of stereo music.

In 1989, the Moving Picture Expert Group (MPEG), an international standardization organization, was planning to introduce an audio standard, and OCF was put forward. Following exhaustive testing, MPEG proposed a family of three coding techniques: layer 1, layer 2 and layer 3 (later called MP3), which was based on improved OCF technology.

The technical development of these standards was completed in December 1991, and European success came in 1992 when OCF technology was incorporated into ISO MPEG standardization. In 1995, MPEG layer 3 became known as MP3 format, transforming from a

pioneering European technology to a worldwide audio standard.

In the second half of the 1990s, MP3 was integrated into commercial applications in the areas of musical transmission over ISDN telephone lines and voice announcement systems for local public transport. MP3 files also began to spread on the Internet.

In 1998, MP3 technology application increased with the era of transportable MP3 players, allowing music fans to store their entire music collections. Its increasing popularity, decreasing costs for storage space and the proliferation of the Internet led to billions of users of MP3 to date.



THE GSM STORY

In the early 1980s, the first generation of analogue mobile telephony (NMT) was reaching under-capacity, and experience gained from the NMT system showed that it was possible to develop a system across national boundaries. With the political situation in Europe lending itself to international cooperation, and the aim to use cross-border mobile telephony to boost the EU market, the decision was taken to develop a new pan-European system.

The Groupe Spécial Mobile (GSM) was formed by the CEPT in 1982 to design a digital pan-European mobile technology. In 1986, EU Heads of State endorsed the GSM project, and the EC proposal to reserve 900MHz spectrum band for GSM was agreed in the EC Telecommunications Council.

In 1988, the EC and the CEPT agreed on the creation of ETSI to ensure the participation of suppliers (who were only associate members of the CEPT) in standard-setting. The vision of a pan-European network was becoming a reality.

The first GSM call was made by Radiolinja in Finland in 1991. By the end of 1993, GSM had over a million subscribers and 25 roaming agreements had been signed. Whilst GSM had initially been planned as a European system, the first indication that its success was spreading occurred when the Australian provider Telstra signed the GSM MoU.

In 1996, GSM networks in Russia and China went live and subscribers hit 50 million. By 1997, 100 countries were on air, and five years later 95% of nations worldwide had GSM networks. Fast forward to 2017 and there are 7.9 billion global mobile connections worldwide.

GSM is indeed an industrial and economic success story. It also highlights the central role played by lawmakers, who envisioned the political benefits of a pan-European system and helped to create the conditions to make it happen. Five key policy decisions were crucial to this global success:

- > Assigning a new harmonized radio spectrum, i.e. devising a systemic balance between efficient, optimum use of a scarce natural resource and significant public interest. The spectrum was not only made available, but also included as balancing factors a number of service obligations for network operators, such as minimum coverage requirements.

- > An ingenious licensing model, i.e. more than one but not an exhaustive number of spectrum licences. This allowed maximized use of the scarce resource whilst introducing sustainable competition, enabling network effects and effectively limiting the curse of “winner-takes-all”.

- > Mandating interoperability (i.e. open interfaces) and cross-border service, igniting complex coordination among an array of private and public actors to make it happen.

- > Consumers first. The consequence of those policy decisions was that consumers drove the service offerings in the GSM system, with the possibility to choose (and change) service providers, network operators, device vendors and later also application providers. The latter were not considered properly in the GSM system, which led to dominating application platforms and various related issues.

> Recognizing local needs in member states. The GSM system is conceptually harmonized but in practice fully interoperable. This nuance means that a conscious decision was made to take into account a dose of local specificities, whilst having full roaming capabilities and ultimately a fast-moving market.

The GSM story exemplifies how policy decisions can spark a global industrial success. Of course, the alignment of planets that prevailed then cannot be repeated. Yet the learnings from this experience should be reflected upon when defining the ground rules for the digital market for Europe with the goal of making the European market a leader in fair and sustainable data-based economy.



THINGS MIGHT NOT ALWAYS GO SO WELL

The ITS Directive²³ was adopted in July 2010 to accelerate the deployment of Intelligent Transport Systems technologies across Europe.

Based on Directive 2010/40/EU, in March 2019 the European Commission issued a Delegated Act “aiming at accelerating the deployment of connected transport technologies across the European Union” (c-ITS).

While cellular (5G) and Wi-Fi (G5) technologies were both available to fulfil the objective of “connected and automated mobility”, the Delegated Act proposed by the Commission supported the adoption of Wi-Fi over mobile technology.

This choice drew ire from the mobile industry and a significant number of automotive companies, who argued that the Commission’s choice contradicted the EU’s 5G plans, placed European mobile and automotive companies at a clear disadvantage to other regions of the world, and failed to ensure technology neutrality.

After heated debates, the European Parliament followed through with the Commission’s proposal and voted in favour of it in spring 2019.

But the Delegated Act still had to be approved by the European Council, and in June 2019 the Council rejected it and requested the Commission to reconsider its scope.

So this is not the end of the story, but as a counter-example to the GSM story it shows, among other things, how policy decisions can boost or hinder innovation, impact industry and shape markets, and how vital trusted collaboration between industry and lawmakers is when it comes to innovation and competitiveness.



23/ Directive 2010/40/EU (ITS Directive)

5G TODAY AND TOMORROW

5G is the mobile technology that has the potential to revolutionize economies, societies and our lifestyle. Industry is investing heavily in this technology to cater to a high data rate, low latency, low power consumption, improved system capacity and massive device connectivity (IoT).

With those features, 5G is not just the-new-mobile-tech, but is set to have a transformative effect across the board on the automotive industry, energy, food and agriculture, city management, government, healthcare, manufacturing, public transportation, and so on. In combination with the IoT, it is expected to play an even bigger role in our day-to-day lives and revolutionize the way companies operate and communicate with customers.

Standardization of 5G started in early 2016 in 3GPP (3rd Generation Partnership Project, founded by ETSI and 6 partner standard organizations: ARIB (Japan) ATIS (US), CCSA (China) TTA (South Korea), TTC (Japan), TSDSI (India). It is to a large extent an industry-driven initiative.

Nonetheless, since 2015 the EU has invested up to 360 million Euros in more than fifty 5G-related R&D projects. Many achievements of these projects contribute to the technical foundations for 5G networks and are fed into the standard-setting process.

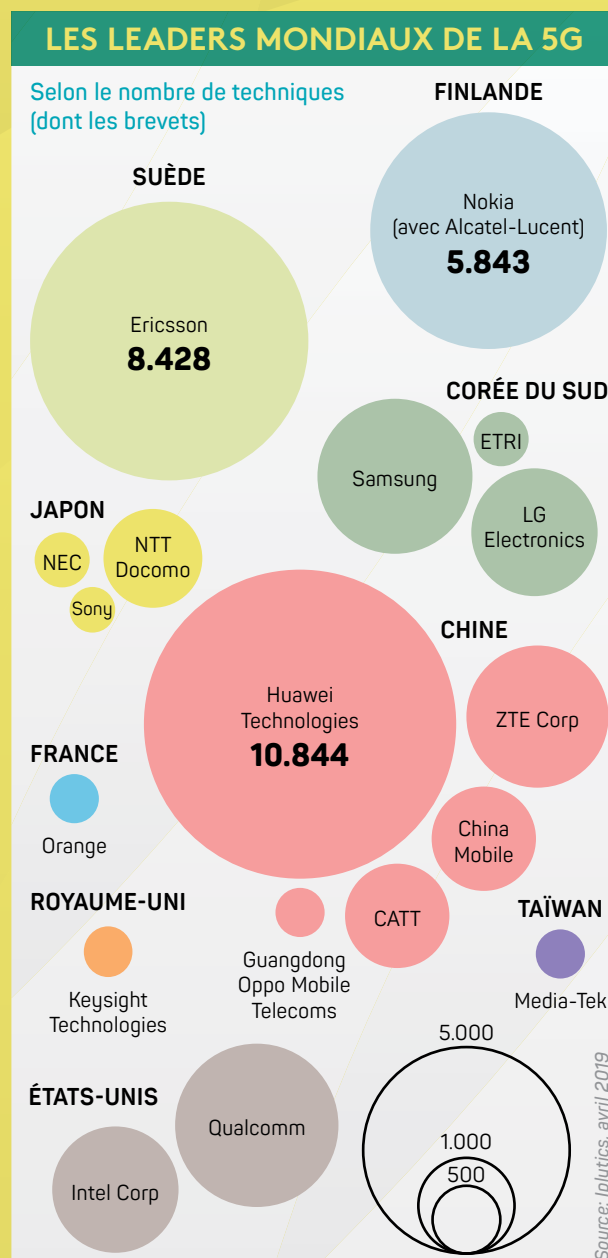
Thanks to massive private and public investment in R&D, as well as to Europe's legacy leadership in mobile communications and to ETSI hosting and contributing significantly to the work in 3GPP, the EU has golden assets in its hand to lead the global race for 5G rollout; a race in which the economic and industrial stakes are extremely high.

According to an Ericsson study, 5G-based mobile connectivity could add €2.2 trillion to the European economy by 2030, provided the appropriate regulatory decisions are made.

But the need for speed is somewhat hampered by Europe's characteristics. While the EU has set ambitious plans for 5G in Europe, it is ultimately the member states who decide on spectrum allocation.

Furthermore, compared to four major carriers in the US, Europe has 120 across 28 member states, many still focusing on recouping their investment in 4G networks. Some suggest that rather than maximizing on upfront fees, member states should assign spectrum in an optimal way to incentivize investment in infrastructure deployment, as France has recently done.

GSMA Intelligence projects that 30% of Europe's mobile connections will run on 5G by 2025, (compared with more than 50% in the US). While the US has an early lead in 5G rollout, it is expected to be quickly surpassed by China, as is Europe.



This paper argues that the EU has built a system that has, over time, exceeded its industrial clout and allowed it to punch above its weight in today's standardization competition, especially in digital-related matters. This represents a tremendous competitive asset in the context of the digital transformation.

However, the EU's underlying strategic vision has dwindled over time, with the system growing overly complex, over-inflated and bureaucratic. If the EU continues in this direction, there is a significant risk that its relatively dominant position will wane beyond recall, and that it will lose a highly competitive tool for trade.

To do nothing is not an option. The do-nothing scenario might work if nobody is trying to eat your cake, but in standard-setting in the digital space there is fierce competition globally to influence and lead. So, doing nothing would mean taking the risk of the EU becoming a rule-taker in the digital world.

With its assets and savoir-faire, there is a lot the EU can do to remedy this scenario. But the wake-up call should be heeded, and the EU needs to act fast.

Below are a series of strategic recommendations deriving from our analysis:

I. POLICY COHERENCE

RECOMMENDATION

1

Standardization must be upheld as a crucial strategic part of the EU and its member states' digital and industrial strategy. It must be asserted as a driver for growth, competitiveness and strategic autonomy, innovation, security and safety of consumers, and sustainability.

RECOMMENDATION

2

The EU and its member states need to step up efforts to de-silo their approach to standardization, coordinate and connect it to their industrial strategy and corresponding policies, especially in the areas of innovation, competitiveness and digitalization.

II. RESOURCES

RECOMMENDATION

3

A coordinator at very high political level, with clear responsibilities and scope, must be tasked with devising the EU strategy for standardization.

RECOMMENDATION

4

Allocate proper management resources at administrative level in the Commission to ensure efficient implementation of the above strategy.

III. REVIEW CONCEPTS & TOOLBOX

RECOMMENDATION

5

In line with a unified political direction, streamline, adapt, clean up and manage the extended standardization machinery, as well as the processes that govern it.

RECOMMENDATION

6

Engage with stakeholders to perform a health check and refresh of the New Approach. Do not alter the fundamentals but boost the use of this regulatory technique.

RECOMMENDATION

7

Connect research to standardization “by design”, e.g. in Horizon Europe programmes.

RECOMMENDATION

8

Increase political and strategic coordination with the CEPT beyond radio matters, to expand the outreach of EU policy making in standardization.

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