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REVIEW OF THE SEOUL DECLARATION FOR THE FUTURE OF THE INTERNET ECONOMY

Synthesis report

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FOREWORD

This report provides a synthesis of the review of the 2008 Seoul Ministerial Meeting on the *Future of the Internet Economy* in all seven areas identified in the proposal “Follow-Up to the Seoul Ministerial Declaration for the Future of the Internet Economy” [DSTI/ICCP(2010)14]. These include:

1. Laying the foundation for the Internet Economy: Access to the Internet via a high-speed infrastructure
2. Review of the areas of digital content and green ICTs in the context of innovation and sustainable growth
3. Understanding the data-driven Internet economy: the development of smarter applications
4. Cybersecurity and privacy:
5. Empowering and protecting consumers
6. Ensuring an open Internet Economy; and
7. Ensuring the global participation in the Internet Economy for development

The report includes an overview of the progress made and highlights areas for further work. It was prepared by Brigitte Acoca, Christian Reimsbach-Kounatze and Verena Weber under the guidance of Anne Carblanc and Dimitri Ypsilanti. It is published under the responsibility of the Secretary-General of the OECD.

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REVIEW OF THE SEOUL DECLARATION FOR THE FUTURE OF THE INTERNET ECONOMY: SYNTHESIS REPORT

Introduction

Ministers participating in the 2008 Seoul Ministerial Meeting on the *Future of the Internet Economy* identified in their Declaration (“the Seoul Declaration”) future work for the OECD aimed at i) furthering analysis of the Internet economy and, based on this analysis, ii) developing regulatory principles, guidelines and other instruments to promote the future development of the Internet economy. In addition, Ministers emphasised the need for further work investigating the role of the Internet and related information and communication technologies (ICTs) in addressing global challenges such as climate change. Ministers mandated the OECD to review the Seoul Declaration within three years after its adoption.

This paper provides a synthesis of the review of the recommendations set out in the Seoul Declaration, and their implementation at the national and international levels. The paper focuses on the seven main themes identified in the proposal “Follow-Up to the Seoul Ministerial Declaration for the Future of the Internet Economy” (OECD, 2010a). These main themes are listed below, and four of these seven themes are discussed in more detail in dedicated reports (see references):

- **Laying the foundation for the Internet Economy: Access to the Internet via a high-speed infrastructure** (OECD, 2011a): This theme focuses on main market and policy developments in the area of high-speed networks and points to areas where further work is needed. In particular, it covers the areas of: i) expanding access to networks; ii) creating an environment for competition, iii) convergence; iv) the adoption of IPv6; (v) radio spectrum; and vi) improving measurement.
- **Review of the areas of digital content and green ICTs in the context of innovation and sustainable growth** (OECD, 2012a): This theme covers main market and policy developments in two areas, digital content and green ICTs, highlights their contribution to innovation and sustainable growth (green growth) and identifies areas where further work is needed. In the area of digital content, issues addressed include: the development of digital content markets, local content, public sector information, the role of Internet intermediaries, and intellectual property rights. In the context of green ICTs, issues addressed include notably: resource efficient ICTs, sensor-based networks, and smart ICT applications such as smart grids. These issues are also related to the next theme on understanding the data-driven economy.
- **Understanding the data-driven Internet economy: the development of smarter applications:**¹ This theme covers market and policy developments in smart applications across the economy, such as smart grids, smart transportation, taking into account the proliferation of smart devices such as smart meters and smart TVs. Some of these applications are discussed in the context of green ICTs (see second theme). However, emphasis is put on the large amount of data being generated through these smart devices, some of which is enhanced through e.g. sensor networks and machine-to-machine (M2M) communication, and the new role of data as an intangible asset.
- **Cybersecurity and privacy:** This theme covers main market and policy developments in the area of cybersecurity and privacy, highlighting in particular the ongoing review of the *OECD (2002) Guidelines for the Security of Information Systems and Networks: Towards a Culture of Security* (Security Guidelines) and the OECD (1980) Guidelines on the Protection of Privacy and

Transborder Flows or Personal Data (Privacy Guidelines). Another issue addressed under this theme is digital identity management.

- **Empowering and protecting consumers** (OECD, 2012b): This theme covers main market and policy developments in the business-to-consumer (B2C) e-commerce marketplace. It focuses on a number of areas including online and mobile payments, consumer purchases of digital content, social and collaborative commerce, and dispute resolution and redress.
- **Ensuring an open Internet economy**: This theme covers market and policy developments affecting the openness of the Internet Economy. It highlights openness particularly in the context of the High Level Meeting in June 2011 on *The Internet Economy: Generating Innovation and Growth*, which led to the *Communiqué on Principles for Internet Policy Making* and the OECD (2011b) *Council Recommendation on Principles for Internet Policy Making*.
- **Ensuring the global participation in the Internet economy for development** (OECD, 2012c): This theme focuses on market and policy developments supporting access to the Internet and related ICTs for people in developing countries and the identification of future needs. It highlights the following four areas for ensuring global participation in the Internet Economy: i) increasing access to the Internet economy in developing countries; ii) promoting applications and their use in developing countries; iii) developing skills; and iv) Internet-related innovation: The case of cloud computing.

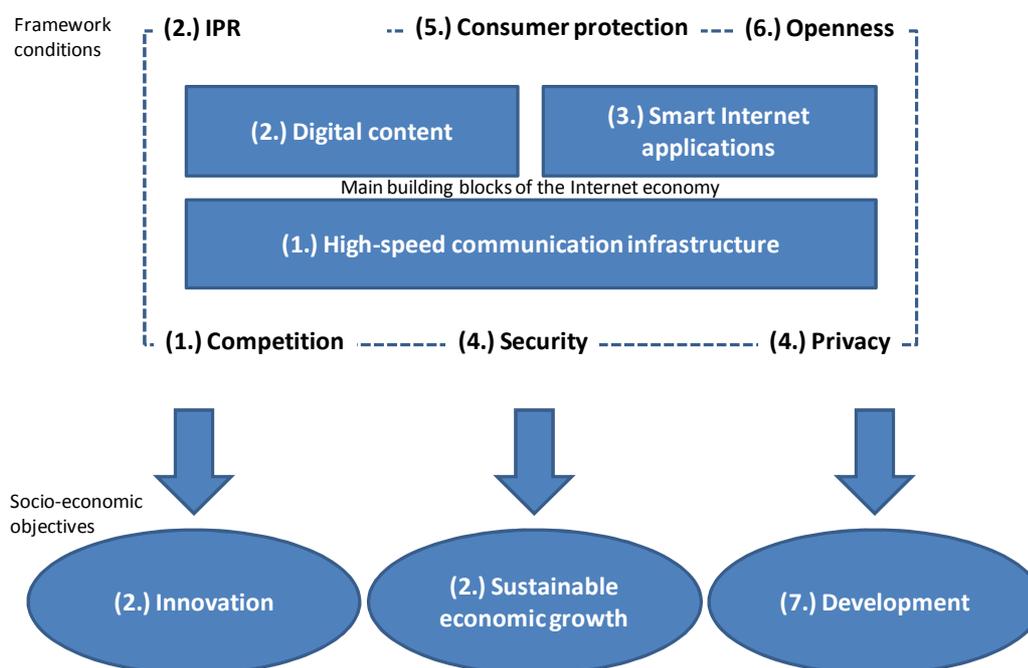
These seven themes address issues of Internet policy making from three different perspectives: (i) the major building blocks of the Internet economy, (ii) their frameworks conditions, and (iii) the socio-economic objectives that the Internet economy can contribute to achieve.

The themes related to high-speed communications infrastructure, digital content² and smart applications correspond to the three *main building blocks of the Internet economy*.³ High speed fixed and mobile networks are the enablers for accessing and transferring data across the different parts and stakeholders of the Internet economy. They are the Internet economy's backbone, on top of which digital content is created and distributed across the economy. Furthermore, they support the operation of "smart" applications based on the collection, transportation, processing and analysis of data flows, some that are increasingly produced by sensors, sensor networks and machine-to-machine (M2M) communication.

The themes related to security and privacy, consumer protection and empowerment, and openness are part of the *framework conditions* required to ensure a well-functioning Internet economy. Security and privacy as well as consumer protection are essential for trust online. Openness refers to multi-stakeholder co-operation, access without permission, free flow of information, and freedom of expression. Altogether these framework conditions (security and privacy, consumer protection, and openness) are critical for ensuring transparency, cultural diversity and the protection of individual liberties, as well as for enabling innovation and prosperity in the Internet economy. Other framework conditions, such as competition and the protection of intellectual property rights are discussed in the context of communication infrastructure and digital content respectively.

The theme related to development addresses the question of how the main building blocks of the Internet economy as well as framework conditions should be developed so that emerging and developing countries can fully participate in and benefit from the Internet economy.

Figure 1. Analytical framework for reviewing the seven themes of the Seoul Declaration



Note: Numbers in brackets indicate the number of the theme as listed above.

The following sections present developments and progress made in the implementation of the Seoul Declaration from these three perspectives and shed light on policy issues which have arisen or increased in scale or scope since the Seoul Ministerial and where further work may be required.

To address the seven themes, the Committee for Information, Computer and Communications Policy (ICCP) working parties, including the Working Party on Indicators for the Information Society (WPIIS) the Working Party on Communication Infrastructures and Services Policy (WPCISP), the Working Party on the Information Economy (WPIE) and the Working Party on Information Security and Privacy (WPISP), worked in close co-operation with the Committee on Consumer Policy (CCP). Measurement issues have been addressed across all themes according to the Seoul Declaration's objectives to improve statistical systems which "measure the changing access and use of the Internet and related IT networks" in order to "provide reliable measures of evolving uses and the impact of the Internet".

The main building blocks of the Internet economy

The eco-system of the Internet economy is mainly composed of (i) the (high-speed) communication infrastructure; ii) digital content; and iii) smart Internet applications.⁴

(i) Access to the Internet via a high-speed infrastructure

In the Seoul Declaration, Ministers identified the importance of high-speed networks and committed to a series of objectives which can be broken down into six areas:

- Expanding access to networks and attaining greatest practical national coverage;
- Creating a market-friendly environment for investment and competition;

- Benefitting from convergence;
- Encouraging the adoption of IPv6;
- Encouraging a more efficient use of radio spectrum; and
- Improving measurement and statistical instruments.

Markets and policy developments

Since the Seoul Declaration, *access to broadband networks* and the Internet has constantly increased. In terms of fixed broadband, penetration levels are close to maturity in some countries, though expectations and service level requirements continue to evolve. In addition, further deployments of fibre networks have taken place. Overall, however, deployment of fibre is still at an early stage (Table 1). On the mobile broadband side, 3G coverage is high and data traffic is growing significantly. In terms of policies, national broadband plans have contributed to increasing access to the Internet. Furthermore, some countries have invested public funds in the deployment of fibre networks.

Table 1: State of FTTH/FTTB Deployment in 2010

	Homes Passed ¹	Main Topology ²	% Main Topology	Largest party deploying
Australia	40 000	PtMP	100%	Government
Austria	63 000	PtP	90%	Municipalities
Belgium	3 750	na	na	Incumbent
Canada	280 000	PtMP	na	Incumbent
Chile	20 000	PtMP	na	Incumbent
Czech Republic	195 000	PtMP	100%	Altnets ³
Denmark	795 300	PtP	85%	Utilities
Finland	544 000	PtP	100%	Incumbent(s)
France ⁴	1 383 588	PtMP	55%	Incumbent
Germany	560 000	PtP	70%	Utilities
Greece	5 000	PtP		Altnets
Hungary	215 000	PtMP	100%	Incumbent
Iceland	33 000	PtP	80%	Utility
Ireland	16 900	PtP	95%	Altnets
Italy	2 245 500	PtP	100%	Altnets
Japan	46 000 000	PtMP	80%	Incumbent
Korea	16 000 000	PtMP	100%	Incumbent
Luxembourg	56 000	PtP	100%	Incumbent
Mexico	100 000	PtMP	na	Incumbent
Netherlands	662 500	PtP	90%	Incumbent
New Zealand	50 000	PtMP	80%	Altnets
Norway	381 700	PtP	100%	Utility
Poland	90 265	PtP	95%	Utility
Portugal	1 470 000	PtMP	100%	Incumbent
Slovakia	615 000	PtMP	95%	Incumbent
Slovenia	310 000	PtP	100%	Altnets
Spain	412 500	PtMP	100%	Incumbent
Sweden	1 464 500	PtP	90%	Altnet
Switzerland	212 500	PtP	90%	Incumbent
Turkey	200 000	PtP	na	Altnets
United Kingdom	138 000	PtP	na	Altnets
United States	19 676 200	PtMP	na	Incumbent

Notes 1) Homes Passed are potential premises to which an operator has the capability to connect in a service area, but the premises may or may not be connected to the network. Typically new service activation will require the installation and/or connection of a drop cable from the homes passed point (e.g. fibre-pedestal, handhole, chamber, utility-pole) to the premises, and the installation of subscriber premises equipment, including an ONT (Optical Network Termination) device at the premises. 2) Topologies can be either point to point (PtP) or point to multipoint (PtMP). 3) Altnets are alternative network operators other than the traditional incumbent operator. 4) Data excludes the Numericable network.

Source: OECD, 2010b based on IDATE for the FTTH Council Europe, FTTH Council North America, FTTH Council Asia Pacific, European Communication Committee, primary⁵

Competition in the infrastructure market has also generally improved as customers have a wider range of communication services and prices to choose from and as new entrants, including mobile virtual network operators, have gained market share. To address the lack of competition in the area of fixed broadband, some variants of functional and structural separation have been adopted by some countries. For

mobile broadband, market regulators have continued to intervene to push down mobile termination rates in countries with calling-party-pays pricing structures. In addition, policy makers have begun to more closely address high international mobile roaming rates that act as a barrier to trade and travel. This was the subject of an OECD Council Recommendation on International Mobile services in 2012 (OECD, 2012d).

In communication markets, *convergence* has increased, along with a growing number of bundled offers such as triple play offers. Recently, quadruple offers have emerged but are, so far, only offered in a couple of countries. There is also growing competition to cable television, satellite and traditional broadcasters from “over-the-top video services” (OECD, 2012j).

Another trend in communication markets is the growth of mobile voice and data traffic. Coupled with the growing number of smart devices, this trend is already increasing and will further increase the demand for scarce *spectrum resources*. Since the Seoul Ministerial, new opportunities in spectrum allocation have arisen from spectrum bands that have been freed by the switch from analogue to digital television. Some countries have already allocated this “digital dividend” spectrum. In addition, technologies have been developed that enable devices to use unused spectrum spaces, so called “white spaces”.

In the area of IPv6, some policy initiatives have spurred the deployment of IPv6, such as its use by governments, but there is a pressing need for further action to accelerate the transition from IPv4 to IPv6 in particular because the remaining unallocated IPv4 addresses have been completely assigned in some regions.

Finally, a number of *indicators and price baskets* have been developed by the OECD since the Seoul Ministerial to account for and better *measure* new developments in the broadband infrastructure. To track the increased importance of mobile network subscriptions, a wireless broadband indicator has been developed. Furthermore, fixed broadband price baskets have been developed to compare the price levels experienced by consumers and businesses in OECD countries for fixed broadband services provided over DSL, cable and fibre networks.

Important areas for potential further work

To attain greater coverage of broadband, the deployment of high-speed networks including fibre networks needs increased attention. In particular, policy makers and regulators need to ensure that new investment is attracted and competition is enhanced. In rural areas, where for example fibre deployment is at a very early stage or not currently economic, alternatives need to be explored. Investing in fibre-to-the-home technology is very expensive and costs per home increase significantly for fibre in less dense areas. Governments have an important role to play in evaluating how best to provide broadband to these areas and in developing an environment conducive to investments in a range of broadband technologies.

A key question for future work that is linked to the deployment of high-speed networks is how to *preserve and spur competition*. For example, due to its high cost, only one fibre network may be economically viable in some areas, in particular in less dense areas. This is a different situation than in a copper environment where it is economically viable for different providers to deploy their own copper networks. In addition, the choice of the network topology determines the conditions for competitive physical access. Investment and topology decisions made today will have important effects on the future infrastructure landscape, its economic viability and competition. In mobile markets, there is also further room to spur competition, especially as far as mobile termination rates and international mobile roaming charges are concerned.

In terms of *convergence of communication services and bundled offers* such as triple and quadruple play, policy makers and regulators continue to have an important role to play in increasing the transparency

for services and in monitoring potential abuses of market power. Developments in over-the-top video services are an important source of new competitive disciplines of pricing and offers from incumbent cable television and satellite providers – in the same way, VoIP services introduced greater competition in telephony.

The review of recent developments has further shown that due to the increase of mobile voice and data traffic as well as growing markets of smart phones and smart devices, such as sensors and RFID tags, the need for an efficient allocation of spectrum is becoming more acute. Where spectrum is freed, a prompt allocation should take place and market forces should be considered in spectrum reallocation and use.

In the area of IPv6, the available evidence suggests that the deployment of IPv6 remains too slow. It is thus crucial that policy makers decisively encourage the transition to IPv6 from IPv4. Actions to spur the development include the upgrade and testing of hardware devices, encouraging the use of IPv6 by websites and developing measures that record progress, including for mobile networks more broadly ready for IPv6. In addition, more governments could engage in mandating IPv6 support for public procurement and further encourage the use of IPv6 by businesses and for services to households.

Finally, there is also room for improving the measurement of access to broadband infrastructure, on the demand side. In particular, indicators measuring the adoption and usage of the broadband infrastructure can be further improved and detailed. To this end, the OECD's model surveys for household and business use of information and communication technologies could be revised and further indicators developed. Work at the OECD has been undertaken, through recent workshops held in Washington (October 2011) and London (June 2012), to improve broadband metrics.

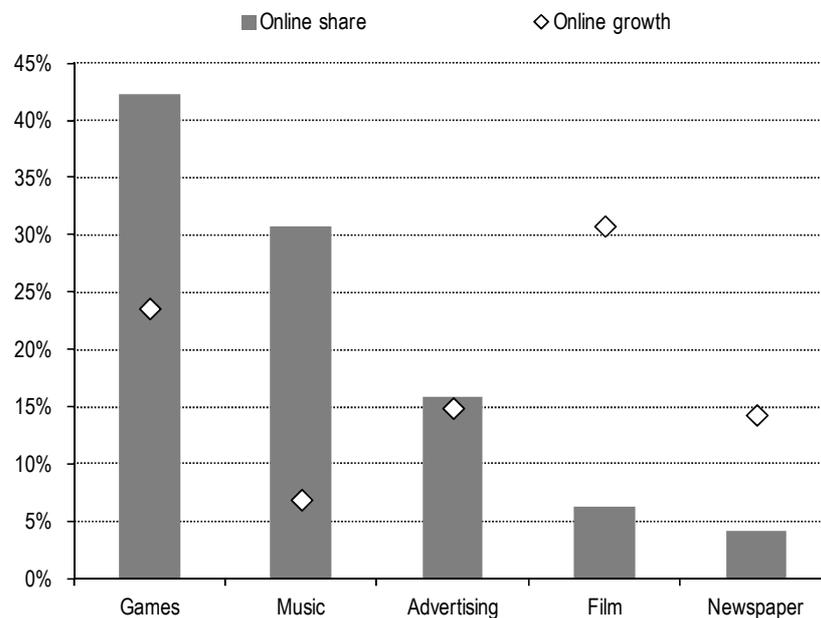
(ii) Digital content: Innovating for economic growth

Ministers identified digital content as an important innovation-related area. This section presents market and policy developments in the creation and distribution of digital content, looking also at public sector information and the role of Internet intermediaries. It also reviews progress made and points policy makers to new issues that have arisen since the Seoul Ministerial and could be subject to further work.

Markets and policy developments

Digital content, in particular online content⁶ markets, have shown significant annual growth rates and online revenue shares have increased considerably. This rapid increase is spurred by several factors, including increasing digital literacy, declining costs, the growth of the participative web,⁷ the increased use of mobile devices to purchase, use and store digital content, and the improvement of the underlying broadband infrastructure. The games and music content industries have the largest online shares of the overall (online and offline) market, representing at least 30% of total revenues. In terms of 2010 growth rates, the fastest growing online content industry is the film industry, but from a low basis. The largest market in absolute terms is by far the online advertising market, with revenues amounting to USD 70.5 billion in 2010, followed by games with USD 22.7 billion in 2010 (Figure 2).

Figure 2. Online content share and growth, 2010



Source: OECD based on PricewaterhouseCoopers 2011

If online advertising has been generating significant revenues, by contrast all other content industries are still experimenting to find the best sustainable business model to increase online revenues. Overall, the economic impact of the online content sector is still unclear. Online content continues to have a major impact on traditional value chains in the area of distribution (e.g. music, films). Moreover, the impact on the production side is constantly increasing through, for instance, the volume of user created content, new forms of advertisement and games.

Since the Seoul Declaration, four new areas that are linked to online content creation, distribution and use have been analysed: *online news*, *virtual worlds*, *local content*, *Internet intermediaries*, and *public sector information*.

While traditional newspaper readership has been declining, the Internet has become an important source of *news provision*. In four OECD countries (Iceland, Norway, Korea and Finland), over 70% of individuals in the age range of 16-74 read or download news online (OECD, 2010d). In terms of relative importance, however, TV and newspapers are still the most important sources of information and online news mainly complement offline news. In terms of business models, direct revenues from news content are still small, and large parts of revenues are generated through advertisement. Willingness to pay is low but increasing. Overall, the upcoming online news environment creates both opportunities and challenges with respect to the important role of news in societies and democracy in general. Reported positive effects include the large diversity of news online and the independence that the Internet offers for news production and digital entrepreneurial journalism. On the challenges side, some observers caution against a decreasing quality of news and put forward that online news readers might doubt the accuracy of the news.

Virtual worlds have been hyped in the year of the Seoul declaration (e.g. Second Life). Since then, adoption has been moderate and the economic crisis has triggered some consolidation in the sector. More recently, however, there has been evidence of renewed interest in virtual worlds. Overall, there is only anecdotal evidence of the potential social and economic value created by virtual worlds so far.

The analysis of *local content* online has developed from the rationale that societies have a rich cultural heritage and knowledge base that should be distributed much more widely, for the benefit of the whole world. Large parts of *local content*⁸ are currently only available to local communities, which is why the Internet started to play an important role for these communities. Ways to publish content online include blogs or “crowd-sourced” websites such as Wikipedia. In terms of developments, Wikipedia, for example, has experienced impressive growth over the last years and the number of articles the site contains continues to increase at a rapid pace. In addition, the share of English articles today only amounts to about 20% of all Wikipedia articles, while an estimated 27% of Internet users are English speakers. Overall, recent developments indicate that the Internet plays a very important role from the creation to the distribution of local content and that its largest contribution may consist in giving creators the potential to disseminate their content widely.

Internet intermediaries play a crucial role in delivering online content to consumers, businesses, and governments since they provide access to the Internet’s basic infrastructure and platforms and enable communication and transactions between third parties. Their main functions are: i) to provide infrastructure; ii) to collect, organise and evaluate dispersed information; iii) to facilitate social communication and information exchange; iv) to aggregate supply and demand; v) to facilitate market processes; vi) to provide trust; and vii) to take account of the needs of both buyers/users and sellers/advertisers. The pace of change of Internet services and their technical complexity make it difficult to achieve stable, established business practices. Nonetheless, the available data indicate that these markets are a significant source of growth, innovation and competition. For example, US census data showed that identified Internet intermediaries represented at least 1.4% of GDP value added in 2008. Overall, the past years have shown that intermediaries have contributed to economic growth through productivity gains, lower transaction costs and wider ICT-sector growth.

Public sector information accounts for a significant share of digital content which is created and distributed over the Internet. The OECD (2008a) *Recommendation of the Council for Enhanced Access and More Effective Use of Public Sector Information* (PSI) that was adopted at the time of the Seoul Ministerial, has provided countries with a general framework aimed at increasing economic and social benefits from better access and wider use and re-use of public sector information.

In terms of *policy developments*, governments have emphasised the availability and accessibility of the underlying information and communication infrastructure - for both fixed broadband and mobile broadband. They have also focused on promoting local content directly. Several initiatives have been put in place to support the digital accessibility of cultural heritage and the creation of new forms of interactive cultural content. Furthermore, governments have promoted the use of digital content in the areas of skills and education. Projects have included the development of high-quality content and the distribution of educational e-books. Finally, they have been increasingly assessing the role of Internet intermediaries and their responsibilities for the action of third-party users of their platforms. Work conducted has explored questions as to whether, when, to what extent and how Internet intermediaries should help to address issues related to content originated by third parties using their platforms. In the aftermath of the OECD Recommendation on Public Sector Information, countries have initiated multiple projects promoting the use and re-use of public sector information. Examples of projects have been large open data initiatives, for example Data.gov in the United States and Data.gov.uk/au in the United Kingdom and Australia, respectively. In addition, governments and the private sector have invested in projects and competitions to find innovative uses of government data. These uses included, for instance, applications that optimise energy usage in houses or that analyse political data. Finally, various legal developments have taken place in recent years to protect and empower consumers in the purchase, use and storage of digital content. These developments are discussed further in the section on framework conditions under consumer protection and empowerment.

Important areas for potential further work

There is a need to better understand the *importance of online content* in the whole economy. Future work should aim at developing new measuring techniques for online content. Several new sources of data such as search-engine data and more Internet-based statistics could be used to improve the measurement of online content. Based on this work, another work stream could look at the impact of online content. The development of new online content services is taking place at a rapid pace and is one of the key sources of innovation in the Internet economy.

In this context, there is a need *to analyse upcoming areas of digital and in particular online content creation and distribution*. For example, interesting developments are taking place, such as the digital book market (e-books) or smart applications (“apps”) and, more generally, digital content for mobile devices. Links to education (e.g. e-textbooks) and consumer protection should be further assessed.⁹ In addition, further work could be undertaken in the area of local content, for example to measure local content and assess local content in the area of education.

Intellectual property rights (IPR) protection has become an important factor in all digital content areas. It is thus proposed to undertake work on the economics of copyright. National IP systems evolve and the changing online environment might call for a review of these systems to promote economic growth. This is particularly relevant in the area of copyright, where business models have been and continue to undergo significant changes. In addition, some governments have taken initiatives aiming at balancing copyright and consumer protection regimes (see the section on consumer protection and empowerment). A thorough discussion about changes to the copyright regime should be based on sound empirical evidence. So far, however, only little public research has been conducted in this area.

Since the Seoul declaration, *cloud computing* has increasingly evolved and is now fostering innovation and the creation of new businesses. As such, it has the potential to significantly spur content creation, storage and distribution. Policy makers should assess the link between cloud computing and digital content creation, also in the context of encouraging universities, research institutes and governments to work together in R&D networks. Another area that has emerged since the Seoul Declaration is the area of “big data”. Work could be undertaken that assesses the links between “big data” and digital content.

The evolving costs and benefits of *involving Internet intermediaries in advancing public policy objectives* should continue to be assessed. Initiatives involving Internet intermediaries in advancing public policy objectives are already under way with some quite advanced and others still at an early stage. Further work could be undertaken to advance the policy debate internationally and help address outstanding issues.

Finally, work is underway to review the OECD (2008a) *Recommendation on Public Sector Information* and to obtain a comprehensive picture of where countries currently stand. Another area for further work is the assessment of the potential of big data analytics to enable more efficient and effective use of public sector information, through the meaningful integration of datasets from various sources.

(iii) Smart applications for a data-driven Internet economy

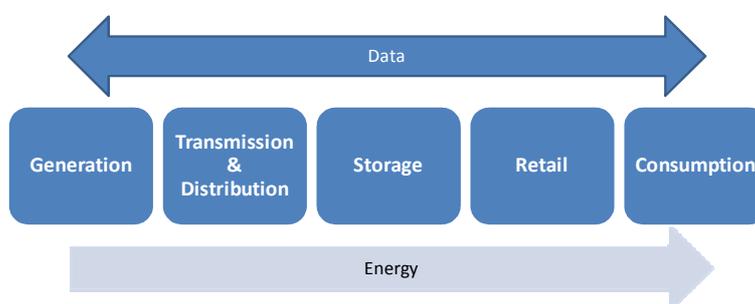
In the Seoul Declaration, ministers shared a vision of a global information society which connects billions of people, machines and objects. They also identified the need to analyse the economic, social and cultural impacts of emerging Internet technologies, applications and services such as sensor-based networks. The interconnection of billions of people, machines and objects is one of the main characteristics of a smarter Internet economy, in which big data flows are generated, processed and analysed. Since the Seoul Declaration, work has been undertaken to assess several smart application areas that are based on smart devices such as smart meters in combination with sensors and sensor networks, machine-to-machine

(M2M) communication, and big data analytics. These include smart grids, smart transportation, smart buildings and smart agriculture. This section presents market and policy developments in these areas. It reviews progress made and highlights areas that would benefit from further work. The increasing economic role of personal data, which also falls under this theme, is discussed under the theme of privacy later in the report.

Markets and policy developments

Work undertaken since the Seoul Declaration highlights that *smarter ICT applications* have an important impact in meeting environmental challenges (see section on green growth as one socio-economic objective for the Internet economy). One of the most promising areas for *smarter ICT applications* is in the electricity sector, in which over two-thirds of global electricity is generated from the combustion of fossil fuels. Smart grids, i.e. electricity networks with enhanced capacities for information and communication, are able to address the major electricity sector challenges along the value chain from energy generation to consumption (Figure 3). They are enabling a wider integration of renewable energy sources, promoting low-carbon transport options including electric vehicles and inducing structural shifts in electricity consumption. Work undertaken showed that innovative applications for end-users revolve around the smart meter. Over 10% of an individual household's electricity consumption can be cut down by simply providing better information (or providing information *in better ways*). Reductions in “peak demand” can also directly contribute to lowering greenhouse gas emissions since this avoids the connection of additional power plants during peak times. But the benefits are not limited to smart meters. Improved monitoring and networked IT systems can also help limit losses of electricity distribution; such losses represent on average 8% of production worldwide but over 15% in individual countries.

Figure 3. Stylised electricity sector value chain with energy and data flows



In the Seoul Declaration, ministers highlighted *sensor-based networks* as an emerging Internet technology requiring further impacts assessment. Work undertaken since then highlights that sensors and sensor networks are an important enabler of many smart applications, in particular when it comes to meeting environmental challenges (see the section on green growth). They significantly contribute to a more efficient use of resources and thus to a reduction of greenhouse gas emissions and other sources of pollution in multiple fields through smart power grids, smart buildings and smart industrial process control. Whereas studies clearly estimated an overall strong positive effect of smart grids, smart buildings, smart industrial applications as well as precision agriculture and farming, results of smart transportation were mixed due to rebound effects. In particular, intelligent transport systems rendered transport more efficient, faster and cheaper, but also increased overall demand for transportation and thus for the consumption of resources. Work conducted also highlighted the crucial role governments have to play to enhance the positive environmental effects of smart applications. It showed in particular that increased efficiency should be paralleled with demand-side management to internalise environmental costs. Finally, the work also highlighted that government programmes demonstrating and promoting the use of sensor technology as well as the development of open standards could contribute to fully tap the potential of the technology to mitigate climate change.

The Seoul Declaration also envisioned the increasing ubiquity of networks connecting machines and objects. M2M involves (smart) devices that are actively communicating using wired and wireless networks. They are not computers in the traditional sense but are using the Internet in some form or another. Estimations conducted showed that while, at the global level, there were around five billion devices connected to mobile networks in 2012, this may increase to fifty billion by the end of the decade. Analysis also showed that the deployment of M2M based applications had the potential to contribute to innovation and growth, most notably through smart applications such as smart grids and smart transportations (including electric vehicles).

In terms of *policy developments*, governments have worked in various areas related to smart ICTs since the Seoul Declaration; most notably in areas related to greening the economy. A major result of the Seoul Declaration was the OECD (2010c) “Recommendation of the Council on Information Technologies and the Environment”. The Recommendation lays out a ten-point check list on how governments can employ ICTs to enhance national environmental performance.¹⁰ The Recommendation was adopted in 2010 and therefore has not been evaluated yet. However there are various indications that governments are increasingly recognising the positive role of smart applications in greening the economy. In that context, many initiatives have been undertaken to deploy smart grids and smart meters. Some countries such as the United States have responded to the crisis with significant investment in smart grids. Besides smart grids, some OECD countries have established smart transportation programmes that also promote electric vehicles, smart routing and intelligent transport systems.

Important areas for potential further work

As the economy is becoming “smarter”, many issues emerge that need to be better understood. These issues, discussed below, include: the emergence of new smart devices such as smart meters, big data (and its implications for privacy, open access to data, etc.), security, competition, employment, and spectrum.

The increasing deployment of smart ICT applications is leading to the generation of *big data streams* which have the potential to become a major resource for enabling new industries, processes, and products, even if many industries, such as energy, are not exploiting them yet. The significant *volume, velocity, and variety* of these data streams and the possibility to use them across the economy thanks to data analytics, signal a shift towards a data-driven socio-economic model – commonly referred to as “big data”. Work needs to be undertaken to better understand how data, as an intangible asset, create significant competitive advantage and drive innovation, sustainable growth and development. With ever more data produced everywhere, “information relating to an identified or identifiable individual” (personal data) becomes increasingly available, and both the growth of data sources and the increasing ease with which they can be linked and processed challenge the frameworks on which privacy protection is based. These issues are discussed further below under the privacy section.

The increasing interdependencies of real world facilities, machines, and objects on the Internet make the Internet a vital infrastructure for society and many smart applications are becoming critical information infrastructures. This raises issues of resilience and security which challenge existing frameworks. The implications for cybersecurity policies are discussed below under the section on the framework conditions.

There are significant barriers to competition in M2M when making use of mobile networks. Given that *subscriber identity modules* (SIMs) are fixed into the device, end-users cannot change mobile operators for the lifetime of the device. This can negatively impact competition, and in turn lead to higher cost for traffic, in particular while roaming. Therefore work could be undertaken to assess policies that allow large scale M2M-deployers, such as car manufacturers, consumer electronics companies and energy companies to access numbering resources.

The connected world is going to greatly influence spectrum policies as wireless is the most flexible form of connectivity. The lifecycle of connected devices however can be much longer than is traditionally the case for ICT-enabled applications. Instead of one to ten years, the expected lifecycle of connected machines can be up to 30 years. This will change the dynamics around spectrum policy, for which the lifecycle of connected devices matters.

The deployment of smart applications promises to increase labour productivity but may also put pressure on employment when processes that previously required human labour force are increasingly automated. For example, smart meters have eliminated the need for manual meter reading and smart transportation systems based on driverless vehicles may progressively replace taxi and bus drivers. Further work could focus on improving the evidence base needed to better understand the direct and indirect impacts of smart applications on labour markets (see Brynjolfsson and McAfee, 2011).

The framework conditions for the Internet economy

A variety of framework conditions are needed to assure a well-functioning Internet economy and the full realisation of its potential benefits. The following sections focus on the framework conditions presented in the OECD (2010a) proposal: i) cybersecurity; ii) privacy; iii) consumer protection and empowerment; and iv) openness. The first three are essential for trust online. Openness notably refers to multi-stakeholder cooperation, to access without permission, to the free flow of information and to freedom of expression. Altogether, these framework conditions are critical components for ensuring transparency, cultural diversity and the protection of individual liberties, as well as for enabling innovation and prosperity in the Internet economy. The protection of children online is another framework condition with links to security, privacy and consumer protection (Box 1). Other frameworks conditions, such as competition and the protection of intellectual property rights were discussed above in the context of communication infrastructure and digital content respectively.

Box 1. The protection of children online

As the Internet permeates every aspect of our economy and society, it is also becoming a daily reality in our children's lives. While it brings considerable benefits to their education and development, it also exposes them to online risks such as access to inappropriate content, abusive interaction with others, exposure to aggressive marketing practices and privacy risks. At the Seoul Ministerial Meeting on the Future of the Internet Economy in June 2008, Ministers recognised the importance of ensuring a trusted Internet-based environment that offers protection to individuals, especially minors and other vulnerable groups.

Following up on the Seoul Declaration, the OECD organised a joint symposium with APEC in 2009 to explore the issue in more detail. Since then, research has been undertaken to analyse what policies are in place to protect children online, their commonalities and differences, and how to improve the evidence base for further policy making. In 2011, the OECD released a report on *The Protection of Children Online: Risks Faced by Children Online and Policies to Protect Them* (OECD, 2011c). Based on the findings of this report in 2012, the OECD Council adopted a new Recommendation to improve national policy frameworks for the protection of children online through better evidence-based policy making and enhanced co-ordination of efforts between all stakeholders (OECD, 2012f).

Cybersecurity

Over the last twenty years, the OECD has been addressing security of information systems as a fundamental requirement for information technology (IT) and the Internet to contribute to economic and social development. Since the Seoul Declaration, however, the risk environment has evolved significantly: in addition to cyber threats increasing at a fast pace, IT and the Internet have become so essential that our economy and society are dependent on them not only for their development but also for their basic functioning. Today, the stakes are higher and the challenges greater than before the Seoul Declaration. The international dimension of cybersecurity, due to both the inherently global nature of the Internet and growing cross-border interdependencies is getting more policy attention.

Markets and policy developments

Current challenges addressed since the Seoul Declaration include work on *botnets*: networks of compromised computers that are remotely controlled by malicious agents. Botnets represent a threat to security and trust in online environments. An empirical study by the OECD on the role of Internet Service Providers (ISPs) in botnet mitigation based on spam data found that the 200 ISPs that hold the lion's share of the access markets in OECD plus the Russian Federation and five key partner countries (Brazil, China, India, Indonesia and South Africa) harbour over 60% of all infected machines worldwide. Further, the networks of just 50 ISPs account for around half of all infected machines worldwide (OECD, 2010d). Therefore ISPs, by virtue of their ownership of the physical networks and consumer-facing position, are well placed to respond proactively to botnets.

Other issues addressed in the Seoul Declaration include *digital identity management* (IdM). Work undertaken since the Seoul Declaration shows that ensuring the protection of digital identities requires both a holistic approach of all policy, law and technology aspects, and the alignment of all actors concerned. The challenge to developing effective policies for IdM is, on the one hand, to balance privacy and security with the need for usability and interoperability. It is, on the other hand and in parallel, to respond to the, sometimes conflicting, economic and social needs of governments, businesses, and individuals. Integral to these challenges is the role of government and its involvement in providing both assurances for online interactions and protection for individuals.

In terms of *policy developments*, cybersecurity policy making has reached a turning point in many countries where governments are now elevating this issue among their priorities. A new generation of national cybersecurity strategies approach the issue from a more holistic perspective, encompassing

economic and social aspects as well as sovereignty considerations. They aim to drive economic and social prosperity and to protect cyberspace-reliant societies against cyber-threats. A key challenge of cybersecurity policy making is to pursue these two objectives while preserving the openness of the Internet as a platform for innovation and new sources of growth. Most of these strategies place a high emphasis on enhanced international co-operation (OECD, 2011f). To tackle the issues of botnets in particular, a number of countries have established initiatives through which end-users are notified by ISPs when their computer is identified as being compromised by malicious software and encouraged to take action to mitigate the problem (OECD, 2011d). Many governments have also established national strategies and policies for digital identity management. Their main objectives are to realise e-government, to foster innovation in public and private e-services and to strengthen cybersecurity. Their primary focus is the public administration with expected spillovers in the private sector. These strategies generally adopt an evolutionary approach based on existing offline identity regulations and practices rather than a revolutionary one, and which touches on policy issues such as registration policies, interoperability, security, and privacy. In 2011, the OECD developed Guidance on Digital Identity Management for Enabling Innovation and Trust in the Internet Economy (see OECD, 2011e). The Guidance introduces the fundamentals of digital identity from a government policy perspective and provides advice and directions for government policy makers on strategies that support innovation across the public and private sectors while enhancing security, privacy and trust online.

Important areas for potential further work

Since 1992, OECD work on security of information systems has been based on a high level policy framework to help all participants address security challenges for economic and social prosperity. These 1992 Security Guidelines were revised in 2002 to take into account the generalisation of networked interconnectedness (see OECD, 2002). Consistent with the call for assessment of existing OECD security-related instruments in the Seoul Declaration, the Guidelines are now being revisited again. Their review is expected to take into account current and anticipated challenges, and to introduce guidance to facilitate their implementation by governments and other participants.

The review will be informed by a broad, open and inclusive consultative process with all stakeholders from member and non-member economies. It will provide a unique opportunity to engage in a global dialogue which can i) advance a common understanding of the importance of cybersecurity for the growth of the Internet economy, ii) help make the revised Guidelines actionable across varying political and socio-economic environments and improve their relevance to countries at different stages of development regarding Internet access, and iii) ensure that the revised Guidelines have the widest possible positive impact.

Privacy

In the Seoul Declaration, ministers explicitly recognised the importance of the protection of privacy and personal data online to the development of the Internet economy. They also invited the OECD to assess the application of certain OECD instruments, including the OECD (1980) Guidelines on the Protection of Privacy and Transborder Flows of Personal Data, in light of “changing technologies, markets and user behaviour and the growing importance of digital identities.” This declaration triggered the launch of a formal review of the 1980 Guidelines. This section presents the market and policy developments surrounding the review process, as well the progress made. It also points policy makers to new issues that have arisen since the Seoul Ministerial, and could be the subject of further work.

Markets and policy developments

Over the last three decades, personal data have come to play an increasingly important role in our economies, societies and everyday lives. Innovations, particularly in information and communication technologies, have impacted business operation, government administration, and the lives of individuals. New technologies and responsible data uses are yielding great societal and economic benefits. The volume of personal data being collected, used and stored is vast and continues to grow. Modern communications networks support global accessibility and continuous, multipoint data flows. The potential uses of personal data have increased tremendously as a result of the wide range of analytics that can provide comprehensive insights into individuals' movements, interests, and activities.

At the same time, the abundance and persistence of personal data have elevated the risks to individuals' privacy. Personal data is increasingly used in ways not anticipated at the time of collection. Almost every human activity leaves behind some form of digital data trail, rendering it increasingly easy to monitor individuals' behaviour. Personal data security breaches are common. These increased risks signal the need for more effective safeguards in order to protect individual privacy.

In recent years, several initiatives have been undertaken to address new and elevated privacy risks, particularly in the context of transborder data flows. Examples include but are not limited to the European Union's system of Binding Corporate Rules (BCRs); the Galway Accountability Project on Commonly Accepted Elements of Privacy Accountability; and the Asia Pacific Economic Cooperation's Cross Border Privacy Rules (APEC CBPR). At the OECD, cross-border co-operation among privacy enforcement authorities has been a priority, resulting in the adoption of the 2007 Recommendation on Cross-Border Co-operation in the Enforcement of Laws Protecting Privacy.

Privacy frameworks around the world are in flux. Three of the primary frameworks with an international dimension (OECD, European Union, and Council of Europe) have been under review simultaneously, and a fourth (Asia Pacific Economic Cooperation, APEC) is implementing new cross-border arrangements. Work on domestic privacy frameworks is likewise underway across the globe, from Australia to Brazil to China to the United States.

Consistent with the Seoul Declaration, the OECD is in the process of reviewing its Privacy Guidelines. Preparations for the review began in 2010, in the context of the 30th anniversary of these 1980 Guidelines. As part of the process, the OECD organised three thematic events. These events addressed i) the impact of the 1980 Guidelines; ii) the evolving role of the individual; and iii) the economic dimensions of personal data and privacy. It also produced two reports, "The Evolving Privacy Landscape: 30 Years after the OECD Privacy Guidelines" (OECD, 2011h), and "Implementation of the OECD Recommendation on Privacy Law Enforcement Co-operation" (OECD, 2011i).

Building on this preparatory work, as well as on the OECD (2011g) *Communiqué on Principles for Internet Policy Making*, the OECD developed Terms of Reference to serve as a roadmap for the review. The Terms of Reference articulated a shared view of current issues and approaches, and provided the rationale for further work. In addition to highlighting the changes in the environment, the Terms of Reference identified those elements which member countries considered essential to improving the effectiveness of privacy protections.

A multi-stakeholder group of privacy experts ("Expert Group") was formed for the review process. This group included experts from governments, privacy enforcement authorities, academics, business, civil society, and the Internet technical community. Participants also included representatives of the Council of Europe and the European Union, as well as experts active in APEC.

Important areas for potential further work

An increasing number of the applications based on the Internet involve personal data, i.e. “information relating to an identified or identifiable individual”. As such, they are subject to the policy frameworks that protect individuals in relation to the processing of their personal data. To a large extent, these policy frameworks reflect the ‘basic principles of national application’ contained in the OECD (1980) Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data (“the Privacy Guidelines”). However, the use of big data analytics increasingly challenges the application of these basic principles.

For example, in the paradigm of the 1980 Privacy Guidelines, data that is not related to an identified or identifiable individual falls outside the scope of these Guidelines. However, with data analytics, the boundaries between personal and non-personal data are blurring and the application of basic principles such as the purpose specification principle are challenged.¹¹ Big data analytics often involve reuses of personal data in ways not envisaged at the time of their collection. They also implicitly rely on the retention of information for an extended period of time. As such, they raise tensions with existing privacy frameworks, many of which are premised on limits to the collection and storage of information, as well as the confinement of its potential uses. Further work could analyse these issues more in depth and explore possible avenues to address them.

Consumer protection and empowerment

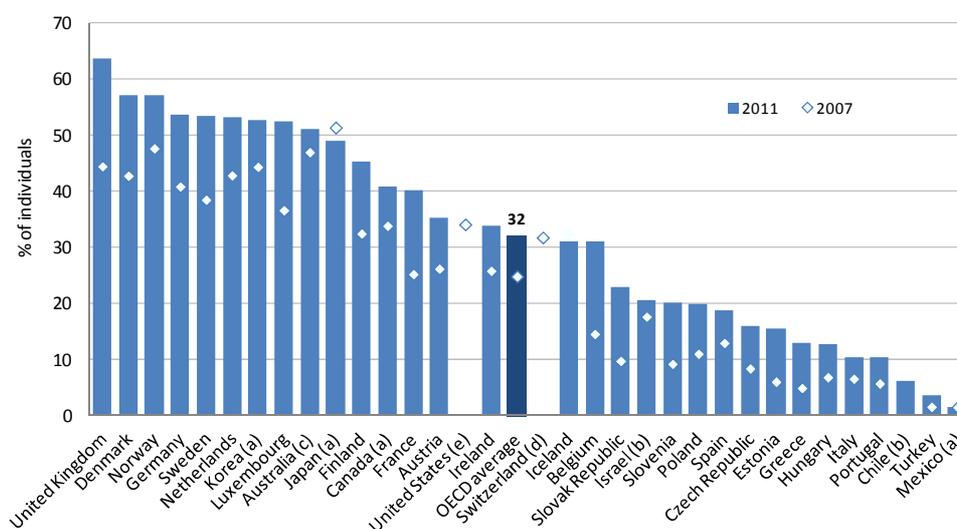
The Seoul Declaration acknowledges that consumers are important stakeholders in the Internet Economy. The Internet provides a platform for them to easily access product information, and purchase multiple goods and services from a broad range of providers. Benefits of the Internet include higher transparency and thus enhanced competition and lower prices. They also include some possibility to buy products from suppliers all over the world. Given these benefits, the Seoul Declaration underlined that governments have an important role to play in ensuring that the Internet provides a secure and trustworthy environment for B2C transactions.

Following the Seoul Declaration, the OECD launched a review of the OECD (1999) *Guidelines for Protecting Consumers in the Context of Electronic Commerce* and is developing policy research and analysis on consumer protection and empowerment in the context of: i) online and mobile payments (OECD, 2012h); ii) the purchase of digital content *via* the Internet and other ICT channels (OECD, 2012e); and iii) the participative web. Markets and policy developments in these areas are discussed below.

Markets and policy developments

Since the Seoul Declaration, the B2C e-commerce marketplace has grown steadily on a global basis. In the OECD area, the average proportion of consumers purchasing products *via* e-commerce increased from about 25% of individuals in 2007 to 32% in 2011 (Figure 4). Asia-Pacific is expected to become the largest B2C e-commerce marketplace by 2013 (representing 34% of total sales share against 31.1% in 2012), followed by North America (31.6% of total sales share in 2013 against 33.4% in 2012), and Europe (29% of total sales share in 2013 against 30.2% in 2012).¹² In the United States, e-commerce sales (including retail and selected services) increased by 10.3% between 2009 and 2010 (from USD 385 billion in 2009 to USD 424 billion in 2010, see US Census Bureau, 2012). Between 2008 and 2011, the value of Europe’s online retail sales nearly doubled, from EUR 118 billion in 2008, to EUR 201 billion in 2011. Some developing economies, such as China and Brazil, are also becoming important economic forces. In China, for example, the volume of online sales increased from CNY 128 billion (about EUR 16 billion) in 2008 to CNY 774 billion (about EUR 94 billion) in 2011. This represents an average growth rate of more than 80% a year.

Figure 4. Individuals who ordered or purchased goods or services on the Internet, 2011 or latest year available (percentage of individuals)



Note: Data from the EU Community Survey covers EU countries plus Iceland, Norway and Turkey. It refers to individuals aged 16-74 years, except for Canada (16+), Israel (20-74), Japan (6+), Switzerland (14+). Data refer to individuals who have bought or ordered goods or services over the Internet, for non-work use, in the last three months (for countries covered by Eurostat). For the rest of the OECD countries, it refers to individuals placing orders over the Internet in the last 12 months. Information on data for Israel¹³: <http://dx.doi.org/10.1787/888932315602>.

- a. 2010.
- b. 2009.
- c. 2008.
- d. 2005.
- e. 2003.

Source: OECD, (2012i).

To a large extent, this is due to online shoppers being increasingly able to access a larger range of products through online and mobile platforms. The range of purchase channels has also increased, in particular for goods and services that are delivered in an electronic format. Purchase channels include traditional e-shops, IP TVs, social media (such as blogs, social networking sites, and other content sharing sites), and cloud computing platforms. With increasing adoption by consumers of mobile devices, such as smartphones, tablets and e-readers, growth is expected to accelerate. Overall, research carried out in the European Union reveals that online products¹⁴ are generally offered at lower prices than those sold offline, resulting in estimated consumer welfare gains of EUR 2.5 billion (Civic Consulting, 2011).

Consumer information and capacity to research and compare products online have been enhanced through the growing *participative web*. The use of search engines such as product and price comparison platforms, as well as product ratings and reviews posted by consumers on traditional online platforms and social media, have been instrumental for empowering consumers. Social media are increasingly being perceived, by both businesses and consumers, as key platforms where e-commerce may be effectively conducted, based on friends, family and other consumers' recommendations. Businesses have in this context reshaped their advertising and selling strategies.

The development of innovative and easy-to-use *online and mobile payment systems* since the Seoul Declaration has also helped to drive growth. While still relatively low (EUR 62 billion in 2010), the value of global mobile payments is expected to increase particularly rapidly in the near future, up to EUR 223

billion by 2013. Research shows that in the United States, the total transaction value for mobile payments will be USD 640 million in 2012, and should reach approximately USD 62 billion in 2016 as consumer usage of smart phones to purchase medium-value products (such as groceries or gas) will continue to increase (EMarketer, 2012). In addition to these new payment systems, businesses have developed a number of loyalty and reward programmes (in particular in the context of digital content purchases), which have helped drive new consumer demand. For example, some businesses enable consumers to purchase products through an annual subscription fee for which they can also get free services (such as free product shipping, or unlimited instant streaming of movies and TV shows).

In terms of *policy developments*, many OECD countries and non-members apply general consumer protection rules (such as contract and distance selling rules) to address B2C e-commerce-related issues, while others have developed more specific e-commerce or mobile commerce regulations. In some instances, the rules overlap with other regulations on, for example, misleading and deceptive advertising, telecommunications, privacy, and copyright. In recent years, some countries have taken steps to adapt and/or review their existing frameworks to the evolving Internet economy. For example, in the United Kingdom, in September 2011, the government announced that a new *Consumer Bill of Rights* would be developed with a view towards clarifying overlapping consumer protection and copyright legislation and regulation, and providing stronger consumer protection, including in the area of digital content. In Canada, the *Competition Act* was amended in December 2010 to include specific provisions to address false and misleading representations and deceptive marketing practices in the electronic marketplace. These amendments have not yet come into force. Taking account of the crucial role that mobile payments increasingly play in the development of e-commerce, some countries, such as Canada¹⁵ and Mexico¹⁶ have taken steps to reduce legal uncertainty in mobile payments.

At the international level, the International Consumer Protection and Enforcement Network (ICPEN) calls for enhanced enforcement efforts in this area. In its report being finalised on mobile payments, the organisation highlights that mobile payments fall under civil law in most jurisdictions and thus are outside of the authority of most consumer protection law enforcement agencies. Co-operation with other governmental and non-governmental bodies is therefore regarded as crucial to help assist consumers in their civil cases in this area.

Another development being called for by governments and some stakeholders relates to the need for enhancing consumer access to their own personal data within the context of commercial transactions. Such a tool will help consumers make better informed decisions by being able to compare prices, get an overview of their transactions history, and/or look at the value of their own data. In the United Kingdom, in 2011, a voluntary programme, *Midata*, was launched by the government with industry with a view towards providing consumers with increased access to their personal data in an electronic format (BIS, 2013).

Important areas for potential further work

Despite the above dynamic developments, B2C e-commerce has not yet reached its full potential, at both domestic and cross-border levels. It still represents a small share of traditional retail and is relatively low compared to business-to-business e-commerce. Trust in e-commerce remains affected by a number of problems that both businesses and consumers continue to experience. These include i) practical barriers, such as language problems, time required for businesses to set up an effective e-commerce platform, and a lack of interoperability of delivery and payment systems; and ii) regulatory barriers, such as complex VAT systems, overlapping frameworks addressing e-commerce issues (including consumer, privacy, intellectual property, telecommunication and competition rules), or regulatory gaps. Such difficulties are perceived to be aggravated in cross-border transactions.

Delivery issues (such as long delivery time periods and non-delivery), inadequate information disclosure, concerns over payment security and misuse of personal data (for example in the context of mobile applications, apps), as well as inadequate dispute resolution and redress mechanisms, are the major problems being reported by online shoppers in the OECD area, in both domestic and cross-border e-commerce. Some of these issues, such as delivery, may however vary from one region to another, and within regions. According to an EU consumer market study, 35% of respondents reported concerns over long delivery times in online shopping from another EU country. More specifically, this appeared to be a major concern for consumers in some EU countries, such as Poland (49%), Romania (46%), Bulgaria (41%), and the United Kingdom (40%) while in other EU countries, such as Hungary, Malta and Cyprus,^{17 18} concerns were less significant (Civic Consulting, 2011). Within the United States, while long delivery times remain a concern for some online shoppers, these concerns have been mitigated, in large part, by the availability of premium shipping services and by newer innovations like *Amazon's* push toward same-day delivery. Another area of growing concerns relates to consumer exposure to unsafe products purchased *via* e-commerce. Such products are, in many instances, counterfeit goods, which are available on professional looking websites (including auction platforms) (see OECD, 2008b). The protection of consumers in this context is a challenge, in particular for consumer protection and market surveillance authorities who have limited capacity to detect counterfeit products in the online environment.

Openness

In the Seoul Declaration, Ministers stressed the importance of maintaining an open, decentralised and dynamic Internet stemming from globally accepted, consensus driven technical standards that support global product markets and communications. Preserving the openness of the Internet and adopting a multi-stakeholder approach to Internet policy making have been highlighted as key factors for continuing to stimulate innovation and economic growth in the Internet economy.

Openness is also key for ensuring transparency, diversity, freedom of expression and the protection of individual liberties, given that many citizens are using the Internet including blogs, social networks and video-sharing sites to express their political views and to access information of everyday social, political, and economic concern. By vastly expanding individuals' ability to communicate and enhancing the public's capacity to obtain such communication, the Internet has proven itself to be a platform that can help advance freedom of expression, freedom of association, the free flow of information, the growth of communications, and economic growth. With regard to the Internet and information technology, the free flow of information refers to the right to freedom of expression. It relates more broadly to the commitment to defend and advance freedom of expression, freedom of association and access to information through all media and regardless of frontiers.

Markets and policy developments

Since the Seoul Declaration, work has been undertaken on the following issues related to openness: i) open access to government data (sometimes referred to as "open data") or public sector information (PSI) as discussed in the section above on digital content; and ii) open access to broadband networks, including fixed and mobile access networks. Work on open access to broadband networks shows that open access policies such as mandated regulated access can be crucial for the development of competition and for enabling investments by new entrants. It highlights for example mobile networks as an interesting case, where mobile network operators (MNOs) have been encouraged – either through voluntary agreements or by some type of mandated regime – to host mobile virtual network operators (MVNOs) to improve the level of domestic competition.

To explore how best to ensure continued growth and innovation in the Internet economy, the OECD held a High Level Meeting in June 2011 on *The Internet Economy: Generating Innovation and Growth*. A

key outcome of the meeting was a *Communiqué on Principles for Internet Policy Making*. These Principles were adopted by the OECD Council in December 2011. The *Recommendation on Principles for Internet Policy Making*, and in particular its second principle, urges policymakers to promote the “open, distributed and interconnected nature of the Internet” in order to unleash innovation, creativity and economic growth. The Recommendation supports the flexible, multi-stakeholder model of development and management for the Internet, while strengthening international co-operation.

Important areas for potential further work

The 2011 *Council Recommendation on Principles for Internet Policy Making* is recent but its essential guiding principles are now well established and increasingly recognised, also in some partner economies. Further work could be needed to apply the principles in different contexts, for example with respect to the evolving role of Internet intermediaries, the use of self-regulatory mechanisms or the development of “back stop” regulatory policies. Drawing on work begun in the follow-up to the Seoul Declaration, further work could aim at highlighting for partner economies the benefits to be derived from policies which ensure more openness of the Internet. In addition, as noted above, work could be undertaken to examine more in depth how cybersecurity policy-making could drive economic and social prosperity, and protect cyberspace-reliant societies against cyber-threats while preserving the openness of the Internet as a platform for innovation and new sources of growth. The revision of the 2002 Security Guidelines would aim to provide guidance on how to achieve this objective.

The socio-economic objectives for the Internet economy

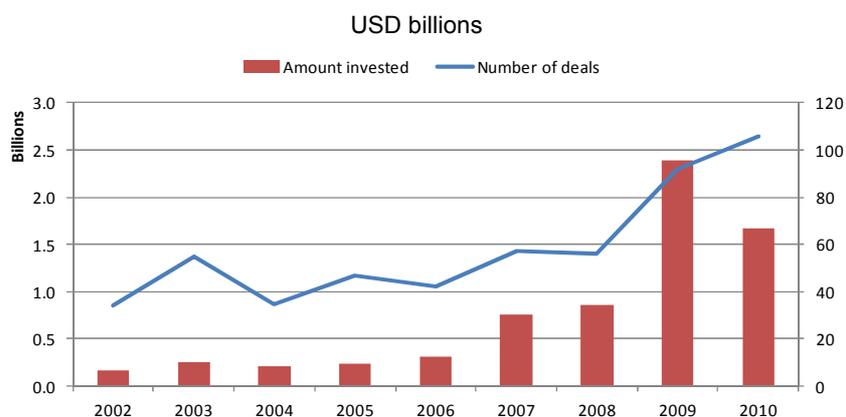
In the Seoul Declaration, ministers envisioned that the Internet economy can contribute to innovation and green growth as well as to development once the right frameworks conditions have been established. The following sections highlight two socio-economic objectives that the Internet economy can help achieve: i) sustainability and ii) development. The role of the Internet for driving innovation and creativity is discussed in OECD (2012a) in the context of digital content (see also section on digital content above).

Green growth

The *Seoul Declaration* highlighted that research on the environmental impacts of ICTs and the Internet and the implementation of appropriate ICT-related policies are essential to tackle global environmental challenges in areas such as energy, transportation, buildings, and agriculture. These environmental benefits are essentially derived from smart applications, (see above section on “smart applications for a data-driven Internet economy”). However, estimates also suggest that ICTs themselves are responsible for 2-3% of the global carbon footprint and are thus required to become more environmentally friendly. This section presents market and policy developments in “green ICTs”, including smart applications for tackling environmental challenges and ICTs with low environmental footprints. It also presents the role of green ICTs for the creation of green jobs. Finally, this section highlights areas which may require further work.

Markets and policy developments

Since the *Seoul Declaration*, the public and private sectors have significantly invested in green ICTs. Many OECD governments have in particular taken the financial and economic crisis as an opportunity to further deploy green ICTs through their economic stimulus packages, laying a new path for *green growth*. Furthermore, the private sector continues to invest in green ICTs, and venture capital is flowing strongly into ICT-intensive clean technologies (see Figure 5).

Figure 5. Venture capital investments in ICT-intensive clean technologies,¹ 2002-10

Note: This includes seed, first round, follow-on, private equity, and mezzanine investments in firms focussing on the following clean technologies: i) electric & hybrids, ii) electro textiles, iii) electronic, iv) flow batteries, v) lithium-ion, vi) power monitoring & metering, vii) sensors, viii) sensors & controls, ix) smart grid, x) smart irrigation, xi) smart lighting systems, xii) smart metering & control, xiii) software, xiv) software systems, and xv) traffic monitoring software.

Source: OECD based on the Cleantech Market Insight Database

In terms of *policy developments*, governments have initiated an important number of green ICT policies and programmes. Countries have engaged in creating awareness of the critical role of ICT innovation in spurring green growth. Many countries have adopted holistic strategies for low carbon economies that spread across different sectors of the economy. In this context, many initiatives have been undertaken to deploy *smart applications* such as smart grids and smart meters. The former allow for a more decentralised energy generation and distribution and the latter enable businesses and especially consumers to more closely monitor energy consumption and to adapt their energy usage (see section on “smart applications for a data-driven Internet economy”).

Some countries have also focused on *greening ICTs* in particular in the public sector in order to reduce energy consumption by governments. Examples include ICT procurement programmes and programmes that aim at reducing the number of data centres through the use of cloud computing. Furthermore, countries have engaged the private sector to improve energy efficiency. In addition to focusing on energy efficiency, countries have put significant effort in waste management and more efficient e-waste management systems.

One key area governments have focused attention on is the development of ICT skills and employment in the evolving “green” and “smart” economy because of the potential of eliciting a *double dividend* by both jumpstarting job creation and accelerating the transition towards green growth. As unemployment remained high in most OECD countries, the economic stimulus packages of many governments addressing the economic crisis have been explicitly aimed at boosting employment, with a significant number having a strong commitment to promote the creation of “green jobs”; many of these jobs requiring ICT-related skills (e.g. jobs in R&D, production, deployment, maintenance, and use of green technologies such as “smart” electricity grids and wind energy turbines).

At the international level, the OECD high-level conference on *ICTs, the environment and climate change*, held in May 2009, underlined the importance of developing global policy guidelines on green ICTs. It led to the adoption of the OECD (2010c) Council of the Recommendation on Information and Communication Technologies and the Environment, which aims at limiting the negative environmental impact of ICT goods and services and at increasing efficiency in other sectors of the economy (enabling impact). The Recommendation was one of the first contributions to the OECD Green Growth Strategy, which was initiated after the OECD *Declaration on Green Growth*.¹⁹

Important areas for potential further work

Important aims for further work could include i) reducing the direct negative effects of ICTs; and ii) leveraging the positive enabling effects of ICTs. In support of the first goal, further work could analyse the environmental impact of the growth of mobile, handheld devices on the one hand, and of cloud computing, on the other. Moving ever more computing power to the cloud allows for “leaner and smaller” devices and could reduce energy consumption significantly. But the increasing number of devices also poses challenges regarding the material and energy in use for the production and use, but also the disposal, of devices.

In support of the second goal, work has been undertaken to assess the positive effects of ICTs in various areas such as smart grids, smart buildings and smart transportation. However, since this is an area where many new developments are still taking place, work should be continued to assess how to make the best and most efficient use of these ICTs, and of the big data streams of data they generate (see section on “smart applications for a data-driven Internet economy”). In addition, those smart technology areas that were formerly separated from each other will become increasingly interlinked via the Internet. Work should therefore also analyse these linkages and provide an overview of how policy makers could deal with the convergence of these sectors and how to best use ICTs to maximise their positive effects.

Global participation for development

In the Seoul Declaration, ministers stated their determination to “support expanded access to the Internet and related ICTs, especially for people in developing countries” and they “recognised the importance of a competitive environment for the successful growth of the Internet economy and the opportunities this can bring for development, particularly for people and regions with the most limited economic means”. The review in the area of the Internet and ICTs for development focuses on i) increasing access to the Internet economy; ii) developing skills in emerging and developing countries; iii) promoting applications and their use; and iv) Internet-related innovation: the case of cloud computing.

Markets and policy developments

In the area of *increasing access to the Internet economy*, significant progress has been made in international interconnection by the deployment of submarine fibre systems, especially in connecting Sub-Saharan Africa and in increasing capacity along the transpacific interconnection to South-East Asia. Further progress could be made in better connecting South America. In terms of national connections, mobile networks seem to be the most promising way to connect the majority of people living in emerging and developing countries. In 2010, 90% of the world was covered by a mobile signal (ITU World Telecommunications/ICT indicators Database). Over the past years, the number of mobile phones and smartphones in developing and emerging countries has increased at a fast pace which will further drive traffic growth. Overall, the growing number of subscriptions and especially mobile subscriptions in developing countries is an indication that people and organisations are willing to spend often scarce resources to get access to the Internet and that they see important additional value in being connected to the Internet.

On the *application layer*, multiple applications in areas such as agriculture, health, education and mobile banking have been developed over the past years. Evidence shows that users benefitted from these applications whereby benefits largely came from access to better quality information and services that particularly disadvantaged groups did not have previously. Opportunities for greater gains are possible as services improve possibly also by leapfrogging on developed economies who also need to develop applications e.g. on health given the challenges posed by ageing populations. The gains for disadvantaged groups are probably among the most substantial. However, success was less substantial when it came to the

scale of such applications and project sustainability. Exceptions include M-PESA for mobile banking and Socialtxt and HMRI 104 Advice for mobile health applications. This was also due to the fact that few initiatives were financially sustainable to allow scaling-up.

In terms of *innovative concepts*, cloud computing has gained in importance since the Seoul Declaration and different cloud services are now used in emerging and developing countries. There is, however, room for progress since the poor interconnectivity in these regions still limits the range of cloud based applications. The major benefit of cloud computing for development is the fact that individuals, businesses and governments can access a wide range of well-developed computing resources that would otherwise not be available in developing or emerging countries. In addition, cloud computing allows them to only buy the quantity that is really needed and avoid the costs of building-up own infrastructure. Especially platforms designed for mobile devices seem to be very interesting for emerging and developing countries because the deployment of mobile networks is more advanced than the deployment of fixed networks.

Finally, the full potential of the Internet economy can only be tapped if people have the necessary *skills*, if they know how to use ICTs and the Internet for economic purposes and in their social life. Some progress has been made in training people to use specific Internet and ICT-based applications, for instance, by training users to train other users.

Important areas for potential further work

A key message from the OECD (2011j) Meeting of the Council at Ministerial Level (MCM) was the renewed emphasis on development. In the area of the Internet economy, the OECD has engaged in development issues through its participation in APEC, the Internet Governance Forum and through workshops on the Internet and ICTs for development.

Demand for work in this domain continues to grow and could be undertaken in several areas. Regarding *communications infrastructure*, progress has been made in deploying submarine fibre but being connected is only the first step. A reliable and competitive offer has to be available in markets before the Internet economy can truly take root in an economy. Future work will need to focus on balancing competition and reliability. In terms of mobile network deployments, work could focus on assessing mobile broadband prices in developing countries and in ensuring that enough spectrum is made available to enable the further deployment of mobile networks in particular for connecting remote and rural areas. When it comes to applications, further innovative mobile applications which can substitute for the lack of administrative and financial structures could be assessed. In addition, more work would be needed to ensure that small applications scale up and that applications are financially sustainable.

Cloud computing can greatly benefit emerging and developing economies, because they may lack the necessary resources in skills and ICTs at the domestic level. However, access to cloud resources requires the build-up of domestic infrastructure as well as policy frameworks, for example, to ensure privacy and security. Standardisation is also key to the further deployment of cloud services in emerging and developing countries. Finally, ICT *skills* have to be developed. Given limited resources there is a need to assess the relative importance of different types of investments in skills and their costs. The extent to which simple technologies can save on certain training needs also requires further analysis.

Conclusion

Overall, the review of the implementation of the Seoul Ministerial shows that progress has been made in all main policy areas identified in the proposal on the OECD (2010a) proposal on the “Follow-Up to the Seoul Ministerial Declaration for the Future of the Internet Economy”. These areas include: i) improving

access to the Internet via a high-speed infrastructure; ii) enabling the creation and distribution of digital content; iii) encouraging the use of smart ICT applications in particular for improving environmental performance (green ICTs); iv) promoting consumer protection and empowerment; v) privacy and security; vi) the openness of the Internet economy; and vii) ensuring the global participation in the Internet economy for development.

There is nevertheless room for further work, including to i) increase broadband coverage and deploy high-speed networks including fibre and mobile networks; ii) better understand the economics of digital content and copyright; iii) assess the socio-economic role of data as intangible asset and knowledge based capital; iv) increase the common understanding of cybersecurity policy making from an economic and social perspective v) communicate the benefits of an open Internet economy beyond OECD countries; vi) tackle the privacy challenges posed by “big data”; and vii) address the regulatory barriers to effective cross-border consumer protection. In addition, as the Internet ecosystem constantly evolves, expert work is needed to continue to monitor, analyse and measure the developing Internet economy and its contribution to economic growth and well-being.

Overall, the review shows that the Internet economy has now reached a point where it has become a new source of growth with the potential to boost the whole economy, to foster innovation, competitiveness and user participation, and to effectively contribute to the prosperity of the whole society.

NOTES

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- ¹ The original title of this theme as introduced in the proposal on the “Follow-Up to the Seoul Ministerial Declaration for the Future of the Internet economy” (OECD, 2010a) was “Understanding the data-driven economy: the development of a smart Internet Economy”. It was renamed to underline the key role of applications in making the Internet economy data driven and smarter.
- ² Digital content was covered under the second theme together with green ICTs. As green ICTs cover smart applications such as smart grids, green ICT will be discussed under “smart applications”.
- ³ The three main building blocks of the Internet economy are listed in chronological order in which they have been addressed by the Committee for Information, computer and Communications Policy (ICCP).
- ⁴ The three main building blocks of the Internet economy are listed in the chronological order in which they have been addressed by the ICCP.
- ⁵ For additional data on European countries, see also the BEREC (2006).
- ⁶ Online content refers to digital content delivered over the Internet or other digital networks.
- ⁷ The concept of the “participative web” refers to an “increased participation and interaction of Internet users who use [the Internet] to communicate and express themselves. [...] It represents an Internet increasingly influenced by intelligent web services based on new technologies empowering the user to be an increasing contributor to developing, rating, collaborating and distributing Internet content and developing and customising Internet applications” (OECD, 2006).
- ⁸ Definition of local content: “an expression and communication of a community’s locally generated, owned and adapted knowledge and experience that is relevant to the community’s situation” UNESCO (2001).
- ⁹ See also the reports on “Empowering and Protecting Consumers in the Internet Economy” OECD (2012b) and “Protecting and Empowering Consumers in the Purchase of Digital Content Products” (OECD, 2012e).
- ¹⁰ Of relevance to the deployment of smart ICT application are for instance the adoption of life cycle perspectives in ICT and ICT-enabled applications for sustainable management of natural resources and materials in production, use and end-of-life phases as well as the support of research and innovation in green technologies and services.
- ¹¹ The purpose specification principle states that “the purposes for which personal data are collected should be specified not later than at the time of data collection and the subsequent use limited to the fulfilment of those purposes or such others as are not incompatible with those purposes and as are specified on each occasion of change of purpose”.
- ¹² See EMarketer (2012).
- ¹³ The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.
- ¹⁴ It should be noted that the study does not cover a number of products including airline tickets and content/music downloads.

- ¹⁵ In Canada, a major review of the payments framework is underway to determine how existing rules should be adapted, or new rules developed, to adequately tackle emerging issues; recommendations were made in that regard to the Minister of Finance in December 2011.
- ¹⁶ In Mexico, a new regulatory framework is being developed by the Mexican Central Bank and the Ministry of Finances, with the participation of the National Banking and Securities Commission to adapt to new mobile payments schemes that have been implemented for the first time in the country in 2011.
- ¹⁷ Footnote by Turkey: The information in this document with reference to “Cyprus” relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of United Nations, Turkey shall preserve its position concerning the “Cyprus” issue.
- ¹⁸ Footnote by all the European Union Member States of the OECD and the European Commission: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.
- ¹⁹ The OECD *Declaration on Green Growth* specifically mentions the role of ICTs in meeting environmental challenges: “In order for countries to advance the move towards sustainable low-carbon economies, international co-operation will be crucial in areas such as ... *application of green ICT* for raising energy efficiency (paragraph 2); and “We recognise that special efforts need to be made at the international level for co-operation on developing clean technology, including by *reinforcing green ICT activities* ...” (paragraph 8) (see OECD, 2009).

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