

DIGITAL ECONOMY: SEEKING FOR BALANCE

GLOBAL TRENDS 2015 – 2020



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EXECUTIVE SUMMARY

The growth of an innovation-driven digital economy has the potential to transform existing industries and drive efficiency and productivity, and give rise to entirely new industries. It will also create new opportunities for businesses to export its innovation overseas. [1, p. 16] For example, as it is estimated in Australia the adoption of smart technology in energy, water, health and transport, and the roll-out of high-speed broadband could add more than 70 000 jobs to the Australian economy and 1.5 per cent to the level of Australia's Gross Domestic Product within a few years. [1, p. 1]

Among the fields of successful digital initiatives are the following: e – Government services, education, work, health care, transport systems, consumption of energy, gas and water.

According to the 2012 United Nations **E-government** Survey rankings, the Republic of Korea is the world leader of e – Government services. Meanwhile, the other countries have also reached a significant progress in e – government services. For example, the Government of India has developed a variant of the National Portal that targeted towards a specific group of people, this site contains specific topics aimed at the rural poor: agriculture, rural energy, features forum discussions and an “ask an expert” section. Making it available in English and in eight local dialects, the government's main objective is to stimulate women, the poor, and people in the remote rural areas to use technology to their own advantage. [8, p. 25]

The traditional model of good **education** is now challenged by a move to virtual learning, and consequent impacts on content, location, timing and methods. The Federal Government of Germany has supported the measures focused on mobile in-service learning aimed at combining didactic methods with innovative technical facilities. In the United States smartphones and mobile broadband connectivity are creating new ways for at-risk students to learn, for example, mathematics. In Belgium the ICT Without Boundaries program is an awareness-raising campaign to introduce ICT in special-needs schools and increase the usage of ICT by children with special needs and the educational Web portal, KlasCement, is for teachers to share the learning materials that they developed themselves, with their colleagues.

According to the World **Health** Organization, chronic diseases such as cardiovascular diseases (CVDs) place a grave economic burden on countries. China's Wireless Heart Health project is deploying a 3G-enabled cardiovascular screening and monitoring system that includes smartphones with built-in electrocardiogram (ECG) sensors. The smartphones send patient heart data to cardiac specialists at a 24-hour call center. As part of the service, doctors can provide real-time feedback to their patients via text or phone call. [14, p. 72] In Denmark every Danish citizen due to the eHealth system has their own personal web page, can view treatment/diagnoses from their own hospital record, book appointments with general practitioners, send secure emails to health authorities, order medication from pharmacies, monitor self-compliance with medication, and get access to local disease management systems. [16, p. 11] In Australia ECHONET project was used

to manage 16 critically-ill patients and reduce the number of times patients need to be transferred. This saved the high transport costs associated with transferring intensive care patients between hospitals. [1, p. 17]

The United States Department of Energy, Office of Electricity Delivery & Energy Reliability declared that building a **smart grid** is the first critical step of many for the nation to maintain its technology prowess and prosperity, and brings new tools, techniques, and technologies together in a network of devices aligned and interconnected for superior grid performance. The information system would provide customers with a window into their own energy use, giving them the tools to make better choices that align with their own values and needs and that achieve greater operational efficiency. [18, p. 8] The advances of smart metering solution are used by the utility operator for the deployment in the Paris area and other urban areas in France. The key elements of that operational system include automatic meter reading (AMR), including for metering applications, and a VHF network for data concentrators in buildings, combined with GSM/GPRS transmission capacity to data management centers. [19, p. 4]

Speaking at the March 31, 2010 White House Forum on Workplace Flexibility, President of the United States Barack Obama declared: “work is what you do, not where you do it”. The President signed the **Telework** Enhancement Act of 2010. It asks agencies to step up efforts to implement telework to help ensure continuity of operations, reduce management costs and improve employees' ability to balance their work and life commitments. [22] Moreover, telework programs are integral to advancing other important national initiatives such as building capacity in the Federal workforce to continue agency operations in the event of snowfall or emergency. Telework also provides necessary access to pools of skilled employees through wider employment opportunities for the disabled. [22, p. 7] Video conferencing can remove the need to travel for face to face meetings, and increase productivity by saved travel time. Telework and videoconferences can be used among the state authorities to lower government travel costs and associated greenhouse emissions. [1, p. 32]

Smart technologies can be used to optimise traffic flows, improve road safety and reduce emissions. In Australia **Intelligent Transport Systems** (ITS) combine computers, communications, positioning and automation technologies to provide real-time data about suggested routes, congestion, collision detection and avoidance. The system uses sensors built into the road to detect cars waiting at intersections and a network of computers to coordinate the flow of traffic. [1, p. 30] One of the objectives, specified in the “ICT Strategy of the German Federal Government: Digital Germany 2015” is improving road traffic safety and flow through the application of ICT. Such systems are the main way to improve traffic safety. [13, p. 9]

Beside the development of the certain sectors of digital economy it's of high importance to increase interaction between information communication technologies. For example, in Estonia **smart buildings** cover solutions that maximize energy efficiency in buildings, such as building management systems that run heating and cooling systems according to occupants' needs. Smart management is room based measurement of temperature, CO2

levels and illumination and adjusting the heating, ventilation and illumination solutions according to the current requirements. [24, p. 35]

Digital technologies can provide new impetus for the digital economy, encouraging innovation, raising the level of skills, triggering dynamic developments and innovations in existing industries and creating new markets. While technologies are key driver of digital economy growth, they may have a disruptive impact on the entertainment and media industries and environment.

Disruptive impact of media digitisation on business models and revenues partly relates to the concerns that sustainable, long-term business models may not be possible if analog dollars are replaced by digital pennies. This reflects concern that the rates of return for online content may not match offline figures. [27] Among the other issues in the field of entertainment and media it worth to mention the problem of development of local content industry that may lead to lower levels of participation in the digital economy and dilution of the local cultural identity, particularly if younger local users mainly view overseas content on the internet. [1, p. 36]

In addition, steps need to be taken to reduce the environmental impact of ICT devices and key infrastructure. The generation of e-waste is a growing challenge. E-waste is one of the fastest growing categories of waste, growing at more than three times the rate of general waste.

Among **conditions** necessary for the digital economy development can be determined: development of physical capacities, institutional changes, digital media literacy, digital confidence for business and community, open access to public sector information and balanced copyright framework.

Research released by Arthur D. Little, Chalmers University of Technology and Ericsson shows that doubling **broadband** speed can yield growth in excess of 0.3 percent GDP and quadrupling broadband speed can yield 0.6 percent growth in GDP. [28, p. 2] The Government of Germany set an objective to install fully – coverage next generation networks. Besides DSL and cable providers, particularly radio technology and, in individual cases also, satellite systems contribute to full basic broadband coverage. [13, p. 11 – 12] The Danish goal is one of the most ambitious in Europe and will help fulfil the European 2020 goal of all EU citizens having access to an internet speed of 30 Mbps or above. The Danish goal may be achieved by continuing with the marketbased and technology- neutral approach, which has worked well so far, and brought Denmark to its current position as one of the leading countries in Europe with regard to broadband development. [21, p. 8]

In the United Kingdom in regard to the **institutional changes** for new IP system to enhance growth and innovation the Hargreaves Review proposes a new role for the Intellectual Property Office (IPO) in issuing formal opinions to help clarify the law where it is not understood or where new developments in technology and markets create fresh

uncertainties, which the courts would be obliged to take account of in relevant cases. [5, pp. 5, 7]

In Australia's Digital Economy report is mentioned that a successful digital economy requires households and businesses to have the necessary skills to effectively and productively participate in digital economy. **Digital media literacy** is a dynamic concept. Skill requirements depend on the circumstances in which users find themselves and will change over time. Digital media literacy can be self-taught or constitute part of formal instruction but is a continuous process for all ages and stages of life. [1, p. 44] The eNorway report has noted that digital skills include the ability to exploit the opportunities offered by ICT, and use them critically and innovatively in education and work. Digital skills also include the ability to be critical to sources and assess content. [30, p. 8]

Industry can contribute to digital economy by demonstrating greater digital confidence. **"Digital confidence"** refers to businesses being appropriately educated about the risks but also being sufficiently aware of the benefits, so that they productively and safely participate online. Businesses that are digitally confident are more likely to incorporate technology into their business processes and enjoy resultant productivity improvements. Better use of the digital economy would enable business to compete more effectively internationally and develop export opportunities. [1, p. 24] The Government of Germany encourages business to use cloud computing as an instrument of saving on costs. In Denmark about one third of all active Danish businesses having tried sending electronic invoices via the national digital infrastructure NemHandel. The efficiency potential from the introduction of electronic invoicing to the public authorities is around DKK 700 million per year. [21, pp. 21-22]

It is important that when users engage with the digital economy, they have the requisite digital confidence and skills to do so safely and productively. As users spend more time online they expect the same levels of protections as exist in the offline world, but often those protections are absent or consumers do not know how to mitigate online risks. Among the main targets could be measured: privacy, e-security and cyber-safety.

India has adopted new **privacy** rules. India's Information Technology Rules 2011 impose significant limitations on how businesses can handle personal information. [32, p. 5] The Australian Government has focused on developing a set of Unified Privacy Principles, enhancing protection for health and credit reporting information and improving education about the impact of new technologies on privacy. [1, p. 41] The US continues to regulate privacy by industry or data type, but it may move toward a more comprehensive approach in the next three to five years. [32, p. 6]

It is essential for the digital society that the population trusts the security of the digital infrastructure. **Online safety** (OS) may include a large variety of topics: how to handle contact with strangers on the Internet, how companies and agencies gather information about individuals and how this information may be used in ways people might not expect or agree to, the safe use of mobile phones etc. A range of e-security awareness raising initiatives have been implemented to help home users, school students and SMEs use the

internet in a secure and confident manner. The Federal Government of Germany will create a climate for greater confidence in Internet technologies and services. All stakeholders - users, providers or IT security planners - bear specific responsibility for IT security. Important is also to educate users in particular about current risks and raise their awareness of the need for greater self protection, promoting the application of trusted computing and trusted platform modules, electronic proof of identity, confidential and verifiable transfer of electronic messages and documents.

A growing number of users are looking to use cyberspace to steal, compromise or destroy critical data. Nearly two-thirds of critical infrastructure companies in the UK report regularly finding malware designed to sabotage their systems. The UK will pursue **cyber security** policies that enhance individual and collective security while preserving UK citizens' right to privacy and other fundamental values and freedoms. More and more children are using the Internet and mobile phones to communicate. So, cyberbullying in schools has become a subject of growing importance within the last few years in the EU. To combat online risks the Government of Denmark decided to set up the Government Computer Emergency Response Team and the Government of Australia has developed the Cyber-Safety Plan.

The Ministry of Science, Technology and Innovation of Denmark is designed to give the private sector **access to data from the public authorities**. Private parties can use public data to develop products and services which create new digital markets for the benefit of the public and private sector. In some instances, such private services will help create new or increase the flow of data back to the public sector. [21, p. 8]

There is a constant need for the IP system to adapt to new forms of innovation, creativity and technology and that need is now particularly marked in copyright because technology has made copying and communicating many works very easy and created opportunities for the widespread and efficient use of digital content. It's specified in Hargreaves Review that the UK's current IP system is falling behind what is needed in the area of copyright. [5, p. 3] **The IP law must adapt to change**. At the same time the Government is aware that the next need for change may come from a very different place. That is why flexibility in the IP system is highly desirable, although it needs to be balanced with as much certainty as possible to encourage investment. [2, p. 2] The issue of flexibility involves the interests of divergent groups. The diversity of interests of the different groups involved in public debates on copyrights can be traced, for example, in the copyright reform of Switzerland (2004 – 2007 years).

The Hargreaves Review identifies two particular difficulties in the IP field: a near-total lack of high-quality **evidence** on some issues and an overabundance of effective lobbying. The UK Government will take certain measures regarding the above issues. The role of the digital economy indicators is also emphasized in Australia's Digital Economy Report.

The online environment has brought changes to copyright licensing. In many sectors, multi - territory licensing of online rights is carried out directly by rightholders, or those

to which the rights have been transferred, without the intervention of collecting societies (direct multi - territory licensing). In other sectors, the multi - territory licensing of online rights is done collectively. [38, p. 12] Currently online music market within the EU has a wide territorial fragmentation. A number of factors contribute to such fragmentation: complex copyright licensing processes, technological barriers, lack of legal certainty for service providers, consumer trust in online transactions, illegal downloading of files (piracy) etc. The European Commission in its “Proposals for a Directive of the European Parliament and of the Council on **collective management** of copyright and related rights and multi-territorial licensing of rights in musical works for online uses in the internal market”, dated July 11, 2012, made the certain recommendations regarding the identified issues.

DRM is revolutionizing the means and ways of circulating content online. It refers to systems for electronically administering and marketing the rights for using digital content. Providers can individually calculate and control the length of time and frequency with which a user makes use of the content – whether for listening, watching, printing or saving. Access to such services will be determined and controlled with technological measures. Although there are rough spots, including on - line payment systems, the issue of DRM and copy machine levies.

The development of distribution environments may lead to the creation of new **markets**. For example, a global repertoire database was supported by the WIPO. A Centralised Portal was proposed within the European Union to pool the repertoire of collecting societies for multi - territory licensing in a single transaction. Markets for the use and sharing via networks of intellectual property rights such as digital content and other intellectual information through the maximum use of digital technologies were forecasted in Japan. In the UK the Hargreaves Review proposed to create the world’s first Digital Copyright Exchange (DCE) system.

Rapid technological development makes future modes of exploitation and use of copyright works unpredictable and therefore requires a system of rights and limitations with some **flexibility**. Copyright legislation should achieve an optimal balance between protecting the interests of authors and right holders in their works and securing the freedom to access, build upon and use these works. [41, p. 7] Innovation may be blocked and growth hampered when unduly rigid applications of copyright law enables rights holders to block potentially important new technologies. A second and also significant problem is a growing mismatch between what is allowed under copyright exceptions, and the reasonable expectations and behaviour of most people. [5, p. 43]

Maintaining a closed list of **copyright exceptions** is increasingly difficult in a world of rapid and unpredictable technological development. In Switzerland consumers, educational institutions and industry were all demanding that the limits of copyrights be more clearly defined for the digital age. [7, p. 8] The Member States of the European Union are free to make an individual choice from the optional exceptions, specified in the Information Society Directive. The mandatory and optional exceptions and limitations recognized in the Information Society Directive shall only be applied in accordance with

the three-step test. [42, p. 13] The scope of a national exception based on a prototype listed in the Information Society Directive may differ from country to country. [42, p.14] In 2002 across the European Union was established the Wittem Project the result of which is the European Copyright Code. The Wittem Group believes that a European Copyright Code drafted by legal scholars might serve as a model or reference tool for future harmonization or unification of copyright at the European level.

In the United Kingdom the Hargreaves Review is considered whether the more comprehensive American approach to copyright exceptions, based upon the so called Fair Use defense, would be beneficial in the UK. The Hargreaves Review also favours a limited private copying exception which corresponds to what consumers are already doing. The UK Government shared the Review's concern and agreed with the Review's central thesis.

In Canada the Copyright Modernization Act, Bill C-11 [47] was adopted by the Parliament of Canada and on June 29, 2012, had received royal assent. The Act has incorporated a number of copyright exceptions and limitations regarding the usage of the copyright works on the Internet.

The Australian Government has declared to consider whether the scope of the safe harbour scheme should be expanded to include additional types of online service providers. [1, p. 20-21]

Court practice in Germany, France and Netherlands is attempted to broader interpretation of copyright exceptions and limitations in conformity with fundamental freedoms.

It's mentioned in the Hargreaves Review that we should be wary of expecting tougher **enforcement** alone to solve the problem of copyright infringement. Instead, Government should respond in four ways: by modernising copyright law; through education; through enforcement and by doing all it can to encourage open and competitive markets in licensed digital content, which will result in more legitimate digital content at prices which appeal to consumers. [5, p. 6] In the Government Response to the Hargreaves Review the Government accepted the spirit of the Review's argument that a combination of education, effective markets, appropriate enforcement and modern laws is likely to be most effective in preserving the value of IPRs for their owners, subject to the test of evidence about what is actually effective. The UK Government also accepted the Review's emphasis on stronger market offerings as an implied criticism of what is currently available to consumers.

Under the Copyright Modernization Act of Canada [47], adopted on June 29, 2012, it is an infringement of copyright for a person to provide, by means of the Internet or another digital network, a service that the person knows or should have known is designed primarily to enable acts of copyright infringement if an actual infringement of copyright occurs by means of the Internet or another digital network as a result of the use of that service. In determining whether a person has infringed copyright, the court may consider the certain factors determined in the Act.

The Hadopi law in France has been successfully implemented and research shows it is having an impact on consumer behavior and on digital sales. However, opinions regarding its effect are controversial.

National Copyright Administration of the People's Republic of China on March 31, 2012 released the Revision Draft of the Copyright law of the People's Republic of China [51]. According to the Chapter VII of the Draft where copyright or infringing rights are infringed, the infringer shall compensate the rights holder the real damage. Where the following infringing activities destroy the Socialist market order at the same time, the administrative copyright management department may order the certain additional measures. When administrative copyright management departments implement their duties regarding investigation and prosecution of suspected unlawful activities related to copyright or neighboring rights, the parties shall grant support and cooperation, those refusing, obstructing or delaying the provision of materials without proper grounds, may be subject to warning by the administrative copyright management departments. Where network users utilize network services to conduct activities infringing copyright or related rights, the infringed person may notify the network service provider in writing, and require it to adopt necessary measures such as deletion, shielding, breaking links etc.

In the United States the White House believes that voluntary approaches to combating online infringement can have a significant impact on reducing online piracy and counterfeiting. The White House has adopted the approach of encouraging the private sector to reach cooperative voluntary agreements.

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INTRODUCTION

Information and communication technologies (ICT) affects various areas of society, from government e – services, business development, health and education to gas, water, energy consumption, transport and work. The digital economy can drive national productivity, create jobs and support new businesses, but at the same time it may have a disruptive effect on the entertainment and media industries, cultural identity and environment. Challenges we are facing now coherent the ways to increase benefits and decrease risks related to digital economy. The ICT growth poses new issues, especially in privacy, cyber – safety, cyber – security and dependence of critical infrastructure on technologies. Information technologies, applied in the right way, may increase the positive economic and social effect and enable to deal more effectively with ICT risks and challenges.

The competition authorities of the United Kingdom, Germany, Switzerland, Japan, Denmark, Norway, Singapore and many other countries have prepared the national strategies of ICT development to use the new opportunities of ICT to strengthen economy, increase and maintain people’s quality of life. Each national ICT strategy has a unique approaches and proposals regarding the enhancement of digital economy.

The President of the United States of America Barack Obama has said that if we are to win the future and be successful in an increasingly competitive international market, we must innovate. It worth to note that copyright protection and flexibility of law are among the key factors of digital innovation and economy growth. When companies are confident that their business activity in digital environment will be protected they have the incentive to pursue advances that push efficiency forward, costs down, and employment up. [55, p. i]

The diversity of interests of the different groups involved directly and indirectly in digital business raises the issue of flexibility and balanced measures of copyright protection. The national digital economy will grow if new businesses arise and different types of digital business activities will have the equal opportunities for development. Unduly rigid applications of copyright law as well as unreasonable broad scope of copyright limitations and exceptions may lead to a detrimental effect for the national economy. Tougher enforcement alone to solve the problem of copyright infringement may lead to the similar negative effect for the digital economy growth. Balanced approach that crowds modern copyright law, education, enforcement and measures to encourage open and competitive markets in licensed digital content with effective business models and prices, which consumers are ready to pay will result in more legitimate content market and dynamic digital economy growth.

The present Review is a compilation of international approaches and national ICT strategies of different countries. Most of them set out the priorities, tasks and projects for the period up to 2015 or 2020 years. Based on the official drafts of laws, international overviews, official state and scientific reports the Review is focused upon the main trends regarding the issues and benefits of digital economy, outlines examples of successful

initiatives, explore the new digital market opportunities, conditions necessary for digital economy growth, including the new framework of copyright, the issue of flexibility and enforcement measures.

I. Growth of the Digital Economy: opportunities and benefits

The digital economy is the global network of economic and social activities that are enabled by platforms such as the Internet, mobile and sensor networks. [1, p. 2] The digital economy refers to the devices most of us use each day such as computers, phones and game consoles. It includes the online maps that we consult, the web searches that we do to find information and our electronic banking. [1, p. iv]

However, recent data suggests that not all community groups are equally participating online. For example, in **Australia** while a majority of Australians use the internet and participate online to some degree, there are still an estimated 2.6 million Australians who do not use the internet. At the same time, the level of internet use is only one measure by which we can determine inclusion, it clearly shows that not all sections of the community are equally involved in the digital economy. [1, p. 48]

As for the internet use, ACMA's findings indicate that age has a significant impact on whether a household had an internet connection. Of those households without an internet connection, nearly half were aged 50 and over. Other determining factors for non-participation included income level (66 per cent of people living in a household without an internet connection earned under \$50 000 a year), whether a person lived with a partner but no children (people living with a partner and no children are more likely to have internet access), and whether people were retired (retirees are less likely to have internet access). The primary reasons cited for lack of an internet connection were lack of relevance to lifestyle, cost and difficulty. [1, p. 49]

Australian businesses are using the Internet and broadband at higher rates than households. However, data also suggests there is significant potential for business to further engage in the digital economy, for example, in their level of contribution to (as opposed to their use of) the digital economy. [1, p. 5]

The nature of the digital economy is such that certain **regulatory frameworks** presently face greater pressures than others. Two examples of such pressure relate to:

- **copyright law** - the rapid emergence of *new platforms for social engagement*, content distribution and political communications is putting pressure on copyright laws. [1, p. 20] It worth also to mention that the Intellectual Property (IP) framework is a vital part of the *business environment* and as determined, for example, in the Government Response to the Hargreaves Review regarding the IP regulation, the UK Government wants "...to see a framework that helps a wide range of **UK** businesses to invest profit and expand as much as possible". [2, p. 5]
- **convergence** - where *devices and platforms which originally had distinct functionalities converge or overlap* and, as a result, put pressure to legislative schemes that were originally designed to deal with distinct devices and platforms. [1, p. 20] As mentioned in the Report of **the Organisation for Economic Co-operation and Development (OECD)** ICT are now becoming less sector-specific

and more a part of the mainstream economic policies that concern the economy and society as a whole [...]. OECD countries with long-term strategies for information societies typically emphasize the role of ICTs and the internet as key enablers of *wider societal change*. [3, p. 335] Technical convergence influence the Information communication technology policies. **The Seoul Declaration** issued by the OECD Ministerial Meeting on the Future of the Internet Economy recognised: “That our challenges are, through an appropriate balance of laws, policies, self-regulation, and consumer empowerment, to create a market-friendly environment for convergence that encourages infrastructure investment, higher levels of connectivity and innovative services and applications.” [3, p. 5] A recent **World Bank report** found that: “Convergence is a positive development for the communications industry because it allows greater diffusion of communications services. This is first because different services can now use a variety of facilities to reach customers. Convergence also helps bring down costs of service provision and will reduce the costs of managing networks.” [4, p. 36).

It worth also to emphasize *the interaction between the copyright and technical convergence*. The copyright is acquiring of regulating the permissibility of technologies, such as consumer recording devices and web search engines. For example, in some cases digital content may be transferred from one system to another automatically as people or businesses interact using digital devices. Improvements in machine to machine learning, for example, may create the possibility for further automation in transfer of content. Interactions may therefore become implicitly as well as explicitly monitored and measured. This data will form new and valuable content to be traded within and between systems in the delivery of new services. Data on context and activities transferred to adjacent systems may be repurposed and traded, giving rise to a range of issues relating to copyright. [5, p. 20] These issues are already visible, for example, the Apple iPhone tracks and stores its location continuously, giving a complete picture of its user’s movements for later retrieval, with legal justification in a short paragraph in a long “terms of use” agreement. *Questions of IP, privacy, and security are converging in ways that will, over time, present sharp challenges to the current legal framework*. [5, p. 15]

The Swiss Federal Institute of Intellectual Property indicated that technological developments are always creating *new possibilities* for production and use. What started with the printing press in the 15th century has continued into the 21st century, from the invention of radio and television to the establishment of the internet. The market for mass consumption of content has been built up step by step. Today, this market makes up an important part of the cultural and entertainment enterprise in Switzerland where more than 80,000 people are employed at an annual turnover of about 17 billion Swiss francs. This is a considerable portion of the **Swiss economy**. [7, p. 15]

The direction to new possibilities was also chosen by the UK Government. It wants to provide effective and fair ways for the opportunities to be grasped, but at the same time, as mentioned in the Government Response to the Hargreaves Review: “*we must not put our hugely important creative industries – or any other IP-led business sector – at risk by what we do*.” [2, p. 2]

The use of information communication technology and e-business skills, as well as the organisational changes enabled by technology, play an increasingly pivotal role in achieving productivity gains. [6, pp. 5 – 6]

As we all know many countries of the world are currently facing a challenging *global financial situation*. However, a crisis can be viewed as an opportunity to promote long-term economic success by investing in critical infrastructure. For example, as it is estimated in Australia the adoption of smart technology in energy, water, health and transport, and the roll-out of high-speed broadband could add more than 70 000 jobs to the Australian economy and 1.5 per cent to the level of **Australia's** Gross Domestic Product within a few years. [1, p. 1]

The growth of an innovation-driven digital economy has the potential to transform existing industries and drive efficiency and productivity, and give rise to entirely new industries, from carbon capture to online retailing. It will also create new opportunities for businesses to export its innovation overseas. [1, p. 16]

As the Internet, digital radio and television, and cellular telephone technology (think of all the on-line services or ringtones available) continue to spread, this market will become increasingly influential. Legislation needs to keep up with developments, [7, p. 15] but at the same time when new opportunities arise, the law sometimes needs to adapt so that the right balance is maintained. [5, p. 41]

II. Examples of successful Digital Economy initiatives

2.1. Digitization of Government Services (the e – Government)

According to the 2012 United Nations E-government Survey rankings, the Republic of Korea is the world leader of e – Government services (0.9283) followed by the Netherlands (0.9125), the United Kingdom (0.8960) and Denmark (0.8889), with the United States, Canada, France, Norway, Singapore and Sweden close behind. [8, p. 4]

Republic of Korea: the Government’s main website has developed into an integrated portal where citizens can find almost every service they want, on both national and local level. The main government portal is a gateway to services through multiple channels, by theme and subjects; citizens can also have a customized channel by inputting their own age, gender and services of interest. Back-office integration across many departments brings together a powerful search engine offering advanced categorizing function, which can list results by websites, services, and news, including at the local level.

A key reason for continued leadership in world e-government progress is significant development and provision of downloadable mobile applications that are available from its national portal. The cross sector mobile apps for citizens are both iPhone and Android compatible including for e-Learning, which allows students to learn on their mobile phone in areas such as social studies, math and English. For employment opportunities, Jobcast provides information on availability of jobs in the Republic of Korea along with the relevant legislation governing labour. [8, p. 24].

India: in addition to the national portal, the Government has also developed an India Development Gateway. This is the National portal of India developed as a single-window access to information and services, with the specific objective of reaching the ‘un-reached’ rural communities of India, especially women and the poor. It catalyzes the use of ICT tools for knowledge sharing, leading to development. [54]

A variant of the National Portal, but targeted towards a specific group of people, this site contains specific topics aimed at the rural poor: agriculture, rural energy, features forum discussions and an “ask an expert” section. Making it available in English and in eight local dialects, the government’s main objective is to stimulate women, the poor, and people in the remote rural areas to use technology to their own advantage. [8, p. 25]

Australia: the Internet is now the most common way Australians last made contact with government. In fact, more people would prefer to use the internet to contact government than by any other means. In addition, those who used the internet to contact the government reported a higher level of satisfaction than those who used other means, such as postal services. [1, p. 11] The strongest growth in the use of the internet to contact government in Australia has been in the older age groups.

Though there are people not enough satisfied with the state (e- Government) sits in Australia for the following reasons: the formal language used by some websites and the

need for easier navigation of websites; the need for government sites to improve their search ability and accessibility, and also to maximise the amount of public services and information available online. [1, p. 15]

The Government of Australia undertakes the steps for further enhancement of the e – Government services, for example, by creating a single sign-on service that will allow people to visit multiple government websites and conduct secure online transactions with participating agencies (initially Centrelink, Medicare Australia and the Child Support Agency) without having to sign on to each agency. It also includes an advanced online forms capability to make it easier to find, fill, track and submit forms to the Government. [1, p. 16]

There is an assistance program for Small Business in Australia. The benefits of electronic lodgement include avoiding simple arithmetic errors and enable quicker processing of refunds, which assists business cash flow. [1, p. 15]

The United States of America: since March 2009 the United States President Barack Obama has ran an online town hall forum on the White House’s website. The forum welcomed questions from citizens and allowed them to vote for questions they wanted answered. More than 100 000 people participated and more than three million votes were recorded. The President then answered some of the popular questions in a press. [9]

Denmark’s services portal is the gateway to the entire public sector in Denmark and provides access to an enormous amount of information and services. It paves the way for an efficient user interface with effective streamlining of public sector departments. The slogan of the page is “your access to the public”. It is, for example, possible to report an address change on this website, apply for student loans and student grants scholarships, see and modify tax issues, apply for a state pension, and report changes in income or marital status. Feedback is offered through a mailbox called E-Box, which collects all the mail that the citizen receives from both public authorities and private companies. [8, p. 31]

Bahrain’s e-government strategy is based upon “delivering customer value through collaborative government.” The government sees citizens as customers who have different needs and demand different services and at the same time demand value for money. Thus the aim of e-government is to provide all services, integrated, to all citizens and upon their choice of channel. The Kingdom provides delivery of services through the following channels: e-government portal, mobile portal, national contact centre (a 24-7 call centre) and e-services centres and kiosks. Bahrain has introduced the “Listen” feature, which enables people with visual disabilities to hear any text available on the website with the click of a butt on. Another very innovative feature is the e-government toolbar, which can be downloaded permanently to your browser. This allows direct access to e-services and RSS feeds without having to go to the main portal. [8, p. 38]

Turkey: the SMS judicial information system, developed by the IT Department of the Ministry of Justice of Turkey, provides a legal notification service for its citizens and

lawyers. This system automatically informs all related parties who have cases before the Turkish courts by short message service (SMS), also known as text message, when any legal event, data or announcement related to their case needs to be sent. Thanks to this system, the parties no longer have to go to the courts to collect this information. This service also provides improved access for the disabled and elderly and enhances overall e-accessibility. The SMS service does not replace official notifications, as it only intends to provide up-to-date basic information. [8, p. 78]

2.2. Digital Technologies in Education

In the UNESCO Publications for the World Summit on the Information Society was mentioned that in knowledge societies, the production and dissemination of educational, scientific and cultural materials, the preservation of the digital heritage, the quality of teaching and learning should be regarded as crucial elements. ICTs should be seen both as educational discipline and as pedagogical tools in developing effective educational services. [10]

The traditional model of good education, which retains great resonance, is one which is based on physical learning activities, in the form of face-to-face contact between learners and teaching staff, and study of paper-based sources. This is now challenged by a move to virtual learning, and consequent impacts on content, location, timing and methods, with results such as the:

- rise of ‘student centred’ approaches, a key aspect of which is the role of the learner in actively;
- acquiring and assimilating information from multiple sources to meet their own objectives, eg solving specific problems, developing specific competencies;
- development of electronic repositories for many teaching materials, such as lecture presentations, reading lists and resources etc.;
- use of the internet and other electronic sources for research, and learning-related communication activities;
- substitution of virtual interactions for physical ones, eg through distance learning materials and online tutorials;
- ability of students to work in many more locations than in the past, both on and off campus. [11, pp. 59 – 60]

Austria: well-trained people constitute the basis for every innovation system and are a prerequisite for the development of new knowledge as well as the ability to adequately

utilise, adapt and apply new knowledge. This area is therefore an essential core element of Research Technology and Innovation strategy (RTI Strategy). To enhance its innovation system the Federal Ministry of Science and Research (BMWF) is going to strengthen mathematics, information technology, natural sciences and technology (MINT) subjects within a pro-active funding program. The number of university graduates in MINT subjects must be increased to counteract the shortage of trained staff in these disciplines. [12, p. 16]

Germany: the Federal Government has supported the development, testing and application of new educational services through digital media. Other media-assisted initiatives for specific target groups and requirements are presently in preparation. Internet-based measures are, for example, planned in so-called age management: the further training of older skilled personnel and further mediadidactic training for multipliers, such as vocational teachers, trainers and educational personnel in transitional systems, training and continued education.

Additional measures focus on mobile in-service learning aimed at combining didactic methods with innovative technical facilities. New digital educational services for children and youth will be developed to promote media skills for handling the Internet and abilities acquired from Internet experience. Motivating girls and young women to take up a course of training or study in the ICT sector remains a major priority here.

With various programs and projects, the Federal Government is focusing on promoting junior personnel in electronics. There is a need to motivate young people for electronics and convince students to engage in research. This is why the Federal Government supports the school-pupil contest INVENT a CHIP and the student program for electromobility, DRIVE-E. [13, p. 23]

The United States of America: smartphones and mobile broadband connectivity are creating new ways for at-risk students to learn mathematics. Project K-Nect was launched in 2008 to determine whether smartphones with digital algebra I content and 24/7 connectivity could improve educational outcomes of students who scored poorly in math. Qualifying students received 3G-enabled smartphones to wirelessly connect to supplemental math content aligned with their teachers' lesson plans, relevant web-based resources, and online collaboration tools. The devices also enabled students to communicate with their teachers and engage in peer learning. As schools educate the next generation of society, mobile technology provides students a more efficient and convenient way to engage with their learning materials and each other 24/7. Mobile devices provide unprecedented access to learning resources, peers, and advisors—inside and outside the classroom, regardless of their location—at school, on the bus, or at home. For four years running, Project K-Nect students have continued to outperform their peers, with students participating in Project K-Nect increased their proficiency rates by at least 30 percent on the State of North Carolina's End of Course exam, compared with classes not in Project K-Nect but taught by the same teacher. Of those students, 50 percent reported a greater interest in attending college and one-third reported a greater interest in pursuing a degree and a career that uses their math skills. Today, Project K-Nect has

expanded to three states and now reaches more than 4,500 students in grades 8 through 12. [14, p. 73]

Australia: The “Podkids” project was created a school newspaper where the students would talk about what they were doing at school and conduct interviews with their parents and teachers but in audio format. When the group first uploaded their podcasts to www.podkids.com.au they thought only parents and some educators would want to listen in. However, today the ‘Podkids’ have listeners in more than 50 countries with at least 50 000 downloads in countries as diverse as the United Kingdom, Japan, the Philippines, Greece, Trinidad and Tobago, Lithuania, Burkina Faso and Nigeria.

In ‘Podkids Episode 16’ the students talk about what having a computer allows them to do Maths 300 and Athletics, helping with music instruction by allowing kids to create their own music, and learning spelling. Several students also noted that using a computer allowed them to save paper: “...so we won’t have to cut down trees and won’t harm the animals.” Another commented that: “The internet is never boring.” [1, p. 45]

To manage the audience, the class teacher acts as the gatekeeper. *No one can contact the kids directly.* There have never been any problems with who sends messages to the Podkids, but all messages are screened just to err on the safe side.

In a sense it is a one way communication because the school controls what is posted and material is only posted that the parents feel comfortable with—no photos, no surnames; just kids talking anonymously with no identifiable features. The process is very much an educational one. By slowly exposing the schoolkids to technology, supervising how they use it and progressively increasing their independence, the aim is to provide them with the necessary skills so that later in life they can safely and productively use technology and online tools to their advantage. [1, p. 87]

It was declared in Australia the Digital Education Revolution, which includes among the other the following:

- the provision of high speed broadband to schools and further consolidation of affordable fast broadband services for school education;
- the National Secondary School Computer Fund, which provides up to \$1 million for secondary schools to upgrade ICT equipment (more than 2700 schools have received more than 290 000 computers after three rounds of funding, with the aim of bringing all secondary students in Australia to a computer/student ratio of 1:2);
- the development of online curriculum tools and resources, including online curriculum resources targeting key learning areas, such as English, mathematics, the sciences, history, languages and geography;
- access to high-quality learning resources from digital repositories developed by schools and academic, cultural and scientific institutions;

- support for the development of policies, protocols, infrastructure and standards required to enable schools to safely and seamlessly communicate, collaborate and access and use resources across school, system and jurisdictional boundaries. (p. 46).

Belgium: the ICT Without Boundaries program is an awareness-raising campaign to introduce ICT in special-needs schools and increase the usage of ICT by children with special needs. The Planning for ICT in Schools (pICTos) program is an online software tool to support school teams in the development of a local (school-based) ICT strategy.

The successful educational Web portal, KlasCement, is for teachers to share the learning materials that they developed themselves, with their colleagues. It has an incentive/point system to encourage teacher participation and contribution of content. [15, p. 82]

The ICT Without Boundaries program was developed to remedy that situation by expanding disabled students' opportunities for learning with ICT. The program focuses on developing learning materials for special-needs students, including learning objects for the deaf, those with mental disabilities and those with autism spectrum disabilities, since publishers will not likely create learning objects for such a niche market. [15, p. 86]

2.3. Digital Health Care

China: according to the World Health Organization, chronic diseases such as cardiovascular diseases (CVDs) place a grave economic burden on countries. In fact, China will lose US\$558 billion between 2005 and 2015 in national income as a result of heart disease, stroke and diabetes. CVD is the leading cause of death in China, claiming about 3 million lives a year. A pilot project involving Life Care Networks and the Community Health Association of China uses mobile broadband technologies to address the prevention and care of CVDs in underserved communities. China's Wireless Heart Health project is deploying a 3G-enabled cardiovascular screening and monitoring system among resource-scarce community health clinics. The system includes smartphones with built-in electrocardiogram (ECG) sensors. The smartphones send patient heart data to cardiac specialists at a 24-hour call center in Beijing. As part of the service, doctors can provide real-time feedback to their patients via text or phone call. This project demonstrates how 3G mobile broadband can extend the reach of specialized physicians into underserved areas and enable community health clinics to treat more patients effectively. [14, p. 72]

Australia: the Government of Australia has demonstrated how key services such as health can be delivered to regional, rural and remote communities of Australia through innovative uses of broadband. For example, the Enhancement of Telehealth in Western Australia project includes remote patient assessments, virtual mental health clinics and

virtual health clinics that allow health workers, medical professionals and specialists to consult with and advise patients across the state. Doctors are also able to send electronic x-rays, MRIs and patient records to where the patient is being treated. Patient records are now held digitally and networked throughout the facility, allowing staff to check and update patient information anywhere in the facility at any time. [1, p. 15]

ECHONET project, Australia: the system was used to manage 16 critically-ill patients and reduce the number of times patients need to be transferred. This saved the high transport costs associated with transferring intensive care patients between hospitals. The system has also provided teaching opportunities for junior staff and improved collegial relations between the staff of the connected hospitals who are able to share expertise and common experience as well as provide support to each other. [1, p. 17]

Denmark: currently enjoys one of the best eHealth systems in the world. Launched in 2003, Sundhed.dk is a public web-based portal that collects and distributes key healthcare information to citizens and healthcare professionals, and empowers patients to access the healthcare system more effectively. Developed as a joint regional and national effort, the portal was developed on a modest budget, but has delivered massive returns. “The system started to get its basics in place back in the 1990’s,” said Claus Pedersen at OUH Odense Hospital. “It started with an understanding that there are some basic common denominators that are the foundations of any eHealth system such as referral letters, discharge letters, prescriptions and lab results.” By focusing on these commonalities, the system was able to standardize large volumes of daily transactions. This created a critical mass in favor of the electronic management of key transactions and processes. The strategy was uniquely ‘bottom up’ in nature: the 1990s saw the emergence of a large number of small projects, which merged into a network of integrated projects. From there, and with government support, a national body was formed in 1999 as a co-operative venture between government, local authorities, public and private organizations focused on eHealth. Today’s system brings together a user-friendly interface that adapts its presentation to suit its users’ needs. As a result, patients now enjoy a very different experience when interacting with their healthcare system. Every Danish citizen has their own personal web page, can view treatment/diagnoses from their own hospital record, book appointments with general practitioners, send secure emails to health authorities, order medication from pharmacies, monitor self-compliance with medication, and get access to local disease management systems. The program has already resulted in significant financial savings and enabled the government to merge 15 counties into five distinct regions without any interruption to health services. [16, p. 11]

The United Kingdom: at least three million people with Long Term Conditions and/or social care needs could benefit from using telehealth and telecare. To achieve this level of change the Department of Health is planning to work with industry, social care and professional partners in collaboration for the “Three Million Lives” campaign. This is not a national target or a government guarantee of delivery, instead it is about the Department of Health providing national leadership, strategic direction, and advice to social care organisations; with support from industry who would be responsible for creating the market and working with local organisations to deliver the change.

The early indications show that if used correctly telehealth can deliver a 15% reduction in visits, a 20% reduction in emergency admissions, a 14% reduction in elective admissions, a 14% reduction in bed days and an 8% reduction in tariff costs. More strikingly they also demonstrate a 45% reduction in mortality rates. [17, pp. 3 – 4]

2.4. Digital Technologies for Effective Consumption (gas, water, electricity)

Australia: Smart meters for utility: smart meters, a more advanced meter than the standard mechanical meter that identifies consumption in more detail than a conventional meter. Smart meters communicate consumption information via a network back to the local utility for monitoring and billing purposes. They can be used to measure household gas, water and electricity. [1, p. 29]

Widespread deployment of smart meters, combined with in-home displays has the potential to improve operational efficiency and significantly reduce the amount of energy used by households. In addition, greater consumer awareness of energy consumption assists in reducing greenhouse gas emissions. [1, p. 30]

The United States of America: a more efficiently operated energy grid should be built. One that maintains affordability, reliability, safety, and security for every consumer and meets the needs of a digital and highly interactive economy. Building a smart grid is the first critical step of many for the nation to maintain its technology prowess and prosperity, and brings new tools, techniques, and technologies together in a network of devices aligned and interconnected for superior grid performance. The benefits of a smarter grid are myriad and enduring. At its core is a sophisticated information system that would allow grid operators much greater visibility into the complex inner workings of this large machine to achieve wide-area situational awareness. Greater visibility would enable quick decisions to optimize performance, reduce emissions, and improve reliability. This same information system would provide customers with a window into their own energy use, giving them the tools to make better choices that align with their own values and needs and that achieve greater operational efficiency. Through a new paradigm for involving consumers with interactive loads that respond to the overall needs of the grid, the power providers and the power users work together to create the best possible electric grid at the least cost to the economy and the least impact on the environment. [18, p. 8]

France: the advances of smart metering solution are used by the utility operator for the deployment in the Paris area and other urban areas in France, demonstrates the feasibility of such a metering system. The key elements of that operational system include automatic meter reading (AMR), including for metering applications, and a VHF network for data concentrators in buildings, combined with GSM/GPRS transmission capacity to data management centers. Up to 2015, almost 1 million AMR are expected to be installed in

France alone. There are obvious benefits today for customers and utilities with the provision of the technology enabling on-line services:

- more frequent invoicing based on real data reading;
- more precise (both in space and time) leak detection;
- improved capacity of backflow detection and measurement;
- contribution to development of environmental friendly attitude;
- improved action efficiency control. [19, p. 4]

Finland: developing the energy infrastructure towards smart grids is a longer term national objective, with smart meter rollout being one of the first steps. Utility companies are already implementing smart devices in various ways. The smart technologies and the practices can impact the operation and overall health of the grid including the following:

- Real-time situational awareness and analysis of the distribution system can drive improved system operational practices that will, in turn, improve reliability;
- Fault location and isolation can speed recovery when outages do occur by allowing work crews to drastically narrow the search for a downed line;
- Substation automation (SA) enables utilities to plan, monitor and control equipment in a decentralised way, which makes better use of maintenance budgets and boosts reliability;
- Smart meters allow utility customers to participate in ToU pricing programs and have greater control over their energy usage and costs;
- SCADA/DMS put more analysis and control functions in the hands of grid operators.
- voltage control, through reactive power compensation and the broader application of power electronics, increases transmission capacity of existing lines and improves the resiliency of the power system as a whole. [20, pp. 57-58]

The Distribution System Operators (DSOs) will install smart metering devices for residential customers and most DSOs plan to invest in customer awareness initiatives of energy consumption. Smart meters are an essential arm of smart grids and the only way of achieving effective Demand Side Management with all the added benefits. DSOs may themselves benefit from smart metering systems. The potential benefits come from remote operation, for instance through lower meter reading costs, remote disconnection and connection etc. Other potential benefits result from improved knowledge of physical displacement of energy flows and increased load management capability and so on. In

other words, improved data flows and communication may allow DSOs to improve how they run their systems, identify outages quicker and reduce losses to some extent. Building a technology-enabled smart electricity grid can help offset the increase in greenhouse gas emissions. [20, p. 62]

2.5. Teleworking and Videoconference

Denmark: actively promoting use of videoconferences as part of its “Green ICT Policy”. The use of video conferences is an alternative to flying or driving to a meeting. Danish businesses already save the environment 355,000 tons of CO₂ per annum by using video conferences instead of physical meetings and further savings of 161,000 tons are readily available. [21, p. 11]

The United States of America: speaking at the March 31, 2010 White House Forum on Workplace Flexibility, President Barack Obama declared: “work is what you do, not where you do it”, emphasizing the integral role of telework in achieving flexible, resilient workplaces. Increasing the strategic use of telework is a high priority for President Obama and Office of Personnel Management (OPM). The President signed the Telework Enhancement Act of 2010. The Act does not mandate telework or promote telework for its own sake. Instead, it asks agencies to step up efforts to implement telework to help ensure continuity of operations, reduce management costs and improve employees' ability to balance their work and life commitments. [22]

The driving vision behind flexibility highlights the critical role that having a fulfilled, healthy workforce plays in reaching productivity goals and attaining agency mission objectives. Telework provides an effective tool to employees seeking to achieve the balance among personal, work, and community responsibilities. It ultimately allows employees to achieve peak performance and meet the goals of flexible workplaces. Moreover, telework programs are integral to advancing other important national initiatives such as building capacity in the Federal workforce to continue agency operations in the event of snowfall or emergency.

Telework is the key to agency planning for continued operation during both short- and long-term disruptions due to emergency situations (e.g., COOP). Regular participation in telework ensures agency preparedness and allows employees to become more comfortable with a virtual work environment. Through continued practice with telework, agencies can ensure that all necessary systems are in place and working successfully. [22, p. 25].

Telework plays an instrumental role in realizing sustainable environmental policies and, with collaboration and transparency fundamental to telework, these programs can facilitate the goals of open government. Telework also provides necessary access to pools of skilled employees through wider employment opportunities for the disabled. [22, p. 7]

One of the challenges of maintaining a successful telework program is determining how to manage IT and other information security issues. The percentage of agencies identifying IT security issues as a major barrier to telework. Respondents were asked to report how their

agencies secure Personally Identifiable Information (PII) while employees engage in telework. The largest percentage of respondents (65%) indicated that no sensitive or classified information is allowed to leave their agency. Slightly smaller percentages of agencies indicated that two-factor authentication is used (61%) and that all information is encrypted (54%). Other measures taken by agencies to ensure security of PII are password protecting all files, allowing only those with compelling need to have access to PII, and providing only government-furnished equipment for telework use. [22, p. 28 – 29]

Switzerland: the Confederation creates the necessary conditions for the deployment and use of ICT for the development of new forms of working which are networked in all regions of Switzerland. In so doing, it aims to relieve congestion on the transport infrastructure. Through a reduction in work-related traffic, an attempt is being made to achieve a reduction in CO2 emissions, thereby making a contribution to achieving the Confederation's climate policy objectives. The federal administration systematically exploits the opportunities offered by ICT for dematerialisation and substitution, e.g. replacing employment-related mobility by teleworking. It establishes the legal, organisational and technical conditions for their use and acceptance. [23, p. 16]

Australia: one of the primary benefits of teleworking is that it enables greater workforce flexibility. It allows employers to attract and retain skilled people who may live in another city or people who are unable to be at a central work location due to family responsibilities or a disability. However, teleworking also offers environmental benefits. By reducing the need to commute for work, teleworking can reduce greenhouse gas emissions [1, p. 31]

Similarly, video conferencing can remove the need to travel for face to face meetings, and increase productivity by saved travel time. The Australian division of Cisco, for example, claims that it achieved a 16 per cent reduction in air travel in a single year after it adopted videoconferencing and other telepresence facilities. [1, p. 31]

Video conferencing technology has also the other benefits, for example, it can assist the delivery of key digital economy services such as telemedicine and distance learning. [1, p. 32]

The Australian Government announced that telepresence technology would be deployed across 20 Australian Government and state government locations for use in inter-governmental meetings such as the Council of Australian Governments and Ministerial Councils. This will lower government travel costs and associated greenhouse emissions by reducing the need for face-to-face meetings. [1, p. 32]

2.6. Smart Transport Systems and logistics

Germany: one of the objectives, specified in “ICT Strategy of the German Federal Government: Digital Germany 2015” is improving road traffic safety and flow through

the application of ICT. To achieve this objective the German Government proposes to implement the Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport. The directive includes following priority measures:

- provision of EU-wide multimodal travel information services;
- provision of EU-wide real time traffic information services;
- specification of a minimum dataset for traffic information;
- harmonised provision for an interoperable;
- EU-wide eCall application;
- information services on safe and secure parking places for trucks and commercial vehicles;

The German Government proposes also to draft a national action plan for smart road traffic with the following priorities:

- Germany-wide management in the development and introduction of the smart road traffic system through setting joint priorities and reaching agreements on joint measures and instruments;
- ensuring the technical lead of German enterprises also at European level by means of German standards;
- meeting the directive requirement of member states to adopt their own action plans;

It is initiated by the Government “Transport research program, Mobility and Transport Technologies”, with the focus on: smart logistics, personal mobility in the 21st century and smart infrastructure. [13, p. 9-10]

Developing products, systems and standards as well as the operation of telematics infrastructure are primarily the job of industry. Collective systems, such as guidance and control systems on trunk roads, can be operated by the public sector. Providing a framework and drafting future guidelines are the tasks of government.

Traffic telematics contributes both to raising traffic safety, particularly road traffic, and to increased efficiency among transport operators through suitable traffic guidance measures. This technology is a useful and necessary addition to investment and regulatory policy. ICT systems are the main way to improve traffic safety. [13, p. 9]

Estonia: *smart logistics* include technologies that enable fuel reduction and energy efficiency through improved route and load planning. For example, operations management software can reduce inventory storage, fuel consumption, distance traveled and decrease the number of vehicles traveling empty or partially loaded. Due to Estonia's small size, smart logistics projects might be quite limited, because the possible savings do not cover the investments required for smart solutions. However, some good examples can be found. For instance, the Union of Estonian Automobile Enterprises has initiated a project for timber and log transportation companies to optimize truck routes. All trucks will be equipped with GPS, laptops, internet connection and access to central information system. Information system holds data about logging areas, forest owners and transportation companies, and calculates optimal routes for trucks. The creation of information systems and technical solutions has been complete and the project has reached the launching phase. [24, p. 35]

Switzerland: together with the cantons, interest groups and the research community, the Confederation will extend the necessary foundations for the use of intelligent transportation systems (ITS), in order to make better use of existing infrastructure capacity, to improve interaction between the various modes of transport, thereby reducing traffic whilst preserving mobility levels. [23, p. 16]

Australia: smart technologies can be used to optimise traffic flows, improve road safety and reduce emissions. *Intelligent Transport Systems (ITS)* combine computers, communications, positioning and automation technologies to provide real-time data about suggested routes, congestion, collision detection and avoidance. [1, p. 30]

In the 1970s the NSW Roads and Traffic Authority (RTA) invented a new traffic control system which continually measures and adapts the flow of traffic through its major intersections. This system (called Sydney Coordinated Adaptive Traffic System-**SCATS**) uses sensors built into the road to detect cars waiting at intersections and a network of computers to coordinate the flow of traffic. It has undergone continual improvement and is now used across Australia and in 130 cities in over 25 countries around the world. [1, p. 30]

2.7. Interaction between Information Communication Technologies

Estonia: *smart buildings* cover solutions that maximize energy efficiency in buildings, such as building management systems that run heating and cooling systems according to occupants' needs. Yoga, a small Estonian company is specialized in smart buildings solutions. They started with electronic access control systems, but have shifted to building's heating and ventilation system management. According to company's own measurement results, heating costs can be easily reduced up to 30% by smart management. Smart management is room based measurement of temperature, CO2 levels and illumination and adjusting the heating, ventilation and illumination solutions

according to the current requirements. The company is currently collaborating with partners to make the solution available for small customers, e.g., residential buildings and private houses. [24, p. 35]

Japan: the project “Toyota City” is an eco model city, combining the following components: Home, Mobility, Destination, Entire living environment. *Home:* optimization of household energy use with Home Energy Management System (HEMS) that permits control of various devices for saving, creating, and storing energy. *Mobility:* establishment of lowcarbon transport system, large-scale introduction of next-generation vehicles and traffic flow control and eco-driving promotion by ITS. *Destination:* optimization of energy use at commercial public facility, introduction of devices for power charging/storing in commercial facilities such as convenience stores, demonstration of use of secondary cells equipped with EV/PHV in times of disaster. *Entire living environment:* green-behaviour support in the entire living environment, analysis of energy use, using Energy Data Management System (EDMS). To achieve the object the following actions need to be supported in entire everyday living sphere: data collection, forecasting, supply – demand adjustment, inducing citizens’ behavior, monitoring. *The first step* is to collect and accumulate citizens’ data in the data base (collect data concerning power use and residents’ daily behavior from HEMS), then *forecast* as a key factor, based on accumulated data in the data base (forecast power demand at each home, predict some of residents’ behavior); *Supply – demand adjustment* is a calculation of optimal power demand based on the forecasting, including calculation of the necessary supply – demand adjustment power. *Inducing citizens’ behavior:* make an optimal supply - demand adjustment, including by awarding eco – points, utilizing visualization, green behavior support and control; *Monitoring:* update forecasting and recommendation models based on data analysis (collect data concerning results of recommendations, analyse collected data, modify various models of Energy Data Management System). [25]

III. Risks of Digital Economy growth

Digital content can provide new impetus for the digital economy, encouraging innovation, raising the level of skills, triggering dynamic developments and innovations in existing industries and creating new markets. [26, p. 6] While content is a key driver of digital economy growth, technology may have a disruptive effect on the entertainment and media industries, as well as its exponential growth may lead to additional environment risks.

3.1. Disruptive Impact of Media Digitisation on Business Models and Revenues: Jeff Zucker of NBC Universal has commented that sustainable, long-term business models may not be possible if analog dollars are replaced by digital pennies. This reflects concern that the rates of return for online content may not match offline figures. [27]

The development of new and successful business models for the online environment is primarily an industry responsibility. Internationally, new models are emerging, for example, movie studio Warner Bros' shrinks the release windows between DVD and online versions of its movies, the streaming video site Hulu and the hybrid model adopted by Nine Inch Nails with their album "Ghosts". [1, p. 36]

The Government's role with respect to online content is that of an enabler. Through the National Broadband Network, the Government of **Australia** is providing significant infrastructure to support the growth of online content. For example both facilitating the exchange of files as part of production of large-scale digital content projects and also ensuring that consumers are able to interact with new online distribution models for digital content. In addition, government has a role to ensure that the necessary investment and skills are available within Australia and that the regulatory framework is supportive of a sustainable content industry.

The similar position is expressed by the **UK** Government seeing itself as an enabler: "success will come down to the creativity of UK people and innovation by businesses, not Government action. We are simply trying to create the best conditions to encourage innovation and growth". [2, p. 3]

3.2. Development of Local Content Industry: among the other issues in the field of entertainment and media it worth to mention the problem of development of local content industry. The digitisation trend is changing customer habits and expectations. Increasingly, they expect an 'on demand' experience, that is, the ability to enjoy what they want, when they want, on the device they want. This has been facilitated by digital video recorders and online music and video sites that offer on-demand content for streaming or downloading. Countries that lack a sustainable local content industry risk:

- lower levels of participation in the digital economy, because content is a proven drawcard;
- slower skills development and lost investment opportunities;

- dilution of their cultural identity, particularly if younger local users mainly view overseas content on the internet. [1, p. 36]

3.3. File-Sharing Risks: P2P networks, offer internet users the possibility to transfer content among themselves. In doing so, they create digital copies. Massive amounts of copyrighted content (e.g., music, films, software, literature) are offered for downloading via P2P networks without a license from the copyright holder. This is illegal and impacts the legal online business.

Regarding this issue the primary question for consumers is whether they can use file-sharing or not. Most **Swiss** experts, for example, assume that downloaded copyrighted content is for making a private copy for personal use, which is permissible under the Swiss law. But what is not permissible is making copyrighted data stored on your own hard disc available to other users for downloading (uploading). [7, p. 33]

In **Australia** file-sharing is cited by *the content industry* as a barrier to further investment in sustainable and innovative content initiatives. One solution proposed by copyright owners is a “three strikes” or “graduated response” proposal under which copyright owners would work together with ISPs to identify the ISP’s customers who are suspected of unauthorised file sharing and the ISP would then send a notice on behalf of the copyright owner to that customer. After multiple notices, a series of escalated steps could be taken with respect to the customer’s account. While *others opposed* this proposal for reasons of the lack of judicial oversight of administering sanctions based on private allegations, the lack of public transparency about the process and concern over consumer rights. On the one hand, the Australia economy benefits from a sustainable content industry and from a general respect for legal rights. On the other hand, issues relating to due process and consumer privacy are important. [1, p. 38]

3.4. Pollution Risks

The United Kingdom: ICT has a surprisingly heavy environmental footprint – a typical European office PC and monitor contains around 20kg of materials, and generates 66 kg of waste and 1,096 kg of CO₂ during its lifetime. Most environmental impacts are concentrated in production, but there is disagreement about whether energy consumption in use is more or less than that consumed in production – however, a reasonable rule of thumb for the UK is that the two are similar. ICT use, for example, in further and higher education will use over £116 m of electricity in 2009, and generate over 500,000 t of CO₂ emissions. ICT accounts for around 2% of global CO₂ equivalent emissions (less than aviation, despite claims to the contrary), and around 3% of UK electricity consumption. ICT applications such as smart buildings could avoid 5 t of CO₂ emissions for every tonne they indirectly generate, and could reduce global CO₂ equivalent emissions by 15% by 2020. [11, p. 16]

80–85% of the capacity of a typical PC or server is wasted, and so considerable energy and financial savings can be achieved through grid computing, virtualisation and other methods of increasing utilisation. Cloud computing and shared services can have sustainability benefits if they are based on highly utilised and energy-efficient data centres, with high usage of renewable or low carbon energy sources, but this is not inevitable. Data centre electricity consumption in cooling, power supply and other support activities is generally 40–100% that of the servers themselves, with very few approaching best practice standards of 25–30%.

The main methods for minimising data-centre energy consumption are: purchasing more energy efficient devices; changing programming configurations and approaches; changing physical aspects such as layouts and cooling. The environmental impacts of PCs can be reduced by purchasing the most energy-efficient hardware and software that meets user needs; configuring for energy efficiency when in active use and switching off completely whenever possible; examining low impact alternatives; and increasing their useful life. [11, p. 35]

Denmark: in order to create sustainable growth, climate issues related to ICT play an important role. The government has launched a targeted campaign to raise awareness of and the use of *Green IT*. Green IT can lead to savings and increased efficiency whilst reducing CO2 emissions. As such, it will enable lower energy consumption and costs for electricity, heat, transport etc. Many green IT solutions will also mean better communication and increased readiness to implement new technological solutions which will equip businesses for the challenges of the future. [21, p. 11]

Estonia: no conventional definition on green ICT exists. Green topics could be approached from the perspective of a “problem” (focusing on reducing the emission) or from the perspective of a “solution” (focusing on new green solutions). This is reflected in the approach to green ICT, which can be divided into *greening of ICT*, where the focus is on reducing direct emissions and pollution of the ICT industry, and *greening with ICT*, where the focus is on enabling contributions to environmental sustainability with the help from ICT. The term “greening of ICT” refers to the direct effects of ICTs, and the term “greening with ICT” to the enabling effects of ICTs. Greening of ICT in a narrower sense refers to ICTs with low environmental burdens, but using ICT as an enabler reduces environmental impact across the economy outside of the ICT sector. [24, p. 10]

Greening ICT means not only improving ICT industry’s environmental performance, but also that ICT applications have large potential to enhance performance across the economy and society, as ICT directly influences many other business areas. [24, p. 9] It was revealed that there are four *obstacles* that constrain wider and more pervasive development and adoption of green ICT in Estonia:

- Low awareness;
- Uncertainty concerning advantages;

- Constrained cooperation;
- Scarcity of financial resources; [24, p. 49]

The awareness problem itself has two sides. Firstly, stakeholders probably do not have a comprehensive conception of green ICT as possible solution for improving energy and material usage efficiency and environmental friendliness. Secondly, even if they do, information about potential of green ICT or greening business practices and products by ICT is limited. [24, p. 7] In order to improve companies and entrepreneurs awareness on green ICT to increase demand for and supply of corresponding products, services, and solutions it's suggested to consider following measures:

- compilation of database of green ICT products and solutions that are instrumental and have proven themselves as proper greening business practices;
- business consulting on clean-technology and green ICT potential and good practice;
- acknowledging and inspiring companies via Green (ICT) Company Award. [24, p. 8]

Uncertainty concerning advantages: companies on the demand side are not proficient in comparing different products and solutions based on their environmental impact and efficient use of resources and energy. [24, p. 7] To overcome the problem of uncertainty concerning the advantage of adopting green ICT solutions it's suggested to consider following policy measures:

- public sector initiative in reviewing and developing analytical tools for pre-assessing and follow-up evaluation of potential advantages and disadvantages of Green ICT solutions;
- public-private partnership in follow-up cost-benefit analysis of already implemented and publicly marketed, but also drafted green solutions; and successive dissemination of best practices;
- distribution of methodology for auditing green ICT solutions. [24, p. 8]

Constrained cooperation: new green ICT ideas and initiatives come from business clusters. Smooth and speedy development and implementation of ICT based solutions for improving energy and material usage efficiency and environmental friendliness depends on cross-sector cooperation between companies enabled by public sector and supported by (academic) research and development organizations. [24, p.7] To improve cooperation between stakeholders of ICT product, service, solution providers and implementers to increase synergy and creativity in the field it's suggested the following policy measures:

- public-private partnership in co-developing exemplary, pioneering, visionary, inspiring green ICT solutions, including cross-sector solutions (also using public sector organizations and services as test and demo sites);
- integrating green ICT to other clusters would initiate the devising, developing and marketing greening solutions (industrial and consumer solutions) for other economic activities and markets;
- clarifying limits of cooperation. [24, p. 8]

Scarcity of financial resources: as Estonian companies rarely have internal resources for development, public sector could encourage innovation in the field and speed up development and adoption of green ICT products and solution by channeling resources into the field. [24, p. 7] In order to speed up the adoption of green ICT it is suggested to increase public transfers for developing and implementing green ICT products and solutions. It's recommended considering following policy measures:

- conditioning public procurements and businesses, entrepreneurship benefits and high risk investments on their greenness and use of green ICT solutions;
- budget funding of exemplary, pioneering, visionary and inspiring green ICT products, services, solutions. [24, p. 8]

Australia: each stage of the lifecycle of the devices and infrastructure that connect and enable the digital economy is increasingly scrutinised from an environmental perspective. Energy efficiency requirements ensure that devices are 'greener' and increasingly have less adverse environmental impact during their life span. Product stewardship and e-waste (consumer electrical and electronic equipment waste) policies can minimise the environmental impact of a product at the end of its lifecycle. [1, p. 32] The Australian Government is currently negotiating with computer and monitor suppliers to develop agreed regulatory standards for ICT equipment.

In addition, steps need to be taken to reduce the environmental impact of data centres, which are part of the key infrastructure that enables the digital economy. Already various industry participants are increasingly incorporating techniques to run data centres on a more energy-efficient basis.

The rapid obsolescence of ICT devices also has a significant environmental impact. In 1992 the average life of a computer was 4.5 years. This has dropped to around two years. The generation of e-waste is a growing challenge. E-waste is one of the fastest growing categories of waste, growing at more than three times the rate of general waste. Televisions, computers, printers and mobile phones include substances, such as lead and mercury, which are harmful if released into the environment. [1, p. 33]

IV. Conditions Necessary for Development of Digital Economy

4.1. Development of Physical Capacities

Research released by Arthur D. Little, Chalmers University of Technology and Ericsson shows that doubling broadband speed can yield growth in excess of 0.3 percent GDP and quadrupling broadband speed can yield 0.6 percent growth in GDP. [28, p. 2]

Germany: as critical infrastructure, future networks and smart network platforms must be made secure and reliable. In terms of both quality and quantity, the concern is not just with simply making adjustments or improvements to existing telecommunications networks, but with the full-coverage installation of a new basic broadband, IP-based infrastructure – next generation networks (NGN). For cost and efficiency reasons, the next generation networks will have to be optimized by merging existing network technologies into an intelligent, high-performance and flexible network platform.

With the Federal Government's broadband strategy, Germany has set ambitious targets for nationwide supply. By the end of 2010 if possible, it aims at fullscale provision with broadband connections of at least 1 MBit/sec (downstream). As soon as possible, high-performance networks (> 50 MBit/sec) will cover the whole country; full basic broadband coverage by 2013, availability of over 30 Mbit/sec for 100 % of all households and of at least 100 MBit/sec for at least 50 % of all households by 2020. A sub-target is to make networks available for at least three-quarters of the population by the end 2014. Besides DSL and cable providers, particularly radio technology and, in individual cases also, satellite systems contribute to full basic broadband coverage. [13, p. 11 – 12]

In comparison with other major European economies, Germany is the current leader in broadband use. If high market growth continues, it will be able to extend its position further. Among the G7 states, it is now in second place. [13, p. 11]

Australia: Technology can change the infrastructure requirements in unexpected ways. The growth of handheld devices and the potential of sensors and smart meters alter our demands, as well as our habits. For example, using sensor networks to improve water productivity requires reliable and effective infrastructure that connects the farms where this smart technology will be deployed. [1, p. 8]

To prepare for the increasing bandwidth demands and enable the applications and devices of the future, the Australian Government has made a number of key commitments to develop Australia's physical capacity to participate in the digital economy. These include establishing a company to build a fibre network across the country and switching existing television services to digital-only. [1, p. 9]

The Government's objective is to connect 90 per cent of all homes, schools and workplaces with optical fibre (fibre-to-the-premises or 'FTTP'), providing broadband services to Australians with speeds of up to 100 megabits per second in urban and

regional towns. The network will connect all other premises with next generation wireless and satellite technologies that will be able to deliver 12 megabits per second or better. [1, p. 9]

By creating a largely FTTP network, Australia will join other leading nations in terms of capacity and enjoy truly high-speed carrier grade video, data and voice services. It will be vital that industry utilises the opportunities created. [1, p. 10]

Denmark: the Danish goal is one of the most ambitious in Europe and will help fulfil the European 2020 goal of all EU citizens having access to an internet speed of 30 Mbps or above. Furthermore, half of all EU homes shall subscribe to broadband connections of 100 Mbps. Despite a general high level of broadband speeds in Denmark, there are still areas where it is difficult to obtain high speed broadband connections. Similarly, there are areas where high speed broadband is accessible, but is sold to a lesser extent than in the rest of the country, e.g. South Jutland is the area where most subscribers can receive 100 Mbps (73 % of all homes and businesses), compared to 25 % nationally. Yet there are fewer in this area who has bought a high speed broadband connection compared to the rest of the country. 70 % of all homes and businesses in South Jutland have a high speed broadband connection, compared to 74 % nationally. The Danish goal should be achieved by continuing with the marketbased and technology- neutral approach, which has worked well so far, and brought Denmark to its current position as one of the leading countries in Europe with regard to broadband development. The Analysis of broadband coverage for 2010 published annually by the National IT and Telecom Agency shows that 92 % of all homes and businesses could have a broadband connection of at least 10 Mbps, and that 25 % could have a 100 Mbps connection. [21, p. 8]

4.2. Institutional Changes

Australia: to build the innovative capacity of Australian firms, the Government will establish a *new Commonwealth Commercialisation Institute* to bring research, business and finance together to help commercialise new ideas and technologies. The Institute will support the best ideas developed by Australian universities, publicly funded research organisations and innovative firms. The new Commonwealth Commercialisation Institute will help to bridge the gap between research and the successful commercialisation of new products and services. [1, p. 17]

The United Kingdom: in regard to the institutional changes for new IP system the Hargreaves Review proposes *a new role for the Intellectual Property Office (IPO)* in issuing formal opinions to help clarify the law where it is not understood or where new developments in technology and markets create fresh uncertainties, which the courts would be obliged to take account of in relevant cases. [5, pp. 5, 7]

The UK Government recognises the potential benefits of greater clarity in the application of copyright law, in particular the application to new technologies and opportunities. Uncertainty can lead either to unintentional infringement, or to opportunities being lost because of fear of infringing. [2, p. 13]

The Government will explore options for a future role for IPO that involves a strengthened focus on innovation and growth, a greater emphasis on publicly available evidence, enhanced ability to promote competitive markets whilst retaining Ministerial oversight of IP policy [2, p. 13]

Japan: will cooperate with Asian countries to establish the foundations of infrastructure, systems, and human resources for the use of advanced digital technologies. This will lead to advances in industry, electronic government, education, and so on as well as the formation of pan-Asian seamless knowledge and economic zone and greater international interpersonal exchanges. [29, p. 20]

4.3. Digital Media Literacy

Denmark: the population needs to have the necessary digital skills to make use of the advanced digital services provided in work and leisure. In a time of increasing digital communication with the public sector, citizens need to be digitally enabled in order to be self-reliant. ICT skills will also help increase labour productivity. Going forward, focus will be placed on those target groups lagging behind in terms of IT skills, for instance via an analysis project for certain target groups, which will pinpoint how they can be motivated to improve their digital skills. [21, p. 11]

To indicate the level of IT skills in Denmark was used the IT barometer, which was scrapped in 2010, and replaced by the regular measurement of IT skills by Statistics Denmark.

The year 2010 also showed in Denmark a strengthening of the network 'Lær mere-netværket' (the Learn More Partnership) consisting of 15 organisations, including libraries, senior citizens' organisations, the public service centres and the adult educational associations. The aim of the network is to give Danes the chance to learn more about ICT in their local community. The network members have reported a major increase in the number of course attendees in 2010. The network attracted a lot of foreign interest in 2010, due to its special structure and organisation. Going forward, even more focus will be on increasing the digital skills of small and medium-sized businesses, which generally have lower IT skills levels. [21, p. 17]

Australia: a successful digital economy requires *households and businesses* to have the necessary skills to effectively and productively participate in digital economy. The focus

of digital media literacy policy and programs is on the development of three core skill sets:

- the technical ability to engage at a basic level with a computer and the internet, such as to create documents and emails;
- the ability to understand and critically evaluate digital media and digital media content;
- the ability to create content and communications.

Digital media literacy is a dynamic concept. Skill requirements depend on the circumstances in which users find themselves and will change over time. Digital media literacy can be self-taught or constitute part of formal instruction but is a continuous process for all ages and stages of life. [1, p. 44]

The Australian Government, for example, is building Australia's digital media literacy amongst *schoolchildren* by committing \$2 billion over five years to the Digital Education Revolution. The aim of the Digital Education Revolution is to prepare Australian students for further education, training and employment and to equip them with the skills they need to live, work and succeed in an increasingly digital world by providing ICT equipment, broadband connections and access to training. [1, p. 44 – 45]

To build digital skills, industry can provide relevant input on its skills requirements and can promote the development and attractiveness of digital skills. *Industry has an important role* to play in developing digital skills. This role includes identifying relevant needs and contributing specialised information, which can form part of ongoing ICT curriculum and training development. In addition, industry can encourage high-level ICT skills in students and graduates through contests, internship opportunities and on-the-job training programs.

Broadband for Seniors, training initiatives in Australia: will establish up to 2000 free internet kiosks in community centers, retirement villages and clubs used by seniors to provide free access to computers, free broadband internet access and free computer training and/or regular computer workshops for seniors. The Broadband for Seniors initiative responds to the needs of senior Australians wishing to be trained in the use of the internet and in particular to help them stay connected to family and friends. [1, p. 49]

Switzerland: today, being able to use ICT skilfully is, along with reading, writing, arithmetic and languages, one of the key skills of individuals, enabling them to integrate into society and the world of work and to further their own development. ICT skills are therefore a prerequisite for access by all the inhabitants of Switzerland to education, catching up on formal school-leaving examinations, professional development and therefore their employability. The promotion of ICT skills among older people enables them to take greater advantage of the possibilities of electronic communication and participation and consequently reduces the risk of exclusion. This also applies to the

unemployed or less educated, for whom basic ICT knowledge is of fundamental importance for their reintegration into the education system and the world of work in Switzerland. Within the framework of a coordinated strategy of the Confederation and the cantons on the integration of ICT into the education system, the Confederation will contribute to promoting individuals' independent use of ICT in the context of lifelong learning. In the process, it also supports measures for the acquisition of basic ICT skills. [23, p. 12]

Norway: the need for digital skills is increasing and changing rapidly. This requires a steady focus on the individual's capacity for being able to keep up with developments. Digital skills include the ability to exploit the opportunities offered by ICT, and use them critically and innovatively in education and work. Digital skills also include the ability to be critical to sources and assess content. Use of digital tools is a skill the individual must acquire, maintain and continually develop, if he or she is to be a digitally skilled and critical citizen. This encompasses:

- concretisation of what should be regarded as basic digital skills;
- regular surveys of the population's digital skills;
- spread of experience gained from ICT training for senior citizens;
- initiatives aimed at increasing ICT skills among job seekers.

Many people develop digital skills through education and their work. But those who do not use ICT at work, or are outside work and education, face major challenges. Many of those who fall outside the education system or the labor market are, however, active users of the technology. Young people, for example, who cannot find work often do have skills in the use of mobile phones and PCs, despite their limited education. The authorities must base their efforts in the varying digital skills of the population when they are developing electronic services. [30, p. 8]

The Government will develop national goals for digital skills in teaching and learning. This will yield better knowledge about which skills the information society requires the individual to have, and provide more knowledge of the population's skills requirements and level.

The program for digital skills is important for the achievement of "Kunnskapsløftet" [Increasing Knowledge], the Government's reform of the entire primary and secondary education system. Education will play an important part in building awareness towards the use of Internet. Development of teaching resources must be directed at exploiting open standards, so that the market mechanisms for development of teaching aids are enabled to function as well as possible. ICT shall be integrated in all school subjects. [30, p. 9 – 10]

4.4. Digital Confidence for Business

Australia: industry can contribute to digital economy by demonstrating greater digital confidence. “Digital confidence” refers to businesses being appropriately educated about the risks but also being sufficiently aware of the benefits, so that they productively and safely participate online.

Businesses that are digitally confident are more likely to incorporate technology into their business processes and enjoy resultant productivity improvements. Better use of the digital economy would enable business to compete more effectively internationally and develop export opportunities in areas such as financial services, culture, architecture and planning.

It’s also determined by the Australian Government that a greater online presence from Australian companies will have a flow on effect of encouraging greater online participation by Australian consumers who are attracted by better online offerings.

Australian businesses are not engaging with the digital economy as extensively as their international counterparts in other key jurisdictions. However, the high levels of internet penetration are not automatically translating into correspondingly high rates of businesses contributing to the digital economy. [1, p. 24] The promotion of digital confidence requires a delicate balance between highlighting and educating users about online risks and about online benefits.

Germany: the Government encourages business to use cloud computing. At present, *cloud computing* is one of the most promising avenues for ICT providers and users. It offers user enterprises a way to obtain customised storage capacities, computing power and software via the Internet for flexible use to meet needs. The fees charged depend on functional scope, utilisation time and number of users. *Companies can save on costs* through economies of scale. Thanks to non-localised access via various terminals, the users can obtain the same requisite information access at any time. In addition, they can draw on professional, continually updated and legally compliant IT so as to concentrate more on their core business.

To ensure the secure and reliable use of cloud computing, a number of problems need to be solved. Current IT concepts have to be adapted to specific requirements, particularly in data security and protection, standardisation, interoperability and service quality. Legal problems include liability issues and aspects of contractual law as well as legal assurance of data protection and security. Cloud computing calls for new business models in the German ICT industry. The Federal Government is seeking to speed up the development and introduction of cloud computing facilities. Especially small and medium-sized enterprises and the public sector should be able to take early advantage of the opportunities. The current challenges will be addressed with the new Cloud Computing Action Programme. [13, p. 10]

Denmark: Virk.dk is the digital point of entry to public services for businesses. It gives access to all the approximately 1,400 forms for submitting information to the public authorities as well as access to business-related information from all public authorities. There are currently over 70,000 active businesses and almost 200,000 employees in these businesses, with around 250,000 submissions made every month. This is equivalent to just under three million submissions per year, or one third of all submissions made to the public authorities each year. Virk.dk is under constant improvement, and is now offered in German, Polish and English language versions. The Danish Commerce and Companies Agency has joined forces with the National IT and Telecom Agency to produce 30 e-learning films on Virk.dk, intended to aid businesses in using the digital solutions and tools provided on the portal. [21, p. 21]

NemHandel (EasyTrade): by December 2010, NemHandel (EasyTrade) counted for 100,000 businesses having sent electronic invoices to the public sector via the national digital infrastructure. This corresponds to about one third of all active Danish businesses having tried sending *electronic invoices* via NemHandel. NemHandel is a flexible and open infrastructure developed by the Ministry of Science, Technology and Innovation. Experience drawn from NemHandel is a vital element in the EU pilot project PEPPOL (Pan European Public Procurement Online). A link was established in late 2010 between NemHandel and PEPPOL, potentially making it possible to send digital business documents across borders within the EU. More and more IT suppliers are integrating NemHandel into their invoicing solutions for small and medium-sized businesses. This helps to ensure simple solutions to match the needs of individual businesses. The efficiency potential from the introduction of electronic invoicing to the public authorities is around DKK 700 million per year. For Danish businesses, *the digitization of business documents represents a total potential of almost DKK 5 billion per year.* [21, pp. 21-22]

Japan: regarding the digital penetration direct links among businesses and consumers in widely separated regions and broad collaboration among businesses will be promoted to take advantage of the potential of regional industries, agricultural, forestry, and fisheries industries, traditional culture, tourism resources, and so on. This will serve to enhance the added value of local products and agricultural products and increase transient populations, leading to enhanced international competitiveness. In addition, digital technologies will be used to improve and expand public services and support collaboration among residents. [29, p. 20]

Singapore: the infocomm industry is a key contributor to Singapore's economy, fuelling the growth of other economic activities and adding jobs to the economy. To ensure that the infocomm industry remains globally competitive, the iN2015 programmes and initiatives aim to promote innovation, strengthen capabilities of Singapore infocomm enterprises and anchor high-value ICT activities of Multinational Corporations (MNCs) in Singapore. Besides creating diversity within the industry, they will also enhance the technology depth of the industry.

Multinational Corporations are important players in the industry as they perform high-value work, engage in R&D activities, and develop many innovative services for

enterprises and consumers. Infocomm MNCs are not only substantial revenue contributors to the economy, but also providers of innovative platforms, and market connectors for the infocomm enterprises. Besides the many infocomm MNCs which have been in Singapore for years, the Government has continued to attract and anchor more infocomm MNCs, such as Equinix with its Global Development Centre in Singapore, Salesforce.com with its first International Data Centre outside the US, and Amazon Web Services, which launched its first Asia Pacific regional base in Singapore recently.

Singapore's excellent infocomm infrastructure has made it a preferred destination for MNCs to anchor their shared IT services. Global infocomm-user MNCs like Citibank, BNP Paribas International Private Bank, Deutsche Bank, Crédit Agricole Corporate and Investment Bank, UOB and Daimler have chosen Singapore as the location to set up their IT hubs at, to support their worldwide business operations. These infocomm investments generate sophisticated demand for infocomm services, and create many high-value ICT jobs and business opportunities for infocomm enterprises.

Singapore infocomm companies can tap into the abundant opportunities in the global marketplace. To help more companies make inroads into overseas markets, IDA has in place various internationalisation programmes. [31, p. 11]

“Made-by-Singapore”: infocomm solutions have earned a good reputation for being of high quality. To extend this mindshare internationally, *an overarching brand identity* was created to help infocomm enterprises market their products and solutions overseas. The brand has seen good take-up by infocomm enterprises and it is used extensively at international trade events such as GITEX, Mobile World Congress and imbX. [31, p. 11 – 12]

It is essential to continue to infuse innovation, new business models and capabilities, and vibrancy into the infocomm start-up ecosystem. To this end, Singapore is working *to attract world-class global infocomm startups and entrepreneurs to use Singapore as a development and engineering base*. Since the launch of this initiative in 2008, about 40 foreign start-ups have committed projects in Singapore. These start-ups come from diverse countries, such as the United States, Israel, Sweden, China, Germany and Finland, bringing more than S\$50 million in project investment. [31, p. 13]

4.5. Digital Confidence for Community

It is important that when users engage with the digital economy, they have the requisite digital confidence and skills to do so safely and productively. As users spend more time online they expect the same levels of protections as exist in the offline world, but often those protections are absent or consumers do not know how to mitigate online risks. It is important that government and industry collaborate to ensure that people are as capable

and confident to interact and engage via the internet as they are offline. Among the main targets could be measured: privacy, e-security and cyber-safety.

4.5.1. The Issue of Privacy

Historically, people have always had some notion of privacy. The basic concepts of privacy to which most people could always relate are: the privacy of our body; the privacy of our thoughts (our mind); and the privacy of our home.

It is time for both organizations and individuals to be accountable for privacy. Organizations need to be accountable for the information they collect or intend to collect from individuals. They need to be open and transparent about what information they are collecting, and they need to validate that the data they do collect is securely protected. However, the onus cannot be entirely on organizations. Individuals also need to be accountable for their information in how they use technology and interact with organizations. They need to increase their knowledge about what they are sharing and with whom they are sharing so that they can make informed decisions and maintain control of the privacy of their bodies, thoughts and homes. [32, p. 3]

Australia: advances in technology significantly impact on individual privacy. People are concerned with a range of privacy issues. Users are feeling unable to keep up with the perceived fast – pace of changes in new technology. Approximately equal number of both internet users and non – users (61 % and 64 % respectively) responded that they were worried about the potential for invasion of privacy through new technology. [33, p. 13]. People are also concerned with being personally identifiable online. For example, research shows that people from both Australia and New Zealand are concerned about putting their photos online [33, p. 17]

As a first stage in response to these issues the Australian Government has focused on developing a set of Unified Privacy Principles, enhancing protection for health and credit reporting information and improving education about the impact of new technologies on privacy. [1, p. 41]

The United States: there are efforts underway to more closely align the US’s position regarding privacy with that of other countries. While others are moving toward more comprehensive regimes, the US continues to regulate privacy by industry or data type. For example, there is a law to protect the privacy of children but only if those children are under 13 and the information is provided online. There are individual privacy laws for various industry sectors. Health care and financial services are key examples. The sectoral regime in the US is not a model that any other country is following. Where other countries are developing comprehensive, omnibus laws, the US regime remains fragmented and piecemeal.

It's not expected Congress to achieve consensus in 2012, but it may move toward a more comprehensive approach in the next three to five years. Certainly, it's in everyone's interest to do so, particularly as new technologies continue to emerge. It seems as though each new innovation, like cloud computing or location-based services, prompts regulators to consider legal protections anew. But the state would cease to innovate if it had to chase each new development with legislation. Ultimately, the US will need an overarching framework to address in a uniform manner new technologies as they are developed. [32, p. 6]

Switzerland: the increasing shift of economic and governmental activities onto the internet requires on the one hand the consistent protection of personal data and the possibility of enforcing rights in this area. On the other hand, it also requires the creation of transparency, by providing access to official data, together with information about its origin and use. [23, p. 17]

India: has adopted new privacy rules. India's Information Technology Rules 2011 impose significant limitations on how businesses can handle personal information. Under the new rules, organizations that collect personal information will be required to provide notice to the individuals from whom they are collecting it. The new rules also mandate organizations to take all reasonable steps available to secure personal information, offer a dispute resolution process when issues arise and publish or otherwise make privacy policies available. India's privacy rules cover any personal information collected in India or transferred to the country. [32, p. 5]

4.5.2. The Issue of E-security

The European Union: online Safety (OS) may include a large variety of topics. The question of the safe online behaviour is a crucial issue in many European countries, especially with respect to the ICT involvement in education process. Thus, students are taught not to reveal any personal information, including their address, name of their school, telephone numbers, etc. In more advanced courses, pupils also learn how companies and agencies gather information about individuals and how this information might be used in ways people might not expect or agree to.

The second element constitutes the copyright issues. Children learn about the existence of copyright for some online materials, and what this means in terms of authors' rights to distribute, reproduce and make their works available to the public. The intention is to help children understand the issues surrounding illegal file sharing, particularly with respect to services offering peer-to-peer sharing.

Learning about how to handle '*contact with strangers*' on the Internet is also a very important topic. To avoid any kind of physical injury, children are recommended never to

arrange to meet someone that they have got to know online without telling an adult and they are also taught that any such meetings must always be in a public place.

Finally, *the safe use of mobile phones*. Increasingly mobile phones have full Internet access and children and young people use both stationary connections and mobile phones to browse the Internet. Therefore, the same safety measures as for using the Internet become important for using mobile phones (protection of personal data, avoiding harmful content, consumer protection, gaming addiction, etc.). [34, p. 41]

Denmark: it is essential for the digital society that the population trusts the security of the digital infrastructure. The population must have confidence in digital services being able to handle such things as sensitive personal data in a secure manner. This applies not only when communicating digitally with the public authorities, but also when using online banking. The population also needs to know how to navigate around the internet safely. The nationwide campaign ‘netsikker nu!’ (secure internet now) focuses each year on security on the internet. [21, p. 11]

The IT Security Committee of Denmark has focused on security in relation to cloud computing, resulting in a *conference* held in December 2010 – “Få skyen sikkert ned på jorden” (bringing the cloud down to earth) – as well as two *publications* on the subject. Netsikker nu! (secure internet now) is a national campaign developed in collaboration between the Ministry of Science, Technology and Innovation and a wide range of Danish businesses and organisations. The campaign was run in 2010 for the sixth year in a row, and focuses on the themes “Tænk, Blokér, Opdatér.” (Think, Block, Update) The aim of the campaign is to make citizens feel safer when they are exploring the internet and focuses on how you can prevent damage when navigating around the internet. One of the campaign’s central issues is to get people to *visit its website* at www.netsikker.nu, which contains movies, tests, good advice and a large number of specialist articles focusing on the following themes: identity theft, online social network services, mobile security as well as children and safety. When the campaign was run in October 2010, the website had 81,941 hits, compared to 17,006 the previous month. Another of the campaign’s initiatives was to distribute the “netsikker nu!” *magazine*, a campaign publication with good advice and guidance on information security. 134,000 copies of the magazine were printed and distributed, and used as educational material at libraries and computer clubs. The magazine is still in demand, and can be read at the Danish IT and Telecom Agency’s website www.itst.dk. [21, p. 20]

Australia: a range of e-security awareness raising initiatives have been implemented to help home users, school students and SMEs use the internet in a secure and confident manner. In Australia these include interactive self-learning modules for students in years three and nine, an annual National E-Security Awareness Week in partnership with industry and community organisations, and the Stay Smart Online website that provides simple step-by-step information on secure online practices and hosts an alert service for plain English information on the latest threats and vulnerabilities and how to address them. [35]

It's also concluded that while "concerns over online security are not currently a barrier to participation" there is a "potential need for more formal and continuing education to address knowledge gaps about appropriate and available *technical and behavioural measures to mitigate online risks.*" [33, p. 2] Among the measures that have been taken by the Australian Government to improve e – security can be marked out the following:

Cyber security website: the government's cyber security website, Stay Smart Online, provides information for Australian internet users on cyber security issues and the simple measures they can take to help protect themselves and their family. The website offers information on a range of topics including securing your computer, tips on how to safely bank and shop online and information for small businesses. There are also links to resources for parents and teachers to help them protect their children online.

Budd:e cybersecurity education modules: the Budd:e cybersecurity education package is a key component of the Australian Government's commitment to raise the cybersecurity awareness among school aged children. Budd:e comprises modules for both primary and secondary school students. These modules are interactive and self learning and are designed to help students adopt secure online practices and behaviours in a fun way. Cybersecurity topics covered in the modules include malicious software, securing personal information online and social networking. Budd:e won the 2010 Australian Interactive Media Industry Association (AIMIA) award for the best interactive media and digital content designed for children. Budd:e is available free to all Australian schools through the Stay Smart Online website or via a CD ROM that can be ordered online. It is also available on Scootle, the Learning Federation's educational resources portal.

Stay Smart Online Alert Service: is a free service available from the Stay Smart Online website. It provides easy to understand information about the latest cybersecurity threats and vulnerabilities and possible solutions to address them. Users can receive alerts via email, online or by RSS feed.

Australian Internet Security Initiative: identifies compromised computers and supports internet service providers to help their customers restore their computer security. This initiative is delivered by the Australian Communications and Media Authority. [35]

Germany: the rapid development of the Internet calls for measures to make sure it is trustworthy and secure and for answers to the question of individual responsibility and the role of the state in the digital world. Effective data protection is essential for the acceptance and development of an information and knowledge society. The Federal Government subscribes to the following principles in developing and planning its Internet policy:

- precedence to the application and enforcement of existing law over new legislation;
- precedence to self-regulation over new legislation;

- evolving and enforceable system of laws.

There is a need for the coherent development of national, multinational and international law.

The Federal Government sees the task of the state in information technology and the Internet as ensuring freedom and stability, protection and reliability and supply and innovation. In these functions, it will create a climate for greater confidence in Internet technologies and services. *All stakeholders - users, providers or IT security planners - bear specific responsibility for IT security.* Important here is to educate young people in particular about current risks and raise their awareness of the need for greater self protection. The Federal Government is also concerned to ensure full policing throughout the Internet.

The security and availability of computer networks make up major functional parameters of globally networked society. In contrast to legitimate users, internationally well organised criminal elements are also engaged on the Internet. There has also been a discernible increase in espionage and sabotage activities. The Federal Government is committed to making networks and services safer. The Government plans to take the following measures:

- promoting the application of trustworthy and tamper-proof hardware components and of IT systems (*trusted computing*) in the federal administration and in major infrastructure sectors and collaboration in the Trusted Computing Group; [13, p. 16]
- making recommendations for the use of trusted platform modules;
- making recommendations for the security of IT systems in major infrastructure sectors;
- devising a system of incentives for the voluntary application of more secure IT systems for better protection against malware;
- program for security research with the focus on: security in mobile environments; protection of Internet infrastructures; development of verified secure systems with a defined level of security (built-in security); new technologies for the protection of IT systems;
- expansion of services by the Federal Agency for Security in Information Technology for Internet security.

Consumer protection on the Internet: many consumers use the Internet to obtain information in a simple way on certain topics and/or avail themselves of services. Some disreputable companies exploit the inattention of consumers when surfing and try to inveigle them into concluding contracts requiring payment, while deliberately concealing

the obligation to pay for the product. Consumers are thus unaware that the product or service is being offered against payment and are then put under heavy pressure to pay the supposed bill. [13, p. 17] To enhance better protection of consumers against cost and/or subscription traps on the Internet the Government proposes measures similar to those it advocates at the EU level: obliging businesses to clearly specify the price in combination with an obligatory confirmation slot for the conclusion of contracts with consumers on the Internet (so-called button solution). An e-commerce contract shall only enter into force when before making an order the customer has been notified in clearly visible form by the seller of the total costs and he has confirmed acknowledgement of this information by means of a separate declaration. The Federal Government has made such a proposal at the negotiations in Brussels on a directive on the rights of consumers and will continue to press for the inclusion of this type of provision.

Secure identities are crucial for trustworthy and reliable activities in the digital world. Even more than today, the identity of persons and objects will in future functions as the key for accessing certain products and services in closed and public networks. Public authorities (central government, federal states and municipalities) and also private institutions will provide statutory infrastructure elements as an identification facility, such as the *electronic proof of identity*. The use of electronic identities in the private sector must be made transparent, placed under civic control and only regulated as far as necessary. The Federal Government supports the use of the electronic proof of identity in the new identity card and other documents and promotes other applications, e.g. De-Mail. Government is going to provide a framework and infrastructure components for secure, transparent and user-centred identity management. Government and private sector measures to educate the population about the dangers of identity theft, including means of protection.

Email security: De-Mail will enable the easy, confidential and verifiable transfer of electronic messages and documents among communication partners of certified identity. This will ensure legal certainty for business and administrative procedures and is a major prerequisite for greater data protection and security in electronic communication. The Federal Government will set the legal framework (De-Mail Act) and make the technical arrangements with close private-sector involvement. De-Mail will be implemented and operated by largely private government-approved (accredited) providers. These will be mutually interoperable in a secure network to avoid stand-alone solutions. [13, p. 18] The Government will lay the legal foundation for the accreditation of De-Mail providers to ensure transparent and trustworthy services for citizens and enterprises through minimum secure electronic message exchange requirements for encryption, secure communication partner identity and verifiability (proof of dispatch/delivery) [13, p. 19]

Switzerland: all the inhabitants of Switzerland are in a position to use ICT competently, in a security conscious way and under their own responsibility in order to improve and extend possibilities of communication and action and to protect themselves from risks in the online environment. [23, p. 5]

Though the Confederation declares self – responsibility of the citizens to protect themselves on – line, it emphasizes that ICT and their security risks pose new challenges every day for people in Switzerland. To be able to use ICT with an awareness of security and thereby to improve confidence in ICT requires an appropriate awareness of the risks, a knowledge of the possible dangers and the ability to avoid or repel them. This requires *improving security-related skills in private life and creating a security culture in the workplace*. The Confederation’s priorities for action are:

- in cooperation with the cantons, the private sector and the science community, the Confederation supports increasing the awareness and skills of the population with a view to security-conscious, legally compliant and responsible use of ICT (media skills);
- in particular, the Confederation enhances the media literacy of children and young people. It does this in cooperation with the media industry and the cantons through advertising and developing offerings for parents, teachers and mentors;
- in cooperation with the cantons and the private sector, the Confederation supports small and medium-sized enterprises (SMEs) in developing a security culture in the workplace. [23, p. 8]

The ICT resilience of critical infrastructures: the economy and society are dependent on the integrity and resilience of its infrastructure networks. These are increasingly digitised and interconnected. This convergence of different infrastructure networks also leads to the emergence of new risks. The protection of critical infrastructures in relation to cyber risks and ICT failures, as well as their information security (integrity, availability, confidentiality of systems and data) are of fundamental importance for the Swiss economy. To increase resilience, appropriate and reliable technologies, processes and competencies are essential for security. The Confederation’s priorities for action:

- the Confederation, in co-operation with the other participants involved, creates a chain of processes and appropriate instruments protect critical infrastructures from cyber risks and ICT failures;
- the Confederation participates in international bodies for the protection of critical ICT structures and acts as an information hub between international platforms and the operators of critical Swiss infrastructures. [23, p. 9]

4.5.3. Cyber – Safety in Digital Age

The United Kingdom: the digital architecture on which we now rely was built to be efficient and interoperable. When the internet first started to grow, security was less of a consideration. However, as we put more of our lives online, this matters more and more.

People want to be confident that the networks that support national security, economic prosperity, and private lives are safe and resilient.

Unfortunately a growing number of adversaries are looking to use cyberspace to steal, compromise or destroy critical data. The scale of the dependence means that our prosperity, our key infrastructure, our places of work and our homes can all be affected. [36, p. 15]

The growing use of cyberspace means that its disruption can affect nations' ability to function effectively in a crisis. Nearly two-thirds of critical infrastructure companies report regularly finding malware designed to sabotage their systems. There are over 20,000 malicious emails on government networks each month. These kinds of attack are increasing; the number of emails with malicious content detected by government networks in the whole of 2010 was double the number seen in 2009. [36, p. 17]

The UK Government vision is for the UK in 2015 to derive huge economic and social value from a vibrant, resilient and secure cyberspace, where actions, guided by the core values of liberty, fairness, transparency and the rule of law, enhance prosperity, national security and a strong society. To achieve this vision by 2015 the Government wants:

- The UK to tackle cyber crime and be one of the most secure places in the world to do business in cyberspace;
- The UK to be more resilient to cyber attacks and better able to protect its interests in cyberspace;
- The UK to have helped shape an open, stable and vibrant cyberspace which the UK public can use safely and that supports open societies;
- The UK to have the cross-cutting knowledge, skills and capability it needs to underpin all its cyber security objectives. [36, p. 8]

To reach the above objectives the UK Government applies the following principles:

A risk-based approach: in a globalised world where all networked systems are potentially vulnerable and where cyber attacks are difficult to detect, there can be no such thing as absolute security.

Working in partnership: though the UK can improve its defences domestically, the internet is fundamentally transnational. Threats are cross-border. Not all the infrastructure on which it relies is UK-based. So the UK cannot make all the progress it needs to on its own. The UK will seek partnership with other countries that share its views, and reach out where it can to those who do not.

Balancing security with freedom and privacy: the UK will pursue cyber security policies that enhance individual and collective security while preserving UK citizens' right to

privacy and other fundamental values and freedoms. Internationally the UK will continue to pursue the development of norms of acceptable behavior in cyberspace. The UK starts from the belief that behavior which is unacceptable offline should also be unacceptable online. Achieving this vision will require everybody, the private sector, individuals and government to work together. Just as we all benefit from the use of cyberspace, so we all have a responsibility to help protect it.

For the benefit of *individuals* by 2015 the UK Government wants a UK where:

- People know how to get themselves a basic level of protection against threats online. They have access to accurate and up to date information on the online threats that they face, and the techniques and practices they can employ to guard against them;
- Individuals are careful about putting personal or sensitive information on the internet; are wary of email attachments or links from unrecognised senders; and are cautious about downloading files from websites they know little about;
- Everyone, at home and at work, can help identify threats in cyberspace and report them – for example, identifying fraudulent websites;
- Individuals play their part in transacting safely with businesses and Government, protecting passwords, understanding the importance of updating software and operating systems regularly and running anti-malware programs to help prevent their computers being used by others to increase the threat;
- People are clear that, as in the offline world, we are each responsible for our behavior in cyberspace (including those who harass others, commit crime or ‘hack’ into systems for publicity or to cause disruption). [36, p. 22 – 23]

For the benefit of *private companies* by 2015 the UK Government wants a UK where:

- Companies are aware of the threat and use cyberspace in a way that protects commercially sensitive information, intellectual property and customer data;
- Private organisations work in partnerships with each other, Government and law enforcement agencies, sharing information and resources, to transform the response to a common challenge, and actively deter the threats we face in cyberspace (the work of the UK Council for Child Internet Safety offers a good example of what can be achieved);
- Companies capitalise on the growth in demand in the UK and globally for vibrant and innovative cyber security services;

- The private sector has built upon the strengths of the UK's skills base in cyber security to invest and create centres of excellence to provide the cyber security skills we will need in future.

The UK *Government* role:

- Built up capacity to detect and defeat high-end threats;
- Helped shape an international consensus on 'norms of behaviour' in cyberspace;
- Reduced vulnerabilities in government systems and critical national infrastructure;
- Grown the cadre of cyber security professionals;
- Strengthened law enforcement and tackled cyber crime;
- Improved prevention and public awareness;
- Raised business awareness;
- Seized the business opportunities – working with industry and academia to boost share of the cyber security market and cemented the UK's status as a safe place to do business online. [36, p. 23]

The UK is a strong supporter of the network of law enforcement contact points known as the '24/7 Network' as the best means to make sure that when urgent assistance is required, partner countries are able to obtain it. The UK will work with other countries to encourage them to join the 24/7 Network and to put in the commitment to make it a success. The Serious Organised Crime Agency (SOCA) already has liaison officers around the world. [36, p. 29]

The European Union: more and more children are using the Internet and mobile phones to communicate. So, bullying in schools has become a subject of growing importance within the last few years. Children are always advised to tell their parents and teachers about *cyberbullying* and not to remain silent about any incident. This topic is also addressed in collaboration with the associations or other public bodies operating in the schools. [34, p. 41]

Denmark: in May 2009, the government decided to set up a state run warning service for internet threats, called *GovCERT* (Government Computer Emergency Response Team) with the purpose of providing the state authorities with an overview of threats and vulnerabilities related to the government's use of the internet. [21, p. 19]

Australia: to combat online risks the Government of Australia has developed the Cyber-Safety Plan. This Plan should help parents and educators protect children from

inappropriate material. It includes: education and information measures; law enforcement; help line and websites; ISP filtering; consultative arrangements with industry, child protection bodies and children; and further research to identify possible areas for further action. [1, p. 42]

The Government of Australia is undertaking a live pilot trial of ISP *filtering technologies* that will inform the Government's policy. Nine ISPs are taking place in the trial to test different technologies against impact on network performance, accuracy including under-blocking and over-blocking, costs and ease of circumvention.

Internet service provider voluntary Code of Practice: this voluntary code of practice, known as the icode, provides a consistent approach for Australian ISPs to help inform, educate and protect their clients in relation to cyber security issues, and address the problem of compromised computers on their networks. It was developed by the Australian Government in collaboration with the Internet Industry Association. The icode was implemented on 1 December 2010 and it has received a positive response from industry. Within its first 12 months 34 ISPs, covering more than 90% per cent of the Australian the home internet market, signed up to the icode.

The Australian Government provides also a range of cyber-safety information and resources designed to meet the needs of children, parents, teachers, and library staff. This includes advice for young children through resources such as Cybersmart Detectives, Cyberquoll, and Cybernetrix. [1, p. 42]

Switzerland: ICT permeate all areas of life. In addition to the benefits to Switzerland's population, there is also a growing danger from predominantly international, increasingly professionalised and commercialised cybercrime. To adequately address these risks, the legitimate interests of people and businesses in Switzerland must be guaranteed and strengthened through the elaboration of a protection concept which is able to constantly adapt to technological progress and the development of internet-related crime. [23, p. 8] To achieve the respective objectives:

- the Confederation, together with the cantons and the private sector, will develop a coherent system for protection from and prosecution of cybercrime. Within this framework, it is also working on solutions for verifying identities, authorisations and functions. The Confederation supports the cantons in the prosecution of cross-border crime and promotes the international cooperation of law enforcement authorities;
- the Confederation, in cooperation with the private sector, is creating the conditions to make products and services comply with data protection requirements (privacy by design) and to provide ICT users with corresponding settings (privacy by default);

- in cooperation with the cantons, the private sector and the research community, the Confederation contributes to protecting the privacy of citizens in the online environment, and in particular that of children and young people;
- the Confederation, within the framework of its competences, supports the training and professional development of experts in ICT security. [23, p. 9]

4.6. Open Access to Public Sector Information

Danmark: the initiative ‘Offentlige Data I Spil’ (Open Data Innovation Strategy) of the Ministry of Science, Technology and Innovation is designed to give the private sector access to data from the public authorities. Private parties can use public data to develop products and services which create new digital markets for the benefit of the public and private sector. The release of public data will thus contribute to growth in Denmark.

Public data has been used to develop a variety of products including – among others – a mobile application for finding parking spaces, an information and reporting application for amateur hunters and an interactive visualisation of the proposed Finance Bill. Throughout 2010, the Ministry of Science, Technology and Innovation published its own data – a total of 66 data sets.

Access to reusing public data will give private businesses the chance to offer data-based services as an extension of existing public services. These can include solutions for mobile phones which provide information from the public authorities, and makes it possible to report to the authorities directly from a mobile phone. This way, the access to public data will allow the private sector to provide various add-on services which provide value for the users. In some instances, such private services will help create new or increase the flow of data back to the public sector, or the private services can act as an attractive and easy form of access for public reporting and self-service, which will thus be strengthened. This will also result in the public sector directly benefiting from private, data-based services. [21, p. 8]

Australia: the Government recognises the digital economy and innovation benefits generated by open access to public sector information. Public sector information can include Government-produced data, such as Australian Bureau of Statistics (ABS) and geospatial data, and copyright protected materials, such as reports and other documentation. It can also include materials resulting from publicly-funded cultural, educational and scientific activities. In this context, ‘open access’ means access on terms and in formats that clearly permit and enable such use and re-use by any member of the public. Australia has a number of projects based on the open access to public sector information, for example [1, p. 12]:

- The Sentinel System, *including* the Sentinel Bushfire Monitoring System to provide timely spatial information to emergency service managers across Australia about the location of bushfires around the country;
- The Australian Diabetes Map. This map combines Australian population data with details about the number of Australians diagnosed with diabetes, their age, gender, location and the type of diabetes that they have. Technology can also assist in compiling and representing large amounts of data to improve our understanding of health issues;
- The Western Australian Data Linkage System links Western Australia’s core population health data sets and provides de-identified, trend data to research, planning and evaluation projects which aim to improve the health of Western Australians;
- Various websites: Swivel (known as ‘YouTube for Data’), ManyEyes and PolicyMap; [1, p. 12]
- The Australian Broadcasting Corporation’s Radio National offers open access licensing as part of its collaborative, social media project Pool; [1 p. 13]
- Three Australian cultural institutions—the Powerhouse Museum, the New South Wales State Library and the Australian War Memorial—have joined the Flickr Commons project, which consists of museums and libraries from around the world publishing their images under a ‘no known copyright restrictions’ tag to increase access to publicly-held collections and provide a way for the general public to contribute information and knowledge. The open access approach lead to a four-fold increase in visitation, no detrimental effect on income produced from the image sales and user-generated tagging and comments that have been incorporated back into the Museum’s website to enhance search capabilities. The Museum concluded that “a new business model for licensing images is essential.” [1, pp. 13-14]

The Australian Government will explore policy initiatives, and work with state and territory governments, to provide more open access to appropriate categories of public sector information, which do not raise issues such as privacy, national security or confidentiality. [1, p. 14]

V. New Framework for the IP System

There is a constant need for the IP system to adapt to new forms of innovation, creativity and technology, but that need is now particularly marked in copyright because technology has made copying and communicating many works very easy and created opportunities for the widespread and efficient use of digital content.

The United Kingdom: digital technology is probably the most important and transformative technology of our time. Because digital is fundamentally an information and communication technology, intellectual property rights lie at its heart. Not only has ICT adoption and use been among the strongest drivers of growth, but it has pushed content and communication technology into new uses, meaning the IP system has become part of people's daily lives. This has transformed us all into regular, if not daily, copyright creators. [5, p.13 UK]

It's specified in Hargreaves Review that the UK's current IP system is falling behind what is needed in the area of copyright. [5, p. 3] The IP law must adapt to change. The challenges of today are around digital copying. That is where most adaptation is currently needed.

At the same time *the Government is aware that the next need for change may come from a very different place.* That is why flexibility in the IP system is highly desirable, although it needs to be balanced with as much certainty as possible to encourage investment. [2, p. 2] The Government is also particularly concerned to reduce barriers to creating viable IP - using small firms, whether in existing industries or in new niches.

The challenge is to make sure that the IP framework is flexible enough to facilitate, rather than obstruct, the capacity for digital technology to deliver growth. This needs to be accomplished in a way that simultaneously protects, as far as possible, the position of existing communities of rights holders, notably the extraordinary diversity of individuals and firms which make up the UK's highly successful creative industries. [5, p. 15]

The Government Response to the Hargreaves Review identified the potential benefits from making changes to the IP system: adding between 0.3 per cent and 0.6 per cent to the size of the UK economy by 2020 – between £5 billion and £8 billion – and cutting deadweight costs in the economy by over £750m. [2, p. 5]

The issue of flexibility involves the interests of divergent groups. Copyright law distinguishes only between rights holders and users. But in the actual public debate on copyrights, however, the interest groups are more varied:

- artists and performers – create works and offer them to the public;
- producers – produce phonograms, videograms, broadcasts and films;

- users and providers – use and further circulate content commercially;
- consumers.

Switzerland: the diversity of interests of the different groups involved in public debates on copyrights can be traced, for example, in the copyright reform in Switzerland* (2004 – 2007 years): *the entertainment industry* was demanded that protection of digital content against illegal copying was improved. They wanted an effective circumvention prohibition for technological measures, such as in the EU Copyright Directive, as well as a limitation on copying for personal use. *The artists and performers* wanted to keep the legally permitted uses – namely personal use – as it was, as long as they received adequate compensation for the use of their works. *Consumer and user groups* wanted to know which uses were permissible, and they feared that permissible uses could be massively restricted by prohibiting the circumvention of technological protection. In particular, they feared that the information and documentation possibilities currently permitted for education, research and science would be negatively impacted and were calling for weaker circumvention regulation. In addition, they felt strongly that the royalty system should be revised when the protection of technological measures is introduced. This is so that users won't have to pay more than once – i.e., once to the content provider and once to the collecting society – when digital rights management systems are in place. [7, p. 29]

Dr Francis Gurry, Director General of the World Intellectual Property Organization (**WIPO**), warned that if the copyright system did not adapt to the radical structural change introduced by digital technology and the internet, “it will perish.” He outlined **three principles of copyright** in the digital environment:

- neutrality to technology and to the business models developed in response to technology (“it is not the role of copyright [law] to prop up moribund business models”);
- comprehensiveness and coherence in the policy response (there is no magic bullet, “an adequate response is more likely to come from a combination of law, infrastructure, cultural change, institutional collaboration and better business models”);
- more simplicity in copyright (“we risk losing our audience and public support if we cannot make understanding of the system more accessible”). [37]

* Swiss has a rank 1 according to the WIPO Global Innovation Index, 2012.

5.1. The Issue of Metrics and Evidence for the New IP Framework

As determined in the Hargreaves Review *the UK Government should ensure that development of the IP System is driven as far as possible by objective evidence*. Policy should balance measurable economic objectives against social goals and potential benefits for rights holders against impacts on consumers and other interests. These concerns will be of particular importance in assessing future claims to extend rights or in determining desirable limits to rights. [5, p. 20]

The Hargreaves Review identifies two particular difficulties in the IP field: a near-total lack of high-quality evidence on some issues and an overabundance of effective lobbying.

The UK Government position regarding these issues is determined in the Government Response to the Hargreaves Review. As mentioned in the Response *to increase the level of high – quality evidence* the Government has strengthened the IPO’s economics team and begun an ambitious programme of economic research with partners. The fundamental issue however is that key data is held by business and other organisations. IPO will work with those organisations to help them offer good-quality evidence.

To decrease the level of lobbying the Government will in future give limited weight in IP policy - making to evidence that is not sufficiently open and transparent in its approach and methodology. The Government is conscious that smaller businesses and organisations face particular challenges in assembling evidence and will assess their contributions sympathetically, with the same emphasis on transparency and openness.

Economic evidence is not, of course, the sole driver of IP policy. Legitimate questions of culture, fairness and “just reward” for creators also arise, and have tended to dominate the debate on copyright issues. These questions are clearly significant. At the same time the Hargreaves Review points out that as copyright becomes increasingly economically important, it is vital that economic considerations are fully weighed in the balance. [5, pp. 19 – 20]

The role of the digital economy indicators is also emphasized in **Australia’s** Digital Economy Report. It is concluded in the Report that the existing datasets are inadequate for the purpose of measuring the future digital economy performance. The issue of the existing datasets and proposals for their resolving are determined as following:

Broader scope of digital economy performance measures: the existing indicators are heavily focused on the internet and may not include the expansive nature of the digital economy. For example, existing data is not designed to capture the use of digital devices external to the online environment (such as smart meters or sensors) nor more highly nuanced digital economy activity (such as the level of sophistication of digital services).

Metrics to highlight nuances in nature of use, drivers for adoption and impact of digital economy engagement: examples given of additional details that could be collected about digital economy participation included:

1. The direct and indirect economic benefits, including productivity gains;
2. The characteristics of businesses and households that adopt broadband technology;
3. More details on what businesses and households are using the internet for:
 - 3.1. The impact of broadband access and subsequent internet use on business practice and performance and individual practices and priorities, including in terms of improving international competitiveness of business;
 - 3.2. The impact of high-speed broadband on the environment and energy use.

Sector and international benchmarking: digital economy benchmarking should occur at the sector level and be analysed against comparable international sectors. [1, p. 55]

Together, the combination of statistics data, reports and project-specific and industry reports provide a starting point for understanding the current state of the digital economy and what can be anticipated to be the primary uses, drivers and impacts for digital economy engagement. [1, p. 57]

5.2. The Role of Collecting Societies

The European Union: the online environment has brought changes to copyright licensing. One change is that online services are not limited by national borders and can reach over to consumers in other member states. Licenses for online services can also be granted and monitored at a distance. In many sectors, multi - territory licensing of online rights is carried out directly by rightholders, or those to which the rights have been transferred, without the intervention of collecting societies (direct multi - territory licensing). In other sectors, the multi - territory licensing of online rights is done collectively. [38, p. 12]

The online environment offers a wide range of opportunities to develop new and innovative services. In the music sector, on-line music services to consumers range from à la carte download to streaming services or cloud-based matching services; and from pay-per download to subscription or advertising-funded services. These services often have a multi-territory reach or are launched in several territories at the same time. Another important feature of these services is that the current prevailing business model lies in being able to provide access to the widest possible repertoire of recorded music.

On-line distribution of music is becoming widespread. IFPI, the international federation of the recorded music industry estimates that digital music revenues to record companies grew by 8% globally in 2011 to an estimated US\$5.2 billion; that 3.6 billion downloads were purchased globally in 2011 (an increase of 17%); and that digital channels now account for an estimated 32% of record company revenues globally. Some markets see now more than half of their revenues derive from digital channels: e.g. US (52%), South Korea (53%). But developments in the EU are slower. [38, p. 21]

Currently online music market within the EU has a wide territorial fragmentation. A number of factors contribute to such fragmentation. Complex copyright licensing processes are not the only reason for the fragmentation of the online market, but they play a part in it. Other reasons include technological barriers (limited access to high-speed networks), lack of legal certainty for service providers (differences in legislation in areas such as consumer protection or content rating), payment methods (access to credit cards), consumer trust in online transactions, illegal downloading of files (piracy) and cultural and linguistic differences. Finally, service providers sometimes take decisions to segment shops territorially and/or launch only in the more mature markets (e.g. with higher consumer online spend) due to purely commercial reasons such as, in the case of advertisement-funded services, the differences between national advertising markets. [38, p. 23]

The European Commission in its “Proposals for a Directive of the European Parliament and of the Council on collective management of copyright and related rights and multi-territorial licensing of rights in musical works for online uses in the internal market” made the following recommendations regarding the identified issues:

Status quo: without policy intervention, this option would rely on the market to solve the problems. In the music sector a number of market developments took place in the last few years (publishers withdrawing their rights, some authors' collecting societies offering multi - territory licenses, new licensing platform being set up). On the basis of this experience, multiple licensing practices would continue to exist with different levels of geographical scale (national or multi-territory) and at a different level of aggregation (repertoire specific or multi-repertoire). [38, p. 42]

The European Licensing Passport: collecting societies wanting to license the online rights of musical works on a multi – territory basis should comply with a set of conditions defined by legislation, which would aim at ensuring that collecting societies engaging in multi - territory licensing have sufficient data handling and invoicing capabilities, comply with certain transparency standards towards rightholders and users and allow for the use of a dispute resolution mechanism. As regards transparency standards, various consulted authors' associations considered that accessible ownership and licence information would facilitate multi-territory and multi-repertoire licensing and overcome the current market fragmentation.

The legal requirements listed in the table below would equally apply to collecting societies granting multi - territory licenses only for their own repertoire or for an aggregated repertoire (a "passport entity").

Licensing scope	<ul style="list-style-type: none"> • Multi - territory licensing of musical works, on the basis of mandates from rightholders and/or from collecting societies; • Exemption for multi - territory licenses for the online rights in musical works for services ancillary to TV and radio programmes (e.g. catch-up TV, simultaneous retransmission) provided by broadcasters. 	
Enhance the capabilities of licensors	Data handling capability	<ul style="list-style-type: none"> • Precise identification of licensed repertoire by means of a continually updated and authoritative ownership database; • Capability for fully electronic data exchange on works and usage of works with users, on the basis of accurate information provided by users in the appropriate format; • Ability to process electronically registration of works, registration of mandates and/or changes to mandates; • Ability to process data of rightholders switching

		from one passport entity to another.
	Invoicing	<ul style="list-style-type: none"> • Timely invoicing: no more than e.g. three months from the accurate reporting of the relevant usage (download, stream, etc.). The user may agree otherwise; • Accurate invoicing: claims on a share per work basis; • Avoidance of overlapping invoices: the "passport entity" should have effective procedures in place to resolve conflicting ownership claims with other licensors and to clear back-claims procedures (when changes in ownership are not reflected in the system at the time of invoicing).
	Rightholder services	<ul style="list-style-type: none"> • Payments to rightholders no later than e.g. six months from actual use of the work/three months from receipt of payment from users; • Accurate reporting on (minimum): licenses issued, applicable distribution rules, revenue per works/shares and per territory, deductions for administrative costs and other deductions.
Legal certainty	Availability of a dispute resolution mechanism linked to MT licenses. [38, p. 43]	

Those collecting societies which do not want to undertake the efforts and investments needed to comply with the legal requirements would be entitled to entrust their repertoire to the "passport entity" (i.e. a collecting society that already aggregates repertoires) of their choice (right to "tag on" their repertoire). A "passport entity" would be obliged to take on the repertoire on reasonable terms and to license it on a non-discriminatory basis. [38, p. 44]

Parallel direct licensing: collecting societies will manage the rights of rightholders on a nonexclusive basis ("non-exclusive mandates" from rightholders to collecting society) and it would give rightholders the ability to conclude direct licenses with users, without having to withdraw their rights from their collecting society. Currently, this is not possible because collecting societies in Europe generally require exclusive mandates from their members. Such "parallel direct licences", negotiated directly between users and rightholders, could in certain cases be more responsive, flexible and adapted to the needs of users. Collecting societies could still grant licenses covering rights which are not directly licensed. In this case, the collecting society would have to adjust the license tariff to take into account ("carve out") the rights which have already been licensed in parallel by rightholders. [38, p. 44 – 45]

Extended collective licensing combined with a country of origin principle: this option would establish the presumption that each author collecting society has the authority to grant "blanket" licences for online uses covering the entire repertoire ("extension effect of the licence") provided that the society is "representative". Such presumption would aim to aggregate rights within each local collecting society, each being presumed to represent the entire repertoire.

This option does not solve but simply shifts data processing problems (such as repertoire identification) to the "back office" of collective management. The collecting society would have to attribute those works to the rightholder to distribute the income collected, but this option will not necessarily require collecting society to improve key elements for the licensing of online users (such as accurate identification and data processing). Individual rightholders and publishers could still exercise their exclusive rights individually or through another licensing entity but first they would have to actively "opt out" of the extension effect, by notifying each local collecting society thereof. The licenses granted by local collecting society would have to be adjusted to reflect these "opt-outs".

This would be combined with the establishment of a country of origin principle applicable to the rights required for online exploitation of musical works so that a single license with a collecting society would suffice to cover the EU territory. An online service considered to be "originating" from one member state would only need to clear the rights for the territory of that member state, instead of clearing them in 27 member states. [38, p. 45 – 46]

The United Kingdom: the Hargreaves Review noted that collecting societies tend to be monopoly suppliers in the sectors in which they operate, and that there was evidence that practice could be improved in some areas. Greater protection is required both for members of collecting societies, and for their licensees. Following the Hargreaves Review the Government proposed that, in the first instance, *collecting societies self-regulate by adopting codes of conduct that incorporate minimum standards set by the Government*. The UK Government will also draw up proposals for a backstop power that allows a statutory code to be put in place for a collecting society that evidence shows has

failed to introduce or adhere to a voluntary code incorporating the minimum standards. [39, p. 12]

Switzerland*: digital rights management (*DRM*) was proposed in Switzerland. It refers to systems for electronically administering and marketing the rights for using digital content. DRM systems make it possible for those providing digital content, such as songs, films or ringtones, to create new business models for offering their products online in various qualities, for diverse users and at different prices. Providers can individually calculate and control the length of time and frequency with which a user makes use of the content – whether for listening, watching, printing or saving. Access to such services will be determined and controlled with technological measures.

DRM is revolutionizing the means and ways of circulating content online, although there are still rough spots. For instance, while more and more works are being made available online, there are few technical standards which make equipment and formats compatible. Also, while available on - line payment systems are diverse (for example, credit cards, ATM cards and systems like Swiss- com's "Click & Buy" and "Paypal" from eBay), they also need improvement. Consumers complain about the lack of user-friendliness. However, DRM appears to be increasingly asserting itself on the market. [7, p. 31]

An example of DRM: the latest album by your favorite band is available from an online music store. According to the store's business conditions, the song can be streamed for a few cents or it can be downloaded for a little more than a franc. Buying and downloading either the album or individual songs gives the buyer the right to play them on no more than 5 other PC's, to burn no more than 3 CD's, and to put them on a player from a certain manufacturer. Creating additional copies is prevented through copy protection.

Opportunities for DRM: the entertainment industry and, partially, artists and performers as well, feel that DRM will massively simplify the selling of digital content. Contrary to collective management, DRM allows exact accounting: one only pays when works have actually been used. From the entertainment industry's viewpoint this exact breakdown of uses would make collective royalties for copyrighted material superfluous in some areas. Furthermore, in the entertainment industry's opinion, DRM would offer artists and performers a certain degree of autonomy from producers and give them the possibility to sell their works at their own expense over their own websites. The net effect would be greater incentive to create works of art, literature and music. [7, p. 32]

Risks and issues in DRM: many artists and performers fear that the providers will profit from DRM systems while they themselves will earn nothing. Numerous artists could not even afford DRM systems and would be dependent on large, online portals, making it difficult or even impossible to collect royalties for their works and performances. [7, p. 35]

The technological measures which control access to many DRM services are particularly controversial among users and consumers. These groups suspect that such measures

* Copyright reform in Switzerland began in 2004 and was finished in 2007.

could be abused and ironically refer to DRM as ‘Digital Restriction Management.’ In addition to limited access to existing works, they fear multiple royalty collection, more expensive content and insufficient protection of the personal data collected by DRM.

Issue of levy in DRM: certain uses of copyrighted material cannot be directly and individually calculated, even today. Copies for private use are an example. Copying is legally allowed, but to compensate a levy is paid on the blank recording media. This remunerates authors for the reproduction of their works for private use. Today, large providers can directly calculate single uses with DRM. This raises the question whether such a levy is justified *when works are downloaded from the internet with a computer or cellular telephone because, in the end, the user is already paying the provider for downloading.*

Many authors, related rights holders, as well as the collecting societies want to keep the blank recording media levy, even in the case of paid downloading. In their view, the levy covers the copies the consumer makes from his own storage medium. The money an internet provider collects from the consumer is to pay for his license to make a copy and make this copy accessible on his server. Since these are two different acts, they argue, one cannot talk about double or even multiple royalties. The goal is for the rights holder to receive an appropriate amount for every use. Saving on a blank recording media is a ‘use’ whether it is made possible through an internet provider or some other means. Many consumer representatives and user groups think that paid downloads of music or film is like buying a CD or DVD in a store. They do not understand why they should have to pay a levy on the blank recording media in addition to paying for the digital purchase. With DRM, use of a work can be broken down and managed exactly. An additional collective royalty would not be justified for one and the same use in their view. [7, p. 36]

The copy machine levy: up until now royalties have been owed only for blank recording media (e.g., CD’s and DVD’s) and for photocopying in schools, libraries and businesses. The copy machine levy would mean that royalties would have to be paid for machines which can be used for reproduction, such as photocopiers, CD burners, or PC’s. Artists and performers would welcome implementation of a (combined) copy machine levy in the hopes of being adequately remunerated for the digital use of their works as well. They point out that the way the work is used would be considered in the calculation of the remuneration and multiple royalties would not be a danger. Producers of such equipment are against creating a copy machine levy because it would make the machines more expensive and would not be specific to the reason for the levy. Users and consumers are afraid of multiple royalty payments because remuneration would be compulsory for both blank recording media and the recording machines. In addition, they wouldn’t take the storage of personal, non-copyrighted content into consideration. [7, pp. 48-49]

The opportunities and risks involved in DRM need solid regulation, not only in terms of copyright but particularly in areas concerning data protection and fair competition. [7, p. 35]

5.3. New Digital Markets

The United Kingdom: the Hargreaves Review proposes that Government brings together rights holders and other business interests to create in the **UK** the world's first Digital Copyright Exchange (DCE) [5, p. 4] Among the **expected benefits** from the DCE were emphasized:

- it will make easier for rights owners, small and large, to sell licenses in their work and for others to buy them;
- it will make market transactions faster, more automated and cheaper;
- a UK market in digital copyright will be better informed;
- a UK market in digital copyright will more readily be capable of resolving disputes without costly litigation.

The Hargreaves Review also recommends establishing a cross sectoral Digital Copyright Exchange in the UK and support moves by the European Commission to establish a framework for cross border copyright licensing. [5, p. 37] An efficient and flexible cross-border licensing framework is essential to the creation of a single EU market for content that smaller firms can readily enter and succeed in.

A Digital Copyright Exchange has the potential to offer a more efficient market- place for owners and purchasers of rights, as well as opening up new markets to creators who may not have previously been able to access them.

In Response to the Hargreaves Review the Government of the United Kingdom has declared that it wants to see a Digital Copyright Exchange, or something like it, that enables a functioning digital market in rights clearance and acts as a source of information about rights ownership. The ownership information is clearly a prerequisite for the marketplace and would itself be a powerful tool against infringement (there would be no excuse for not checking *a single, publicly accessible register*) and a valuable first step in any diligent search for the owner of possible orphan works. [2, p. 5]

The Government will work to ensure that *Crown copyright materials* are available via the exchange from day one, or as soon as possible thereafter, and will encourage public bodies to do likewise. [2, p. 5]

The Digital Copyright Exchange should be build on the following principles:

- be a compelling proposition to rights holders but not compulsory;
- allow prices to be set or negotiated by the rights holder, subject to controls on unfair competition;

- be open to access by individuals and businesses, free at the point of use, to open standards that mean firms can readily write software to automate access and provide services that rely on information gathered or licenses purchased via the DCE, to facilitate the development of businesses in the emerging markets supported by the DCE;
- be run on a self funding basis, fees being charged on licensing transactions through the exchange rather than the upload of rights data or search of the database. [2, p. 5]

The global licensing trend was also supported by the **WIPO** Director General, Francis Gurry, who said: “I believe that an *international music registry* - a global repertoire database - would be a very valuable and needed step in the direction of establishing the infrastructure for global licensing.” [40]

Japan: media revitalization achieved through the integration of communications and broadcasting and collaboration between the two, the effective use of radio spectrum as a result of the completion of the transition to digital broadcasting, advances in radio technologies, and the development of distribution environments for programming will lead to the creation of the following new markets:

- Markets for the use and sharing via networks of intellectual property rights such as digital content and other intellectual information through the maximum use of digital technologies;
- Markets for personalized network services adapted to the needs of individual consumers through the accumulation and analysis of digital information. [29, p. 20]

The European Union: according to the “Proposals for a Directive of the European Parliament and of the Council on collective management of copyright and related rights and multi-territorial licensing of rights in musical works for online uses in the internal market” *Centralised Portal* could be created. It would allow collecting societies to pool their repertoire for multi - territory licensing in a single transaction, coordinated through a central portal. A commercial user could request a multi-repertoire multi - territory license from the portal. The participating collecting societies would, through the portal, designate a licensing society from amongst its participants, and the license would be concluded with that collecting society. The portal would set the costs of administering the license, allocate the back-office tasks (data processing) amongst participant collecting societies and ensure the distribution of royalties. Finally, the portal would require participating collecting societies to comply with agreed minimum standards of service and make available the requisite IT tools to those collecting societies requesting them. Participating societies would grant their rights to the portal on a non-exclusive basis.

Although this option relies on a voluntary form of cooperation, it would create a *pan-European organization with a de facto monopoly power*. This would exacerbate

competition restrictions, notably customer allocation (because the portal rather than a commercial user would choose the licensing society) and price fixing (as administration fees would be decided by the portal rather than different collecting societies). Under the Proposals the negative consequences of customer allocation and price restrictions could only be accepted under the EU competition rules if they are outweighed by the creation of significant efficiencies for consumers. [38, p. 46 – 47]

5.4. Copyright Flexibility

Copyright legislation should achieve an optimal balance between protecting the interests of authors and right holders in their works and securing the freedom to access, build upon and use these works. Rapid technological development makes future modes of exploitation and use of copyright works unpredictable and therefore requires a system of rights and limitations with some flexibility. [41, p. 7]

Regarding current limitations and exceptions **Netherlands** Prof. Dr. P. Bernt Hugenholtz mentioned in its report “Fair use in Europe. In search of flexibility” that limitations and exceptions rarely take into consideration current educational and scholarly practices, such as the use of copyright protected content in Powerpoint presentations, in ‘digital classrooms’, on university websites or in scholarly e-mail correspondence.

Moreover, whereas social media have in recent times become an essential means of social and cultural communication, current copyright law leaves little or no room for sharing ‘user-generated content’ that builds upon pre-existing works. [42, p. 10]

The United Kingdom: it’s mentioned in the Hargreaves Review that the UK policy should balance measurable economic objectives against social goals and potential benefits for rights holders against impacts on consumers and other interests. These concerns will be of particular importance in assessing future claims to extend rights or in determining desirable limits to rights. [5, p. 8]

Among the economic implications is the danger, which attends all legal uncertainty, of eroded incentives for consumers to purchase and for investors to invest, which is precisely, for example, in the UK music industry. Commercially it leaves rights holders with an unsatisfactory choice between having rights they cannot or do not enforce, or seeking to preserve legal entitlement to payment for acts of private use and reuse, which ordinary consumers regard as part of normal use. This alienates customers and puts the state in a position where it is invited to “choose sides” between rights holders and citizens. Effective enforcement of the law, in these circumstances, can become impossible. [5, p. 43]

Copyright law was never intended to be an instrument for regulating the development of consumer technology. But where it can block or permit developments or applications of technology that is precisely what it becomes. When this happens, copyright’s significant economic benefits as a mechanism to incentivise individual creativity need to be measured against their negative impact in impeding innovation elsewhere in the economy. Copyright holders have a long history of resisting the emergence of technologies which threaten their interests, including audio tape recorders and VHS recorders. When the first sound recording technologies emerged, some music rights holders opposed the recording of music. At that time, it was the recorded music industry who were seen as dangerous innovators. [5, p. 46]

There is a recent example of the detrimental effects of the UK’s failure to keep up with developments in consumer technology. *The Brennan J7 music player*, the brainchild of

Martin Brennan, a young British entrepreneur, enables consumers to store music from CDs which they have purchased on its hard disk, making them easily accessible for playing from one point. It is hard to see this product as an undesirable innovation, or to see it as requiring actions any different than those already done by millions of consumers with other digital music players. However the Advertising Standards Authority has ruled (understandably, given where the law stands) that advertisements for the Brennan should include a warning that using it involves copyright infringement. The UK cannot afford to place unnecessary obstacles in the way of innovation in consumer products.

Martin Brennan, J7 Music Player designer, noted:

“My company is possibly one of the best examples of the sort of SME that can help lead this country out of the recession – 10,000% growth in 30 months during the recession – but out of date legislation and red tape may sabotage my growth. It is no exaggeration to say that this matter has caused me more sleepless nights and wasted days than any other in my company’s history... Aside from legal headaches I face the cost of reassuring customers that record companies will not sue them. It’s daft because US companies Apple and Microsoft have been selling format shifting products in the UK for a decade.” [5, p. 49]

Current EU law confines copyright exceptions to a closed list of categories, such as criticism, news reporting, research, or archiving. Almost all are restricted to non-commercial uses. Individual EU countries may implement exceptions within these categories to a greater or lesser degree, but there is no flexibility to create exceptions in new areas. The UK does not currently exploit all the exceptions available. Previous attempts to modernise this framework in the UK have not succeeded. [5, p. 42]

Under the European approach to exceptions, new kinds of copying which have become possible due to advancing digital technology are automatically unlawful. They require agreement of rights holders if they fall outside the pre-established and closed list of categories for permissible exceptions. Even copying which falls within one of the permissible areas at EU level can still require new action by national legislatures to create or develop the exception to meet new needs. The risk in this situation is twofold:

- innovation may be blocked and growth hampered when unduly rigid applications of copyright law enables rights holders to block potentially important new technologies. As an example, can be mentioned the UK experience when the interests of rights owners have put them in conflict with developers of video recorders and web search engines. Research scientists, including medical researchers, are today being hampered from using computerised search and analysis techniques on data and text because copyright law can forbid or restrict such usage. As data farming becomes routine in systems across the economy, from the management of transport to the administration of public services, copyright issues become ever more important as potential obstacles. In these circumstances, *copyright in its current form represents a barrier to innovation and economic opportunity.*

- a second and also significant problem is a growing mismatch between what is allowed under copyright exceptions, and the reasonable expectations and behaviour of most people. *Digital technology has enabled use and reuse of material by private individuals in ways that they do not feel are wrong* – such as sharing music tracks with immediate family members or transferring a track from a CD to play in the car or to a laptop and MP3, sharing a family home movie on your Facebook page which makes incidental use of copyright material. It is difficult for anyone to understand why it is legal to lend a friend a book, but not a digital music file. The picture is confused by the way some online content is now sold with permissions to format shift (iTunes tracks) or to “lend” files (Amazon ebooks) at no extra cost. This puts the law into confusion and disrepute. [5, p. 43]

5.5. Copyright Exceptions and Limitations

Netherlands: maintaining a closed list of copyright exceptions is increasingly difficult in a world of rapid and unpredictable technological development, and hard to reconcile with a generally recognized need to create technologically neutral copyright norms. [42, p. 4]

Prof. Strowel has noted that *droit d'auteur* codifications have lost much of their flexibility in the course of the 20th Century, as copyright laws were updated ever more frequently to accommodate the needs of a changing society, so as to respond to technological development and to implement the dictates of European harmonization. Consequently, much of the original conciseness, elegance and openness of the laws following the *droit d'auteur* tradition has been lost.

A possibly more important reason why laws of the author's rights tradition are less tolerant of unauthorized but 'fair' uses, lies in the natural rights rationale that underpins the author's rights paradigm. If protecting author's rights is essentially a matter of fairness, limitations to this right must remain 'exceptions'. By contrast, the **US** copyright system that has its main justification in utilitarian considerations ('to promote the progress of science and useful arts'), more easily absorbs 'fair' uses that are in line with its main goal of optimizing the production and dissemination of creative works. [42, p. 7]

The fair use rule as it is applied by the lower federal courts actually provides considerably more legal security than is sometimes assumed, some commentators in the U.S. have argued for making U.S. copyright law more predictable by making the rule more precise, by adding more exceptions or by making the various policies underlying fair use more *transparent*. Hugenholtz research therefore does not recommend simply replacing the existing structure of circumscribed limitations and exceptions commonly found in the copyright law of the Member States by a single overriding open norm, such as fair use. [42, p. 9]

On the other hand, the advantage of legal security that is usually ascribed to the **European system** of precisely defined exceptions should not be overstated. In the first place, courts unhappy with the literal application of a precise norm in a given case will often find solace in overriding (and usually vague) norms external to the law of copyright. In the second place, the introduction into the fabric of EU law of the 'three-step test', and its literal implementation in several laws of the Member States, has considerably reduced legal security, since courts are now invited to examine and (re)interpret statutory exceptions in the light of this entirely open-ended norm. The permission to use a work without prior authorization given by the national law maker can ultimately be withdrawn by the court on the grounds that the use at issue supposedly conflicts with the three-step test of the Information Society Directive. As a result, the legal security that a structure of circumscribed limitations and exceptions might offer is severely undermined.

In conclusion, what copyright laws in Europe ideally need today is a statutory system of limitations and exceptions that guarantees both a level of legal security and fairness, by combining relatively precise norms with sufficient flexibility to allow a fair outcome in hard and/or unpredictable cases. An example of such a semi-open structure of limitations and exceptions can be found in the European Copyright Code that was drafted as a model law by a group of European scholars. [42, p. 9]

Switzerland: content is now accessible to users and consumers anywhere in the world, and it can be copied and saved. Instead of going to a store to buy music recordings, films, books, or software, they can acquire them online. And this content can be copied and further circulated over the internet without any loss of quality. [7, pp.7-8]

With new technologies consumers also have the resources to do the impermissible. The consequence for those involved in the production of culture is empty pockets and a diminished incentive to create cultural contents. In response to these changed consumer behavior patterns, the entertainment industry is protecting commercial cultural goods with technological measures such as copy barriers on CD's and DVD's and by fighting unlicensed file-sharing on the internet. Such industry position leads to the fact that consumers and users fear that access to existing works as well as the use and further development of technologies for disseminating information could be restricted. Consumers, educational institutions and industry were all demanding that the limits of copyrights be more clearly defined for the digital age. [7, p. 8]

The European Union: the Member States of the European Union are free to make an individual choice from the optional exceptions, specified in the Information Society Directive. These optional exceptions relate to diverse purposes, including private copying; use of copyrighted material by libraries, museums and archives; ephemeral recordings; reproductions of broadcasts made by hospitals and prisons; illustrations for teaching; use for scientific research; use for the benefit of people with a disability; press privileges; use for the purpose of quotations, caricature, parody and pastiche; use for the purposes of public security and for the proper performance or reporting of administrative, parliamentary or judicial proceedings; use of political speeches and public lectures; use during religious or official celebrations; use of architectural works located permanently in public places; incidental inclusions of a work in other material; use for the purpose of advertising the public exhibition or sale of artistic works; use in connection with the demonstration or repair of equipment; use for the reconstruction of buildings; and additional cases of use having minor importance.

The mandatory and optional exceptions and limitations recognized in the Information Society Directive shall only be applied in accordance with the three-step test. [42, p. 13]

Impact of the Three-Step Test: in line with the Information Society Directive [43], the exceptions and limitations:

“shall only be applied in certain special cases which do not conflict with a normal exploitation of the work or other subject-matter and do not unreasonably prejudice the legitimate interests of the rightholder.”

The three-step test can be understood to require an additional scrutiny of exceptions and limitations that are narrowly defined at the national level anyway. The inclusion of the criterion of ‘certain special cases’ may even be understood to impose an obligation on national legislators to further specify the exception prototypes in the Information Society Directive in the sense of an obligation to only implement certain special cases of the EU prototypes at the national level. The three-step test can be also considered as a counterbalance placing additional constraints on the catalogue of exceptions and limitations. [42, p. 20]

It worth to note that the first three-step test in international copyright law was based on a drafting proposal tabled by the UK delegation at the 1967 Stockholm Conference for the Revision of the Berne Convention. The three-step test was perceived as a flexible framework at the Stockholm Conference, within which national legislators would enjoy the freedom of safeguarding national limitations and satisfying domestic social, cultural and economic needs. [42, pp. 20-21]

The reappearance of the three-step test in Article 10 WIPO Copyright Treaty [44] is even more important than the outlined initial understanding of the provision. The reference to international obligations in Recital 44 of the Information Society Directive particularly addresses the three-step test in Article 10 WIPO Copyright Treaty. It is understood that the provisions of Article 10 permit contracting parties to carry forward and appropriately extent into the digital environment limitations and exceptions in their national laws which have been considered acceptable under the Berne Convention. Similarly, these provisions should be understood to permit contracting parties to devise new exceptions and limitations that are appropriate in the digital network environment. The Article 10(2) WIPO Copyright Treaty neither reduces nor extends the scope of applicability of the limitations and exceptions permitted by the Berne Convention”. [42, p. 20-21]

The three-step test of Article 10 WIPO Copyright Treaty is intended not only as a restrictive control mechanism but also as a guideline for the extension of existing limitations and exceptions, and the introduction of new exemptions in the digital environment. The preamble of the WIPO Copyright Treaty confirms this analysis. It stresses the necessity:

“to maintain a balance between the rights of authors and the larger public interest, particularly education, research and access to information, as reflected in the Berne Convention”.

When considering the implementation of a national free adaptation rule, the EU three-step test, specified in the Information Society Directive does not apply. For example, as the right of adaptation falls outside the scope of the Information Society Directive, national legislators are not bound by the EU three-step test. It is to be considered, however, that the international three-step tests of Article 13 TRIPS [45] and Article 10(2) WIPO Copyright Treaty may become relevant in this context. [42, p. 28]

The free adaptation rule in **Germany** and the new work exemption in the **Netherlands** – define the scope and reach of the right of adaptation rather than limiting the exclusive right. In other words, these principles may be seen as part of the definition of the right of adaptation. In this line of reasoning the exemption of free adaptations or new works does not constitute a limitation or exception in the sense of the international three-step tests of Article 13TRIPS and Article 10(2) WIPO Copyright Treaty.

If, on the other hand, these international three-step tests are deemed applicable to national rules, such as the free adaptation principle in Germany, it is to be considered that the international three - step tests are flexible balancing tools that seek to offer sufficient breathing space for national lawmakers to satisfy domestic social, cultural and economic needs. Hence, the international three-step tests are unlikely to impose substantial constraints on national lawmakers. [42, p. 28]

Application of exceptions and limitations in national law: many exceptions listed in the Information Society Directive [43] constitute prototypes for national law making rather than precisely circumscribed exceptions with no inherent flexibility:

- Reproductions for non-commercial private use ‘on any medium’. The provision does not specify whether a legal source must be used for these privileged acts of private copying;
- Reproductions made by publicly accessible non - profit libraries, educational establishments or museums, or by archives.;
- Use for non-commercial scientific research and illustrations for teaching as long as the source is indicated. The organizational structure and the means of funding of the privileged institution do not preclude the application of the exception. The non-commercial nature of the educational or research activity in question is decisive;
- Use by the press of published articles on current economic, political or religious topics, use for the reporting of current events, and use of political speeches, extracts of public lectures and similar material. Use of this type must be justified by the underlying informatory purpose and, unless impossible, requires the indication of the author’s name. In the case of articles of current topics, copyright may expressly be reserved;
- Quotations from material already lawfully made available to the public, for purposes such as criticism or review. The taking of material must be justified by the underlying purpose. In addition, the use must comply with fair practice. The author’s name must be indicated;
- Use for the purpose of caricature, parody or pastiche without defining these purposes any further;

- The incidental inclusion of protected material in other material without specifying the nature of the inclusion in question.

The scope of a national exception based on a prototype listed above may differ from country to country. While certain EU Member States availed themselves of the flexibility inherent in rather general definitions of permissible limitations in the Information Society Directive, others decided to implement a less flexible variant of a given prototype. [42, p.14]

According to the recommendations made by **Professor Hugenholtz** a Member State desiring to take full advantage of all policy space available under the Information Society Directive, and thus maximize flexibilities available at the EU level, might achieve this by literal transposition of the Directive's entire catalogue of exception prototypes into national law. In combination with the three-step test, this would effectively lead to a semi-open norm almost as flexible as the fair use rule of the United States. For less ambitious Member States seeking to enhance flexibility while keeping its existing structure of limitations and exceptions largely intact, it's recommended exploring the policy space left by distinct exception prototypes. [42, p. 29]

The European Copyright Code: is the result of the Wittem Project that was established in 2002 as a collaboration between copyright scholars across the European Union concerned with the future development of European copyright law. The aim of the Wittem Project and the European Copyright Code is to promote transparency and consistency in European copyright law. The Wittem Group believes that a European Copyright Code drafted by legal scholars might serve as a model or reference tool for future harmonization or unification of copyright at the European level.

Limitations in the European Copyright Code have been brought together under several categories. The categories do not however prejudice as to the question, what interests do, or should, in a particular case or even in general, underlie the limitation. In practice, this might be a mixture of several of the interests indicated. The weakness in a particular case of the interest under which the applicable limitation has been categorized does not prejudice as to the (non-) applicability of the limitation.

The European Copyright Code reflects a combination of a common law style open-ended system of limitations and a civil law style exhaustive enumeration. On the one hand, the extension to similar uses provides the system with a flexibility which is indispensable in view of the fact that it is impossible to foresee all the situations in which a limitation could be justified. On the other hand, the possibility of flexibility is narrowed down in two ways. Firstly, the extension applies to uses 'similar' to the ones expressly enumerated. Thus, a certain normative effect is bestowed on these examples; the courts can only permit uses not expressly enumerated insofar as a certain analogy can be established with uses that are mentioned by the Code. Secondly, such similar uses may not conflict with the normal exploitation of the work and not unreasonably prejudice the legitimate interests of the author or rightholder, taking account of the legitimate interests of third parties. [41, p. 19]

In cases where the use of copyright protected works is controlled by technical measures, the rightholder shall have an obligation to make available means of benefiting from the uses mentioned in the Code (articles 5.1 through 5.5) on condition that:

- the beneficiary of the limitation has lawful access to the protected work;
- the use of the work is not possible to the extent necessary to benefit from the limitation concerned;
- the rightholder is not prevented from adopting adequate measures regarding the number of reproductions that can be made. [41, p. 23]

The following uses with minimal economic significance are permitted without authorisation, and without remuneration: [41, p. 19 – 20]

- the making of a back-up copy of a work by a person having a right to use it and insofar as it is necessary for that use;
- the incidental inclusion of a work in other material;
- use in connection with the demonstration or repair of equipment, or the reconstruction of an original or a copy of a work.

It's worth to mention that according to the Article 5.3 of the European Copyright Code reproduction by a natural person for private use is permitted if the source from which the reproduction is made is not an obviously infringing copy.

Limitations in the European Copyright Code covers uses for the purpose of freedom of expression and information (with or without remuneration), uses permitted to promote social, political and cultural objectives, uses for the purpose of enhancing competition (with or without remuneration), for the purpose of reporting of administrative, parliamentary or judicial proceedings. Any other use if it is comparable to the mentioned uses is permitted provided that the corresponding requirements of the relevant limitation are met and the use does not conflict with the normal exploitation of the work and does not unreasonably prejudice the legitimate interests of the author or rightholder, taking account of the legitimate interests of third parties. [41, p. 21]

The United Kingdom: the Hargreaves Review is considered whether the more comprehensive American approach to copyright exceptions, based upon the so called Fair Use defense, would be beneficial in the UK. And it was concluded that importing Fair Use wholesale was unlikely to be legally feasible in Europe and that the UK could achieve many of its benefits by taking up copyright exceptions already permitted under EU law and arguing for an additional exception, designed to enable EU copyright law to accommodate future technological change where it does not threaten copyright owners. [5, p. 5]

The economic benefits imputed to the availability of Fair Use in the US have sometimes been overstated. Fair Use is (from the viewpoint of high technology companies and their investors) just one aspect of the distinctiveness of the American legal framework on copyright, albeit in the view of most an important part. The “safe harbour” provisions of the *Digital Millennium Copyright Act* [46] are usually mentioned as another part of the legal context which encourages risk taking and innovation by protecting platform providers from legal responsibility for content carried on their networks. For example, Google argues that Fair Use was vital to the successful emergence of the indexing and search technology which has turned it into one of the most valuable and dynamic companies in the world. Facebook likewise believes that a global business based upon user generated content required a flexible legal view of copyright to enable it to emerge with its highly successful business model. [5, p. 45]

The Hargreaves Review also favours *a limited private copying exception which corresponds to what consumers are already doing*. As rights holders are well aware of consumers’ behaviour in this respect, the benefit of being able to do this is already factored into the price that rights holders are charging. A limited private copying exception which corresponds to the expectations of buyers and sellers of copyright content, and is therefore already priced into the purchase, will by definition not entail a loss for right holders. **Rights holders will be free to pursue whatever compensation the market will provide by taking account of consumers’ freedom to act in this way and by setting prices accordingly.** [5, p. 49]

According to the *Recommendation* made by the science group in the Hargreaves Review the UK Government should firmly resist over-regulation of activities which do not prejudice the central objective of copyright, namely the provision of incentives to creators. Government should deliver copyright exceptions at national level to realise all the opportunities within the EU framework. The UK should give a lead at EU level to develop a further copyright exception designed to build into the EU framework adaptability to new technologies. This would be designed to allow uses enabled by technology of works in ways which do not directly trade on the underlying creative and expressive purpose of the work. The Government should also legislate to ensure that these and other copyright exceptions are protected from override by contract. [5, p. 52]

In Response to the Review *the UK Government shared the Review’s concern* that a widespread flouting of copyright through private copying in particular brings the law into disrepute: it is not appropriate simply to tolerate unlawful private copying where it is not commercially damaging. The Government agreed with the Review’s central thesis that *the widest possible exceptions to copyright within the existing EU framework are likely to be beneficial to the UK, subject to three important factors:*

- The amount of harm to rights holders that would result in “fair compensation” under EU law is minimal, and hence the amount of fair compensation provided would be zero. This avoids market distortion and the need for a copyright levy

system, which the Government opposes on the basis that it is likely to have adverse impacts on growth and inconsistent with its wider policy on tax;

- Adherence with EU law and international treaties;
- That unnecessary restrictions removed by copyright exceptions are not re-imposed by other means, such as contractual terms, in such a way as to undermine the benefits of the exception. [2, p. 7-8]

Having accepted the general case for broader copyright exceptions within the existing EU framework, the UK will be in a stronger position to argue that other flexibilities are needed now and in the future. [2, p. 8]

Canada: the Copyright Modernization Act, Bill C-11 [47] was adopted by the Parliament of Canada and on June 29, 2012, had received royal assent. The Act has incorporated a number of copyright exceptions and limitations regarding the usage of the copyright works on the Internet. For example, it is not an infringement of copyright for *an educational institution*, or a person acting under the authority of one, to do any of the following acts for educational or training purposes in respect of a work or other subject-matter that is available through the Internet:

- (a) reproduce it;
- (b) communicate it to the public by telecommunication, if that public primarily consists of students of the educational institution or other persons acting under its authority;
- (c) perform it in public, if that public primarily consists of students of the educational institution or other persons acting under its authority; or
- (d) do any other act that is necessary for the purpose of the acts referred to in paragraphs (a) to (c). (Paragraph 30.04)

The above – mentioned does not apply if the work or other subject-matter — or the Internet site where it is posted — is protected by a technological protection measure that restricts access to the work or other subject-matter or to the Internet site, as well as if the educational institution or person acting under its authority knows or should have known that the work or other subject-matter was made available through the Internet without the consent of the copyright owner.

A library, archive or museum, or a person acting under the authority of one, may provide a copy in digital form to a person who has requested it through another library, archive or museum if the providing library, archive or museum or person takes measures to prevent the person who has requested it from:

- making any reproduction of the digital copy, including any paper copies, other than printing one copy of it;
- communicating the digital copy to any other person;
- using the digital copy for more than five business days from the day on which the person first uses it.

It is not an infringement of copyright for *an archive* to make, for any person requesting to use the copy for research or private study, a copy of an unpublished work that is deposited in the archive and provide the person with it if:

- the person who deposited the work, if a copyright owner, did not, at the time the work was deposited, prohibit its copying;
- copying has not been prohibited by any other owner of copyright in the work.

Exceptions and limitations regarding temporary reproductions for technological processes may have a certain positive influence for regulation Internet *caching* services. According to the Paragraph 30.71 of the Copyright Modernization Act it is not an infringement of copyright to make a reproduction of a work or other subject-matter if:

- the reproduction forms an essential part of a technological process;
- the reproduction's only purpose is to facilitate a use that is not an infringement of copyright;
- the reproduction exists only for the duration of the technological process.

A person who caches the work or other subject-matter, or does any similar act in relation to it, to make the telecommunication more efficient does not, by virtue of that act alone, infringe copyright in the work or other subject-matter. The respective provision does not apply unless the person, in respect of the work or other subject-matter:

- does not modify it, other than for technical reasons;
- ensures that any directions related to its caching or the doing of any similar act, as the case may be, that are established by whoever made it available for telecommunication through the Internet or another digital network, and that lend themselves to automated reading and execution, are read and executed;
- does not interfere with the lawful use of technology to obtain data on its use.

Hosting: a person who, for the purpose of allowing the telecommunication of a work or other subject-matter through the Internet or another digital network, provides digital memory in which another person stores the work or other subject-matter does not, by

virtue of that act alone, infringe copyright in the work or other subject-matter. The mentioned provisions do not apply in respect of a work or other subject-matter if:

- the person providing the digital memory knows of a decision of a court of competent jurisdiction to the effect that the person who has stored the work or other subject-matter in the digital memory infringes copyright by making the copy of the work or other subject-matter that is stored or by the way in which he or she uses the work or other subject-matter.

Australia: in recognition of the key role that internet service providers (ISPs) play in providing access to the internet, Australia's copyright law provides a so-called '*safe harbour scheme*' that limits the liability of some online service providers for copyright infringements that occur in the course of carrying out certain activities.

The scheme applies to four categories of online activities. Broadly, these online activities include providing facilities or services for transmitting, caching, or storing at the direction of the user, and referring users to an online location using hyperlinks.

The issue is that it is unclear whether the present scheme works effectively for some types of online service providers that have subsequently grown in popularity as new platforms for social engagement, content distribution and political communications since the scheme's introduction. Uncertainty about whether newer digital economy platforms are covered by the safe harbour may interfere with the ability providers of these platforms to effectively develop business models in Australia. Examples of some of the types of platforms that may not be carriage service providers and, consequently, may not come within the present scheme include social networking and user-generated content sites. [1, pp. 20-21]

The query is whether an examination of the scope of Australia's safe harbour scheme would be beneficial, in particular whether its scope, consistent with international obligations under the AUSFTA, should be expanded to encompass a larger range of online services that are important to the digital economy. The Australian Government received slightly more submissions in favour of an expansion of the present scheme. *Of those who favoured expansion, reasons given included that the expansion would:*

- remove a barrier to the next Flickr/Facebook/YouTube being developed in Australia (proponents noted that these sites had all developed in the US which enjoys a more expansive scheme);
- provide greater certainty to digital economy platforms and attract their investment into Australia;
- increase the global competitiveness of Australia's online businesses;
- position Australia on par with leading trading partners in the Asia-Pacific region, thereby maintaining the attractiveness of Australia as a regional hub;

- promote innovative and collaborative uses of technology that fulfil user demands and help Australia realise its potential to become a global centre for innovation.

Of those who opposed the expansion, the reasons given included that:

- the existing scheme had failed to encourage ISPs to cooperate with copyright owners and, consequently, it was not appropriate to broaden them;
- digital economy platforms should be developed through licensing arrangements instead of safe harbours;
- expansion would not harmonise Australia's law with the US but would secure a windfall benefit without imposing the corresponding obligations on service providers to disclose details of alleged infringers;
- there is a lack of evidence that the existing scheme discourages the proliferation of localised versions of these digital economy platforms in Australia;

The Australian Government has declared to consider whether the scope of the safe harbour scheme should be expanded to include additional types of online service providers. [1, p. 20-21]

Flexibility is needed both in legislation and in **court practice**. While most courts will shy away from directly overriding the rules of copyright, interpreting rights and limitations 'in conformity' with fundamental freedoms may lead to additional flexibilities. [42, p. 11]

Berthold Brecht plays, Germany: the Federal Constitutional Court of Germany decision concerned a play that contained extensive quotations, for a total of four pages, from a pair of Berthold Brecht plays. The quotations did not meet the stringent test of the statutory quotation right. The Court, however, held that in light of the freedom of artistic expression embedded in Article 5(3) of the Constitution, the quotation right deserves broad application with respect to artistic works. Copyright exemptions should be interpreted accordingly, and reflect a balancing of relevant interests. In this case the Court considered, the commercial interests of the copyright owner should give way to the user's interest in providing artistic commentary. [42, p.11]

Google Bildersuche, Germany: the decision of the German Federal Supreme Court in the Google thumbnails ('Bildersuche') case provides yet another illustration of the way courts constricted by the closed system of limitations and exceptions look for flexibilities outside copyright law. Recognizing that the right of quotation in German copyright law does not allow the reproduction and making available to the public of copyright protected pictures in 'thumbnail' form by the Google Image Search engine, the German Court found comfort for defendant, Google, by application of a doctrine of implied consent. The Court held that Google's use of the pictures was not unlawful

because the copyright owner had consented implicitly to use of her material in the image search service by making her works available online without employing technical means to block the automatic indexing and displaying of online content by search engines. [42, p.12]

At the same time the German Federal Court of Justice concluded that the unauthorized use of picture thumbnails for search engine purposes did not fall under the right of quotation in § 51 of the German Copyright Act and thus the maintenance of the traditional context requirement prevents the German courts from the more extensive reading of the quotation right. In this context, the Court stated that:

“neither the technical developments concerning the dissemination of information on the Internet nor the interests of the parties which the exception seeks to protect justify an extensive interpretation of § 51 of the German Copyright Act that goes beyond the purpose of making quotations. Neither the freedom of information of other Internet users, nor the freedom of communication or the freedom of trade of search engine providers, require such an extensive interpretation.” [42, p.16]

NVM estate agents v ZAH, Netherlands: estate agents which are members of the Dutch Association of Estate Agents provide information on their own websites regarding houses sold through them. The supply of houses of all NVM-estate agents has been brought together on the website www.funda.nl. ZAH is a search engine that daily browses through almost all websites for houses that have been put up for sale. Search results are made available on its websites (www.zoekallehuizen.nl and www.zah.nl). The information that ZAH places on its websites is obtained by means of a deep link to the website featuring the house for sale. ZAH did not request permission from NVM estate agents for doing so. [48, pp. 22-23]

The Court of Appeals Arnhem concluded that the broadened quotation right covered information made available by the search engine. In the Court’s view, the search results announced the contents of underlying source databases. It is thus important to note that the Netherlands implementation strategy seems to bring picture thumbnails under the umbrella of the right of quotation. [42, p. 16]

Mulholland Drive, France: the case was brought by a purchaser of a DVD of David Lynch’s film Mulholland Drive who sought to transfer the film into VHS format in order to watch it at his mother’s house. Technical protection measures applied by the film producers prevented the making of the VHS copy. In this regard, the French Supreme Court held that the relevant Articles L. 122-5 and L. 211-3 of the French Intellectual Property Code had to be interpreted in the light of the three-step test. The exception for private copying could not be invoked against the application of technical protection measures when the intended act of copying would conflict with a normal exploitation of the work concerned.

Examining the private copying exception in the light of this criterion of the three-step test, the French Supreme Court rejected the previous decision taken by the Paris

Court of Appeals. The latter Court had ruled that the intended private copy did not encroach upon the film's normal DVD exploitation. The French Supreme Court reversed this holding for two reasons. On the one hand, it asserted that a conflict with a normal exploitation had to be determined against the background of the enhanced risk of piracy inherent in the digital environment. On the other hand, the Court underlined that the exploitation of cinematographic works on DVD was important for recouping the investment in film productions. The result of this way of applying the test is the erosion of the French private copying exception in the digital environment. [42, p. 19-20]

Saif v. Google France, France: regarding picture thumbnails the Paris Court of Appeals noted that the owners of copyright in the images at issue had failed to notify Google of the URL's of the works that they wished to remove from the search engine's index and thus found refuge for Google in the application by analogy of the safe harbour available under French law (in conformity with the EU E-Commerce Directive) to passive internet service providers. [42, p. 12]

The Court of Justice EU, as many national courts in EU Member States, formally adheres to the dogma of a strict interpretation of limitations and exceptions. The adoption of this general principle, however, need not necessarily prevent the Court from arriving at a balanced solution in an individual case. Hence, the dogma of strict interpretation itself may be applied rather flexibly by the Court. [42, p. 25]

5.6. Enforcement of IP Rights

It's mentioned in the Hargreaves Review that we should be wary of expecting tougher enforcement alone to solve the problem of copyright infringement. Instead, Government should respond in four ways: by modernising copyright law; through education; through enforcement and by doing all it can to encourage open and competitive markets in licensed digital content, which will result in more legitimate digital content at prices which appeal to consumers. [5, p. 6]

The United Kingdom: digital technology has made enforcement significantly more difficult because of the ease with which electronic copies can be made and the perceived anonymity of the online world. Copying and distribution costs have fallen to zero, and many consumers of online products, most notably music, cannot see why they should continue to pay prices based upon those which prevailed in the era of the compact disc. Most also cannot understand, or do not accept, that they are doing anything wrong by transferring a music file from a CD they have bought to an MP3 player, iPod or other device. A survey published by Consumer Focus in February 2010 found that 73 per cent of consumers do not know what they are allowed to copy or record. A Harris Interactive Poll for the BPI in 2010 found that 44 per cent of all peer-to-peer (P2P) users stated that they believed their actions to be lawful. The Strategic Advisory Board for Intellectual Property Policy (SABIP) concluded that: "There is also substantial evidence that many individuals do not perceive software piracy to be an ethical problem at all.

It is not surprising that consumers are confused. In a world where it is possible to listen to music free on the radio; free or by subscription through a computer or smartphone from a streaming service; or by continuing to put a purchased or borrowed CD in a player, the concept of "ownership" and "purchase" has itself been redefined. Online music providers (and other publishers) operate *a variety of business models including:* free downloads supported by advertising; free downloads for light users, with premium charges for heavier or advanced use (the so called "freemium" model) and various subscription services, including storage services where consumers can keep "their" libraries. For the browsing consumer, it is not always obvious whether a music service is providing copyright material illegally - unless the supplier chooses to put the skull and crossbones on its mainsail, like Pirate Bay, the Swedish download service established in 2003, which today claims five million users, in spite of the fact that its founders received jail sentences in 2009. [5, p. 68]

Measurement of any area of unlawful activity presents *statistical challenges:* these are not new problems in the world of criminology, where policy analysts are used to drawing different lessons from surveys of victims of crime, general social surveys about crime and police recorded levels of crime. However, for online copyright infringement, there are further complications:

- the offence leaves no physical trace;

- surveys question respondents who have an imperfect understanding of what is within the law in the first place and may be motivated either to deny taking part in unlawful activity or to exaggerate doing so;
- free downloads are not necessarily illegal and paid for downloads are not necessarily legitimate;
- what is legal in one country may not be in another and the internet allows businesses and consumers to trade across boundaries;
- not all P2P file sharing is illegal and not all illegal activity is conducted via P2P;
- studies that have attempted to measure piracy by measuring internet traffic are problematic because other factors affect traffic levels including changes in volumes of spam and increases in broadband speed, which permit much greater volumes of activity, and especially higher density video files.

An indication of the range of estimates for the extent of music piracy in the UK can be seen by comparing a claim made in the BPI's Digital Music Nation report in 2010 that 65 per cent of music downloads are illegal to MidemNet's 2010 Global Music Study figure of 13 per cent for the UK. Results divergence on this scale tends to confirm the impression of unstable research conditions. [5, p. 69] The uncertain and disputed nature of the prevalence data makes it difficult to reach confident conclusions about the impact of copyright piracy on growth. This assessment is complicated further by a number of other relevant points:

- not all illegal downloads are lost sales – the user may not have paid a higher price for a legal copy absent cheap or free illegal versions;
- money not spent on legal copies is not lost to the economy – it may be spent on other purchases. This is of no comfort to the sector suffering losses, but the effects across the economy will not necessarily be problematic;
- even within the industry affected, purchases prompted by experience from an illegal copy (for example, concert tickets or other merchandise) can offset losses;
- in business software, piracy has promoted the lock-in effect for the legal provider's software and helped to make that software the global standard. As Microsoft executive Jeff Raikes observed: "In the long run the fundamental asset is the installed base of people who are using our products. What you hope to do over time is convert them to licensing the software" (2007). [5, p. 73]

The American SSRC study, involving quantitative and qualitative research, found a consistent set of attitudes on piracy:

- piracy is often regarded with ambivalence by consumers;

- pragmatic issues of price and availability usually override moral considerations;
- consumers know what they are buying (though this is in relation to physical DVDs/CDs bought from street vendors not online piracy).

By looking at the various levels of piracy in different countries, they concluded that *educating* students or other consumers about piracy made no discernible difference to their behaviour. They noted the very large numbers of educational campaigns but observed that piracy levels, particularly in emerging economies, appeared to remain high and that consumer attitudes remained ambivalent to piracy. However, the US Social Science Research Council also draw attention to the absence of benchmarking and quality evaluation of education campaigns, despite their profusion. BASCAP identified 333 such campaigns in developed countries alone over 10 years. They examined 202 campaigns but there appeared to be no evaluation of their success or the lessons learned from any of them. [5, p. 79]

The impact on the incentives to create works: some of the responses to the Call for Evidence reported some indications of weakened of incentives to invest in creation.

The BPI estimates that British record companies invest around £370m in artists and repertoire (A&R) and marketing and promotion every year - approximately 10% of the global total. A significant decline in sales has a very profound effect on new talent development – in other words, it is reducing record companies’ ability to fund new artists and invest in careers. The BPI collects data on A&R investment and has found that spend has fallen in each of the past three years for which data is available; from more than £250m in 2006 to £201m in 2009 - a decline of 20% over four years. The greatest barrier to growth in the creative industries is copyright infringement on the Internet deterring investment in new content. [5, p. 75]

Approaches to tackling digital piracy: many rights holders have called for stronger enforcement and other measures to secure compliance with rights. The Alliance Against IP Theft suggested a number of changes which can be categorised into calls for:

- implementing the Digital Economy Act in full, including its substantial measures to combat online infringement;
- a levelling up of penalties, such as increasing the maximum penalty for digital copyright infringement to match that available for physical copyright infringement;
- increasing the use and level of damages to act as a deterrent;
- increasing financial incentives for investigators and prosecutors (for example, by raising the allocated percentage of Proceeds Of Crime Awards);

- taking forward educational awareness measures;
- working with ISPs as gatekeepers to the internet to ensure legitimate businesses do not suffer at the hands of illegal services;
- coordinating action across relevant Government departments and agencies responsible for enforcement;
- establishing a dedicated online crime unit with investigatory and operational powers. [5, p. 76]

The current UK law already allows courts to award greater damages than merely the cost of the unpaid license. It states that the court may have regard to all the circumstances and, in particular, to any benefit accruing to the defendant in awarding additional damages.

Educational notifications should be sent to consumers who may not know that they are infringing or may not know that their internet connection is being used by others to infringe. The letters will point out that the infringement appears to have occurred but will also direct the consumer towards sites with legal content and advice on how they can stop others from using their connection to infringe. [5, p. 76]

Although online infringement of copyright and the measures used to combat it are well established phenomena, there is relatively little research evaluating *the impact* of specific approaches. A recent exception is a study by the US Social Science Research Council which reviews available evidence on what works and what does not in relation to addressing what they term “media piracy” (the term covers the making of both physical and non-physical copies).

The US Social Science Research Council report argues that investment to date in stronger enforcement has not significantly reduced piracy. For example, it suggests that since the era of the free and illegal file sharing operation of Napster in 1999, when P2P sharing first took off, rights holders have brought legal actions against many P2P sites and have generally succeeded in shutting them down. But this is a short term effect. Looking at the approximately 27,000 Recording Industry of America Association (RIAA) legal cases brought against P2P users between 2003 and 2008, a Pew Internet and American Life Project survey showed a 50 per cent drop in the percentage of users acknowledging use of P2P services, from 29 per cent to 14 per cent. However, by 2005 this number had reverted to 24 per cent. [5, p. 77]

Where enforcement and education alone have so far struggled to make an impact on levels of copyright infringement, there has been more evidence of success where *creative businesses have responded to illegal services* by making available lower priced legal products in a form consumers want. Where a legal offering is readily available at the right price, incentives to circumvent enforcement measures, such as site blocking, are reduced. [5, p. 79]

At the same time some rights holders have said that they “cannot compete with free” and US Social Science Research Council report indicates that competing with free will be an ongoing feature of the digital business challenge. Moreover digital markets are global markets and even if intensified enforcement were significantly to change behaviour in the UK that change would probably not be mirrored elsewhere, particularly in the growing markets of India and China or in difficult jurisdictions like Russia, a point made in the SSRC study.

This is not a counsel of despair but a recognition that *what rights holders face is a particular form of a challenge shared by many businesses*, namely how to construct a distinctive product offering that consumers are willing to pay for. There is research suggesting a willingness to pay significantly more than zero for a CD, albeit not the current full market price, even when illegal copies of the same thing were available for no charge. Brindley and Walker (2009) conducted a survey in the UK of teenagers that showed increased use of licensed streaming services is displacing file sharing as a way of accessing music. This means that it is *all the more important that licensing is made as simple as possible so that new offerings can come to market as soon as possible*. [5, p. 80]

A combination of enforcement, education and a big push to expand the legitimate market for digital content, through services which attract consumers of all ages and backgrounds is essential. It will be important to ensure that enforcement measures are not designed or implemented in a way that alienates consumers and undermines work in education and extending the appeal of legitimate markets. Emphasising enforcement as an alternative to improved digital licensing and modernised copyright law is the wrong approach. Action is needed on all fronts. [5, p. 81]

WIPO concluded regarding the enforcement measures that it is optimal for governments to devote a level of public spending on law enforcement, such that the marginal benefit of fighting IPR violations equals the marginal cost of enforcement activity. The marginal benefit includes the welfare effects and the marginal cost includes the opportunity cost of not using scarce fiscal resources to provide other public goods. Public spending on law enforcement will affect the probability of apprehension and the penalties faced by suppliers, distributors and (knowing) consumers of IPR infringing goods, leading to adjustments in the market for offenses until equilibrium is reached.

In terms of enforcement against online copyright infringement and related educational initiatives it is essential that enforcement and educational initiatives are carefully tracked and their impacts correctly understood. If this is not done, resource will be wasted and further harm may be done to the interests of everyone concerned. [5, p. 81]

According to the *recommendations* made in the Hargreaves Review the UK Government should pursue an integrated approach based upon enforcement, education and, crucially, measures to strengthen and grow legitimate markets in copyright and other IP protected fields. The impact of the enforcement regime set out in the Digital Economy Act should be carefully monitored and compared with experience in other countries, in order to

provide the insight needed to adjust enforcement mechanisms as market conditions evolve. In order to support rights holders in enforcing their rights the Government should introduce a small claims track for low monetary value IP claims in the Patents County Court. [5, p. 85]

In the Government Response to the Hargreaves Review the Government accepted the spirit of the Review's argument that a combination of education, effective markets, appropriate enforcement and modern laws is likely to be most effective in preserving the value of IPRs for their owners, subject to the test of evidence about what is actually effective.

The UK Government also accepted the Review's emphasis on stronger market offerings as an implied criticism of what is currently available to consumers. The Government noted that this is something of a chicken-and-egg situation where rights holders want to see stronger enforcement regimes in place before investing in new services but by delaying their investment are creating a gap in legitimate provision which is being filled unlawfully. [2, p. 10]

In order to minimise the risk of the system being disrupted by vexatious or non bona fide appeals, the UK Government introduced a £20 fee for subscribers to appeal. The fee will be refunded if the appeal is successful.

The Government will, subject to establishing the value for money case, introduce a small claims track in the Patents County Court for cases with £5000 or less at issue, initially at a low level of resource to gauge demand, making greater provision if it is needed.

Site blocking will not be brought forward at this time. However, the Government will explore the issues of other measures that can be pursued to tackle online copyright infringement. [2, p. 12]

Government and public sector enforcement bodies will work with industry, with a particular focus on supporting efforts to develop new legitimate digital markets, tackling organised IP crime and enhancing the availability of high-quality evidence. In pursuit of good data to inform enforcement of copyright online, the Government agreed that it would be desirable to begin establishing benchmarks and data on trends in online infringement of copyright as soon as possible. [2, p. 10]

Canada: under the Section 18 of the Copyright Modernization Act of Canada [47], adopted on June 29, 2012, it is an infringement of copyright for a person to provide, by means of the Internet or another digital network, a service that the person knows or should have known is designed primarily to enable acts of copyright infringement if an actual infringement of copyright occurs by means of the Internet or another digital network as a result of the use of that service. In determining whether a person has infringed copyright, the court may consider:

- whether the person expressly or implicitly marketed or promoted the service as one that could be used to enable acts of copyright infringement;
- whether the person had knowledge that the service was used to enable a significant number of acts of copyright infringement;
- whether the service has significant uses other than to enable acts of copyright infringement;
- the person's ability, as part of providing the service, to limit acts of copyright infringement, and any action taken by the person to do so;
- any benefits the person received as a result of enabling the acts of copyright infringement;
- the economic viability of the provision of the service if it were not used to enable acts of copyright infringement.

Any act or omission that is contrary to any of the moral rights of the author of a work or of the performer of a performer's performance is, in the absence of the author's or performer's consent, an infringement of those rights (Paragraph 28.1 of the Act).

According to the Act in any proceedings for an infringement of moral rights, the court may grant to the holder of those rights all remedies by way of injunction, damages, accounts, delivery up and otherwise that are or may be conferred by law for the infringement of a right.

Under the Paragraph 38.1 of the respective Act a copyright owner may elect, at any time before final judgment is rendered, to recover, instead of damages and profits, an award of statutory damages for which any one infringer is liable individually, or for which any two or more infringers are liable jointly and severally:

- in a sum of not less than \$500 and not more than \$20,000 that the court considers just, with respect to all infringements involved in the proceedings for each work or other subject-matter, if the infringements are *for commercial purposes*;
- in a sum of not less than \$100 and not more than \$5,000 that the court considers just, with respect to all infringements involved in the proceedings for all works or other subject-matter, if the infringements are *for non-commercial purposes*.

If the copyright owner has made an election with respect to a defendant's infringements that are for non-commercial purposes, they are barred from recovering statutory damages from that defendant with respect to any other of the defendant's infringements that were done for non-commercial purposes before the institution of the proceedings in which the election was made.

If a copyright owner has made an election respect to a defendant's infringements that are for non-commercial purposes, every other copyright owner is barred from electing to recover statutory damages in respect of that defendant for any of the defendant's infringements that were done for non-commercial purposes before the institution of the proceedings in which the election was made.

If the defendant satisfies the court that the defendant was not aware and had no reasonable grounds to believe that the defendant had infringed copyright, the court may reduce the amount of the award to less than \$500, but not less than \$200.

Under the Paragraph 41.1 of the Act the owner of the copyright in a work, a performer's performance fixed in a sound recording or a sound recording is entitled to all remedies — by way of injunction, damages, accounts, delivery up and otherwise — that are or may be conferred by law for the infringement of copyright against the person who contravened the *technological protection measures*. At the same time the owner of the copyright in a work, a performer's performance fixed in a sound recording or a sound recording may not elect to recover statutory damages from an individual who contravened the respective provisions only for his or her own private purposes.

The provisions regarding the circumvention of technological protection measures does not apply to a person with a perceptual disability, another person acting at their request or a non-profit organization acting for their benefit if that person or organization circumvents a technological protection measure for the sole purpose of making a work, a performer's performance fixed in a sound recording or a sound recording perceptible to the person with a perceptual *disability*.

If a court finds that a defendant that is a *library, archive or museum or an educational institution* has broken the provisions regarding circumvention of technological protection measures and the defendant satisfies the court that it was not aware, and had no reasonable grounds to believe, that its actions constituted a contravention of the certain provisions, the plaintiff is not entitled to any remedy other than an injunction.

Every person, except a person who is acting on behalf of a library, archive or museum or an educational institution, is guilty of an offence who *knowingly and for commercial purposes* contravenes the provisions of the Act concerning circumvention of technological protection measure and is liable:

- on conviction on indictment, to a fine not exceeding \$1,000,000 or to imprisonment for a term not exceeding five years or to both;
- on summary conviction, to a fine not exceeding \$25,000 or to imprisonment for a term not exceeding six months or to both.

ISPs responsibility: in any proceedings for infringement of copyright, the owner of the copyright in a work or other subject-matter is not entitled to any remedy other than an injunction against a provider of an information location tool that is found to have

infringed copyright by making a reproduction of the work or other subject-matter or by communicating that reproduction to the public by telecommunication. The respective conditions apply only if the provider, in respect of the work or other subject-matter:

- makes and caches, or does any act similar to caching, the reproduction in an automated manner for the purpose of providing the information location tool;
- communicates that reproduction to the public by telecommunication for the purpose of providing the information that has been located by the information location tool;
- does not modify the reproduction, other than for technical reasons;
- complies with any conditions relating to the making or caching, or doing of any act similar to caching, of reproductions of the work or other subject-matter, or to the communication of the reproductions to the public by telecommunication, that were established by whoever made the work or other subject-matter available through the Internet or another digital network and that lend themselves to automated reading and execution;
- does not interfere with the lawful use of technology to obtain data on the use of the work or other subject-matter.

An owner of the copyright in a work or other subject-matter may send a notice of claimed infringement to a person who provides:

- the means, in the course of providing services related to the operation of the Internet or another digital network, of telecommunication through which the electronic location that is the subject of the claim of infringement is connected to the Internet or another digital network;
- for the purpose of digital memory that is used for the electronic location to which the claim of infringement relates (hosting services);
- an information location tool.

A notice of claimed infringement shall be in writing in the form, if any, prescribed by regulation and shall contain the following information:

- state the claimant's name and address and any other particulars prescribed by regulation that enable communication with the claimant;
- identify the work or other subject-matter to which the claimed infringement relates;

- state the claimant's interest or right with respect to the copyright in the work or other subject-matter;
- specify the location data for the electronic location to which the claimed infringement relates;
- specify the infringement that is claimed;
- specify the date and time of the commission of the claimed infringement;
- contain any other information that may be prescribed by regulation.

A claimant's only remedy against a person who fails to perform his or her obligations is statutory damages in an amount that the court considers just, but not less than \$5,000 and not more than \$10,000.

France: the Hadopi law has been successfully implemented and research shows it is having an impact on consumer behavior and on digital sales. However, opinions regarding its effect are controversial. It is specified in the IFPI Digital Music Report 2012 [49] that there have been more than 700,000 notices sent, which IFPI estimates to have reached around 10 per cent of P2P users in France.

There are good indications of the impact Hadopi has had on piracy in its first year of operation. The use of unauthorised P2P networks has sharply declined, with overall P2P use down by 26 per cent since notices started being sent in October 2010, the equivalent to a loss of around two million P2P users. A study by Ipsos MediaCT, conducted in November 2011, found 90 per cent of P2P users in France were aware of the law and 71 per cent would stop infringing if they received a notification as part of the graduated response program. A new study by Professor Brett Danaher found that French iTunes sales were 23 per cent higher for singles and 25 per cent higher for digital albums that they would have been in the absence of Hadopi.

Meanwhile, the Minister of Culture of France Aurélie Filippetti noted that Hadopi was not successful in its mission of developing legal offers. The financial plan, that has included 12 million euros per year and 60 agents, is too expensive for the purpose of sending a million of e-mails. Finally, the suspension of the internet access seems for the Minister to be a disproportional measure regarding the aim that should be achieved. As part of the budget efforts, the Minister will ask to reduce significantly the budget of Hadopi for the year 2012. The Minister prefers to cut funding if the usefulness of the certain measures is not evidence based. [50]

China: National Copyright Administration of the People's Republic of China on March 31, 2012 released the Revision Draft of the Copyright law of the People's Republic of China [51]. According to the Chapter VII of the Draft where copyright or infringing rights are infringed, the infringer shall compensate the rights holder the real damage; where the real damage is hard to calculate, compensation may be granted on the basis of

the unlawful income of the infringer. Where the real damage to the rights holder or the unlawful income of the infringer are hard to determine, a reasonable multiple will be calculated with reference to the common trading cost of the right. The compensation amount shall include the reasonable expenses incurred by the rights holder in order to cease the infringing activity. Where the real damage to the rights holder, the unlawful income of the infringer and the common trading cost of the rights are all hard to determine, and the exclusive licensing contracts or transfer contracts are registered, the People's Courts decide to impose a compensation of 1 million Yuan or less, on the basis of the circumstances of the infringing activity.

To those wilfully infringing copyright or related rights two times or more, the compensation amount will be calculated on the basis of one to three times the compensation values mentioned above.

Where the following infringing activities *destroy the Socialist market order* at the same time, the administrative copyright management department may order cessation of the infringing activities, confiscate unlawful income, confiscate or destroy infringing reproductions, and may impose a fine; where circumstances are grave, the administrative copyright management department may also order the confiscation of materials, tools, equipment, etc., mainly used in producing infringing reproductions; where it constitutes a crime, criminal responsibility is investigated according to the law:

- without permission of the copyright holder, reproducing, distributing, renting, performing, screening, transmitting or disseminating their works to the public through information networks, except where the Copyright Law provides otherwise;
- using the works of others in violation of the provisions of Article 48 of the Copyright Law (use of already published works without permission of the copyright holder if it doesn't meet conditions regarding the limitations of copyrights);
- publishing books of which other persons enjoy an exclusive publication right;
- without permission of the performer, transmitting or recording their performances, reproducing, distributing or renting audio products recording their performances, or disseminating their performances to the public through information networks;
- without permission of the audio producer, reproducing, distributing, renting or disseminating their audio products to the public through information networks, except where the Copyright Law provides otherwise;
- without permission of radio stations or television stations, relaying, recording, reproducing or disseminating their radio or television products to the public

through information networks, except where the Copyright Law provides otherwise;

- producing or selling works passing off another person's signature.

Circumvention of technological protection measures: those infringing copyright or related rights or violating duties concerning technological protection measures or rights management information as provided in the Copyright Law, shall bear civil responsibility to cease the infringement, cancel the influence, make a formal apology, compensate damage.

Concerning the following unlawful activities, the administrative copyright management department may impose a warning, confiscate unlawful income, and confiscate devices or components mainly used in *avoiding or destroying technological protection measures*; where circumstances are grave, confiscate the corresponding materials, tools and equipment and may impose a fine; where it constitutes a crime, criminal responsibility is investigated according to the law:

- without permission, wilfully avoiding or destroying technological protection measures adopted by rights holder, except where laws or administrative regulations provide otherwise;
- without permission, wilfully producing, importing or providing devices or components mainly used in avoiding or destroying technological protection measures to other persons, or wilfully providing technological services to avoid or destroy technological measures to other persons;
- without permission, wilfully deleting or changing digital management information, except where laws and administrative regulations provide otherwise;
- without permission, and where it is known or should be known that rights management information are deleted or changed, still reproducing, distributing, publishing, performing, screening, transmitting, or disseminating corresponding works, performances and audio products to the public through information networks.

When administrative copyright management departments implement their duties regarding investigation and prosecution of suspected unlawful activities related to copyright or neighboring rights, *the parties shall grant support and cooperation*, those refusing, obstructing or delaying the provision of materials without proper grounds, may be subject to warning by the administrative copyright management departments, where circumstances are grave, corresponding materials, tools and equipment are confiscated.

Where the parties refuse to obey administrative punishment, they may apply for administrative redress with the related government organ within 60 days of the day of receiving the administrative punishment decision letter, or raise a lawsuit with the

People's Courts within three months of the day of receiving the administrative punishment decision letter.

Network computer programs infringements: where network users utilize network services to conduct activities infringing copyright or related rights, the infringed person may notify the network service provider in writing, and require it to adopt necessary measures such as deletion, shielding, breaking links, etc.

Where the network service provider adopts the necessary measures timely after receipt of the notification, it does not bear responsibility for compensation; where it does not timely adopt the necessary measures, it bears joint responsibility with the said network user.

Where network service providers know or should know that network users use their network services to infringe copyright, and do not adopt necessary measures, they bear joint liability with the said network users. At the same time when network service providers provide storage, search, linking and other purely technological network services to network users, they do not bear a duty to examine for information concerning copyright or related rights.

Where users pay remuneration to collective copyright management organizations according to the contract concluded with collective copyright management organizations or statutory provisions, and a lawsuit is raised by the rights holder concerning the same right and the same use method, they do not bear responsibility for compensation, but shall cease the use, and pay remuneration according to the corresponding collective management use fee standards.

Where computer programme reproduction holders do not know and also do not have reasonable grounds to know that the said programme is an infringing reproduction, they do not bear responsibility for compensation; but they shall cease the use and destroy the said infringing reproduction. If ceasing the use and destroying the said infringing reproduction creates major damage to the user of the reproduction, the user of the reproduction may continue the use after paying a reasonable use fee to the copyright holder of the computer programme.

Where creators cannot prove that their reproduction activities are lawfully authorized, network users cannot prove that the works or reproductions they disseminate to the public through information networks are lawfully authorized, renters cannot prove that the audiovisual products, computer programmes or audio products they rent are lawfully authorized, as well as distributors cannot prove that the reproductions they distribute have a lawful source, they shall bear civil or administrative legal responsibility.

Preservation measures: where copyright holders or related rights holders have evidence to prove that other persons are carrying out or are about to carry out activities infringing their rights, that if not timely stopped may cause damage to their lawful rights and interests that is hard to remedy, they may apply with the People's Court before suing to adopt measures to cease the relevant activities and preserve property. In order to prevent

infringing activities, and under conditions where evidence may be lost or hard to obtain in the future, copyright holders or related rights holders may apply with the People's Courts before suing to preserve evidence. After the People's Courts receive applications, they must give a ruling within 48 hours; where it is ruled to adopt evidence preservation measures, their implementation shall begin immediately. People's Courts may order the applicant to provide a bond, where the applicant does not provide a bond, the application is rejected. Where the applicant does not sue within 15 days of the People's Court adopting evidence preservation measures, the People's Court shall remove the preservation measures.

Parties in copyright and related rights disputes may apply for arbitration with an administration organ according to the "Arbitration Law of the People's Republic of China", sue with the People's Courts, and may also apply for administrative *mediation*.

Copyright holders and related rights holders may apply to *Customs* to investigate and prosecute works that are imported or exported and suspected of infringing their copyright or related rights.

The United States: the White House believes that *voluntary approaches* to combating online infringement can have a significant impact on reducing online piracy and counterfeiting. It has been facilitated voluntary agreements to "quarantine" sites engaged in counterfeiting and piracy by working cooperatively with credit card companies, domain name registrars, and online advertisers.

The White House has adopted the approach of encouraging the private sector to reach *cooperative voluntary agreements* to reduce infringement that are practical, effective, and consistent with the commitment to broader Internet policy principles such as due process, free speech, and privacy. Examples of the voluntary agreements encouraged and facilitated by the Administration include the following:

- In December 2010, as a result of the Administration's strategy to combat illegal online pharmacies, American Express, Discover, eNom, GoDaddy, Google, MasterCard, Microsoft (Bing), Network Solutions, PayPal, Visa, and Yahoo! announced that they would form a non-profit group — later named the Center for Safe Internet Pharmacies — to combat illegal fake online "pharmacies";
- In June 2011, American Express, Discover, MasterCard, PayPal and Visa — major credit card companies and payment processors — reached an agreement to develop voluntary best practices to withdraw payment services for sites selling counterfeit and pirated goods;
- In July 2011, a voluntary agreement was finalized among several ISPs — AT&T, Comcast, Cablevision, Verizon, and Time Warner Cable — and major and independent music labels and movie studios to reduce online piracy;

- In May 2012, the Association of National Advertisers and the American Association of Advertising Agencies issued a joint statement of best practices to address online infringement. [52, p. 1-2]

On October 1, 2011 the Anti-Counterfeiting Trade Agreement (ACTA) [53] was signed by the United States and seven other countries that is a first-of-its-kind alliance of trading partners. ACTA represents a considerable improvement in international trade norms for effectively combating the global proliferation of commercial-scale counterfeiting and piracy in the 21st Century. [52, p. 3]

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