

# Riding the Waves or Caught in the Tide?

Navigating the Evolving Information Environment



INSIGHTS FROM THE



TREND  
REPORT

# ABOUT IFLA

## IFLA is the global voice of the library and information profession.

The International Federation of Library Associations and Institutions (IFLA) is the leading international body representing the interests of library and information services and their users. IFLA is an independent, non-governmental, not-for-profit organization with over 1400 members in nearly 150 countries.

We work to improve access to information and cultural heritage resources for the global community in this rapidly changing digital and print environment. Our key initiatives include access to digital content, international leadership, outreach, cultural heritage, and multilingualism.

In our professional programmes we build the capacity of our members, and set the professional agenda through development of guidelines, standards, publications and events around the world.

IFLA's status as the global organisation for library and information services ensures that our voice is represented through formal relations with the UN and other organisations.

## CONTRIBUTORS

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# INTRODUCTION

## In the global information environment, time moves quickly.

In 2010, the quantity of information transmitted globally exceeded 1 zettabyte for the first time, and is expected to double every two years<sup>1</sup>. The amount of new digital content created in 2011 amounts to several million times that contained in all books ever written<sup>2</sup>. OECD figures show that Internet traffic has risen by 13,000% in the last decade, with more digital information created in 2008-2011 than in all of previous recorded history<sup>3</sup>.

By the end of September 2013, the National Security Agency's (NSA) new data centre in Utah in the United States will be open and capable of storing up to 12 exabytes (12,000 petabytes) of information. To put that in perspective, just 400 terabytes would be needed to store all the books ever written in any language – and with 1,000 terabytes in 1 petabyte, that's less than 1% of NSA's new Utah centre's storage capacity (0.0033%).

## What is the IFLA Trend Report?

The sheer volume of information and the speed at which it is being created online is one of the focal points of the IFLA Trend Report. The IFLA Trend Report is the result of twelve months' consultation with experts and stakeholders from a range of disciplines to explore and discuss emerging trends in our new information environment. It is not a static report, but a dynamic and evolving set of online resources for library and information professionals to contribute to at [trends.ifla.org](http://trends.ifla.org). There's a great depth of data already on the online platform for libraries to use, share and build on, including a **bibliography** and **literature review** of existing trend reports, **expert papers** and **discussion summaries**.

The IFLA Trend Report identifies five high level trends in the global information environment, spanning access to information, education, privacy, civic engagement and technological transformation. While it sets out existing and likely future trends which characterise the new digital paradigm, it doesn't forecast the future of libraries.

That is where you come in. How libraries evolve to remain relevant in the new information landscape is perhaps the most urgent question facing the profession today.

## How you can get involved in the IFLA Trend Report

The launch of the IFLA Trend Report and web platform is just the beginning of the discussion. Up to now, IFLA has consulted with experts outside the library sphere to get their views on trends in the information environment - now it is your turn.

Over the next twelve months, we will be engaging with IFLA members around the world to promote and build on the Trend Report. We will be helping them to deliver their own workshops, discussion groups, seminars and other activities identifying and discussing information trends most relevant in their region. We want to see the outcomes from these regional discussions included on the online platform, for libraries around the world to continue the discussion online. Sign up at [trends.ifla.org](http://trends.ifla.org) to follow the evolution of the Trend Report, and write the next chapter!

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<sup>1</sup> International Data Corporation (2011) 'The 2011 Digital Universe Study: Extracting Value from Chaos' <http://www.emc.com/collateral/demos/microsites/emc-digital-universe-2011/index.htm>

<sup>2</sup> DEvolving (2011) 'Truth, Lies and the Internet: a report into young people's digital fluency' p 12 [http://www.demos.co.uk/files/Truth\\_-\\_web.pdf](http://www.demos.co.uk/files/Truth_-_web.pdf)

<sup>3</sup> World Economic Forum (2012) 'Global Information Technology Report: living in a hyper-connected world' p 59 [http://www3.weforum.org/docs/Global\\_IT\\_Report\\_2012.pdf](http://www3.weforum.org/docs/Global_IT_Report_2012.pdf)

# FIVE KEY TRENDS WHICH WILL CHANGE OUR INFORMATION ENVIRONMENT

## TREND 1:

### NEW TECHNOLOGIES WILL BOTH EXPAND AND LIMIT WHO HAS ACCESS TO INFORMATION

An ever-expanding digital universe will bring a higher value to information literacy skills such as basic reading and competence with digital tools. People who lack these skills will face barriers to inclusion in a growing range of areas. The nature of new online business models will heavily influence who can successfully own, profit from, share or access information in the future.

## TREND 2:

### ONLINE EDUCATION WILL DEMOCRATISE AND DISRUPT GLOBAL LEARNING

The rapid global expansion in online education resources will make learning opportunities more abundant, cheaper and more accessible. There will be increased value on lifelong learning and more recognition of non-formal and informal learning.

## TREND 3:

### THE BOUNDARIES OF PRIVACY AND DATA PROTECTION WILL BE REDEFINED

Expanding data sets held by governments and companies will support the advanced profiling of individuals, while sophisticated methods of monitoring and filtering communications data will make tracking those individuals cheaper and easier. Serious consequences for individual privacy and trust in the online world could be experienced.

## TREND 4:

### HYPER-CONNECTED SOCIETIES WILL LISTEN TO AND EMPOWER NEW VOICES AND GROUPS

More opportunities for collective action are realised in hyper-connected societies – enabling the rise of new voices and promoting the growth of single-issue movements at the expense of traditional political parties. Open government initiatives and access to public sector data will lead to more transparency and citizen-focused public services.

## TREND 5:

### THE GLOBAL INFORMATION ECONOMY WILL BE TRANSFORMED BY NEW TECHNOLOGIES

Proliferation of hyper-connected mobile devices, networked sensors in appliances and infrastructure, 3D printing and language-translation technologies will transform the global information economy. Existing business models across many industries will experience creative disruption spurred by innovative devices that help people remain economically active later in life from any location.

# DIGITAL TRENDS ON COURSE FOR COLLISION

**The IFLA Trend Report identifies five high level trends shaping the global information environment. They're evolving rapidly, and on course for collision – with reverberations that will ripple through the role and services provided by libraries around the world. How will your library navigate its way through the following scenarios?**

## **The rise of new technologies and the end of privacy?**

New technologies are transforming the global information economy. But each new generation of digital books, apps, databases, mobile and now wearable technologies redefines the boundaries of privacy and data protection – and responsibilities for the management of both – within libraries.

*“Data collection today is not constrained to the Internet: it is present in every action in the “real” world too, from shopping to travelling, working, etc...if this is left to Technology, we have passed the point of no return: today it is technically possible to follow someone in their daily life simply with image recognition, their mobile phone, their credit card and their Internet use.”*

**Dr. Olivier Crepin-Leblond – Chairman Internet Corporation for Assigned Names and Numbers (ICANN) At-large Advisory Committee (ALAC)**

## **E-lending in libraries and the treasure trove of personal data**

Today simply reading an e-book can reveal a great deal about you. How long it takes you to finish a chapter, your favourite parts, the speed and consistency of your reading and what you're likely to borrow or buy next. In an economy increasingly built on 'information mining', this kind of data is of great value for publishers, distributors and authors.

*“Platforms [like Facebook, YouTube or Second Life] act as cyberspace (absentee) landowners who provide any user with “ready to mediatize” spaces, where what is sold is not the content but the use of the production tools. The Web 2.0 seems to distribute the means of production to the masses, but the economic gains are for the few...”*

**Divina Frau-Meigs – Professor, Université Sorbonne Nouvelle**

Libraries providing e-lending resources and access to other digital content subscriptions for users possess valuable personal data. What responsibilities do libraries have to protect their users' data? If libraries are mere conduits for access, with content creators and distributors able to exploit the personal data of library users, have libraries become part of the new information-mining business model?

## “Please switch off your wearable technology”

The boundaries of privacy are being further redefined by mobile and wearable technology. According to Cisco's Global Mobile Data Traffic Forecast 2011-2016<sup>4</sup> by 2016 there will be over 10 billion mobile devices connected to the Internet with the Middle East and Africa experiencing a 104% increase in mobile data traffic (followed by Asia and Eastern Europe at 84% and 83% respectively).

Google Glass and the next generation of wearable computers are on the horizon – turning the computer on, and its camera turned outwards, all the time. A user walking into a library wearing Google Glass is, in a fashion, putting all of their fellow library users under surveillance. How should libraries respond to new technologies that challenge, if not remove, the boundaries of privacy? Libraries position themselves as 'safe' spaces for the benefit of the whole community – can this be maintained once Google Glass is in the building? Do enthusiastic adopters of new technology even care about privacy?

## The information gold mine in online education

Online education and the spread of Massive Open Online Courses (MOOCs) will also have an impact on the boundaries of data protection and privacy. How is the data generated by students undertaking online education being used and protected? Test results, course progress and personal data have long been useful tools for educators to chart a student's progress alongside his/her fellow students, and improve course modules. But in the global information environment, who else has access to this data?

With most students now turning to search engines for the answers to their questions, how are their search habits influencing the information that is returned? Is this all the information they need? These algorithms have been developed and are owned by private corporations, and are primarily designed to maximise advertising revenue – what issues does this pose for librarians and educators?

## The algorithm has all the answers - so what's a library?

A recent study by the Oxford Internet Survey found that “trust in people providing Internet services” exceeds trust in other major institutions including newspapers, corporations and government.<sup>5</sup> But when automated search technologies limit the range and diversity of information available to us based on our search habits, language and geographical location, can the results returned by our search engines really be trusted? How can libraries and educators ensure students and users are accessing the information they need, and not simply the information their amalgamated data tells the algorithm they're looking for?

*“How do we enable “luck”? How do we establish communities that thrive on the unexpected?”*

Louis Zacharilla – Co-founder, Global Intelligent Community Forum

And if the primary vehicle for information seeking is a privately owned algorithm, how do libraries engage? Build a competing algorithm? Focus on building digital literacy skills to assist users navigate to the most authoritative information returned by existing search technologies? How can libraries be vehicles for serendipitous discovery if the dominant mode of search is algorithm-based?

<sup>4</sup> Cisco Visual Networking Index (2013) 'Global Mobile Data Traffic Forecast Update, 2012–2017' p 3  
[http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white\\_paper\\_c11-520862.pdf](http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.pdf)

<sup>5</sup> Oxford Internet Surveys (2011) 'Trust on the Internet now exceeds Trust in other Major Institutions' p 47  
<http://microsites.oii.ox.ac.uk/oxis/blog/2010/trust-internet-now-exceeds-trust-other-major-institutions>

## Education goes global and mobile...but loses tactile and local?

Technological barriers are falling away, accelerated by increasing penetration of mobile devices in developing countries. Today there are just over 2.4 billion Internet users around the world<sup>6</sup>. By 2015, Brazil, Russia, India and China will have 1.2 billion Internet users alone<sup>7</sup>. Mobile technologies are facilitating the rise of MOOCs and open access in the global classroom, while posing interesting questions for educators. Are mobile technologies going to be the only, or the predominant way students absorb new education methods? As education resources go global and open access, how do we preserve the production of local content? Will students in Kenya have access to MOOCs and open educational resources incorporating local content, or mainly EU, US or UK content? What impacts could this have on cultural identity?

## The machine is the translator

Advances in automated machine translation are changing the way we communicate with one another, and breaking down language barriers. In regions where local educational content is limited, students will have access to translated materials from overseas. Researchers and users will be able to read in their own language any book, article, online blog ever written. As language limitations dissolve between communities, new creative partnership and business models will emerge. Automated machine translation will change the way we communicate, but will it increase our understanding? What is the cultural impact of using machine translations without the benefit of cultural context?

Automated translation will challenge existing business models and regulatory frameworks. If you can run any work through an automated translator, what impact could this have on publishing? What new business models will emerge in a borderless communication environment?

## The emergence of new voices and groups in a surveillance society

As automated machine translation breaks down language barriers, new voices and groups are connecting across the globe. The convergence of mobile technology, online access and global media has empowered new Internet movements, reflected in successful campaigns against the Stop Online Piracy Act (SOPA) in the US, and the Anti-Counterfeiting Trade Agreement (ACTA) in the EU as well as the rise of the Arab Spring.

These technologies can also be utilized to destructive ends, to promote extremist ideologies and the anonymous and/or crowd-sourced organization of criminal activities. To what extent should technical or regulatory structures be introduced by governments to determine how different actors can share and control information? How far should information surveillance go to protect the public interest? Can fringe/grassroots activism movements have an impact in a society where nothing is private? Governments around the world, even those seen as democratic, are taking steps to filter online access to information that is extremist, criminal, sensitive or deemed otherwise 'immoral'. Libraries have historically opposed government censorship – have our responses to Internet censorship been adequate? If filtering is becoming a standard government practice, what impact could that have on libraries' ability to adequately collect and preserve our digital history?

<sup>6</sup> Internet World Stats (2012) 'Usage and Population Statistics' <http://www.internetworldstats.com/stats.htm>

<sup>7</sup> Boston Consulting Group (2010) 'Winning in Emerging-Market Cities' p 17 <http://www.bcg.co.jp/documents/file60078.pdf>

## **“What are you doing about Bit Rot?”**

The global information environment is a fragile one. The great pace of technological change has left its information pathways littered with the likes of old formats, out-dated software, broken URLs, corrupted webpages and discarded files.

*“I am really worried right now about the possibility of saving ‘bits’ but losing their meaning and ending up with bit-rot. This means you have a bag of bits that you saved for a thousand years but you don’t know what they mean, because the software that was needed to interpret them is no longer available, or it’s no longer executable, or you just don’t have a platform that will run it. This is a serious, serious problem and we have to solve that.”*

Vint Cerf - Chief Evangelist, Google

Preserving our digital heritage is a priority for libraries and archives around the world. Identifying and capturing digital content of historical or cultural significance in the information deluge is one challenge for libraries. Copyright restrictions on digital content, format obsolescence and lack of technological capacity are others. Automated technologies like web harvesting and search algorithms are increasingly being used by libraries to identify and record our digital output – what have we lost in turning curation and preservation over to algorithms?

## **An information chain challenged by new technologies**

Traditional concepts of “authorship” and “ownership” have broken down in the new information environment. New digital content is being created at an unprecedented pace, and is crowd-sourced, computer-generated and re-mixed as well as created by individuals. It can be easily shared and distributed, with impacts on markers of authorship, exercising of control and notions of “ownership”. New technologies have profoundly disrupted the traditional information chain (creator, publisher, distributor, retailer, library, reader), challenged established business models and regulatory frameworks while facilitating new sources of competition and new access models. Who will benefit most from the changing information chain? And how will our regulatory frameworks adapt to support an evolving information chain in the new global economy?

## **New technologies will transform the global economy – but who benefits?**

It’s clear that new technologies stand to profoundly equalize access to information around the world, not simply for developing countries but a range of social and economic groups. Technology enables young entrepreneurs to reach a global audience. New creation and distribution models stand to profoundly disrupt the existing information chain. Access barriers for the elderly, the visually impaired, new migrants and economically disadvantaged can be reduced. What will the world look like? And will the next generation technologies stay unregulated long enough for new users to shape their potential?

*“In the next 5 years Western businesses will be competing with young African entrepreneurs who will successfully build the next batch of billion dollar companies.”*

Marième Jamme - CEO, Spot One Global Solutions

How will the next 1 billion Internet users’ experiences and knowledge be affected by changing education, social and regulatory models? Will they have access to the content they need?

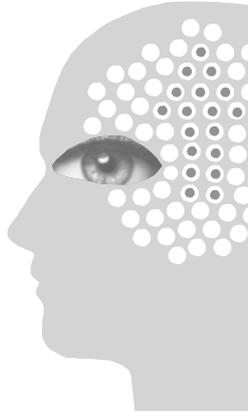
## The vulnerability of new technologies to over-regulation

Throughout history, governments have regulated the flow of information within their borders. With the emergence of each new technology, intellectual property reform has been initiated to shape its benefits and limitations, according to the needs of existing business models:

*“The future as far as content creation and the rights of both creators, as well as those who want to use and share content will be contested. The risk is that it will not be given a chance to play itself out with the protagonists finding new solutions that effectively balance interests while also respecting the rights to access and share information because the stage on which this contest is taking place is so dominated at present by interest groups representing the distributors, and the governments that they get on their side through very intensive and expensive lobbying.”*

**Anriette Esterhuysen - CEO, Association for Progressive Communications (APC)**

Existing frameworks governing access to information are being rapidly outstripped by the pace of technological change and changing concepts of “ownership” facilitated by online distribution and sharing. Are existing notions of copyright irrelevant in the new information environment? How can we foster innovation and access to content while ensuring respect for those who have created it? And will “access anytime, anywhere, on any device” undermine the concept of physical ownership – to the ultimate detriment of libraries as physical spaces?



## TREND 1:

# NEW TECHNOLOGIES WILL BOTH EXPAND AND LIMIT WHO HAS ACCESS TO INFORMATION

**An ever-expanding digital universe will bring a higher value to information literacy skills such as basic reading and competence with digital tools. People who lack these skills will face barriers to inclusion in a growing range of areas. The nature of new online business models will heavily influence who can successfully own, profit from, share or access information in the future.**

## LIKELY DEVELOPMENTS

The on-going explosion of choice of digital content and information increases the **importance of information literacy skills** as essential tools for distinguishing authoritative information from content that is influenced by various social, political, commercial and sometimes extremist agendas.

**Tension continues to increase over ownership of intellectual property and technological innovations.** Adaptations are needed to reflect new patterns of information use and to support creativity and economic sustainability.

In a hyper-connected world, access to information becomes the gateway for health, education and employment resources – as well as social, political and economic freedoms. **A billion new Internet users in developing countries change the landscape of the online world.** However, deficiencies in reading and digital literacy skills remain barriers to accessing online resources, possibly leading to a widening digital divide and global inequalities.

**Mobile access to digital content** and products from a broader range of devices weakens the traditional concept of ownership based on static rights to content in one location.

The operation of the Internet as an open and internationally accessible source of information is threatened by governments seeking to extend control over their own information environments. This type of control leads to a **patchwork of national Internets.**

Questions of **ownership of information and content** become more complicated as boundaries between producers and consumers of information are increasingly blurred. A rise in the amount of content created by automated machine processes further complicates such situations.

**The existing business models of many online service providers designed to make money from submitted personal data and user-generated content are challenged.** The debate around future business models focuses on whether these profits should be shared between content creators, intermediaries and the original owners of personal data.

The use of technical measures to prevent access to copyrighted content becomes outdated, as new business models that harness public enthusiasm for **consuming, sharing, creating and modifying** offer a broad range of content across different platforms and devices.



## TREND 2:

# ONLINE EDUCATION WILL DEMOCRATISE AND DISRUPT GLOBAL LEARNING

**The rapid global expansion in online education resources will make learning opportunities more abundant, cheaper and more accessible. There will be increased value on lifelong learning and more recognition of non-formal and informal learning.**

## LIKELY DEVELOPMENTS

Online Open Education Resources (OER), adaptive teaching technologies, Massive Open Online Courses (MOOCs) and gamified learning approaches **transform the global learning landscape** over the next decade.

**Online courses will be serving more people** in the near future than all the students currently attending universities around the world. New courses feature more cross-sectional, multidisciplinary learning.

**Digital opportunities for lifelong learning become increasingly essential** in a more globalised economy and a rapidly changing technological environment where more people gain new skills and knowledge throughout their adult lives.

Broader strategies to build knowledge and skills raise the recognition and certification levels of **non-formal and informal learning pathways**. Skills and experience gained in everyday life become more visible and valuable.

In an environment where information is easier to locate and obtain, future educational methods focus more on **how to authenticate and exploit this information**. Memorisation of information continues to decline in importance.

The wave of disruption of traditional methods of learning driven by online education benefits learners by **dramatically reducing costs and increasing access** to wider learning opportunities.

The future **education market becomes shaped by network effects** that drive business models of companies like Google, Facebook and Amazon. Established education providers risk being undermined if content producers successfully engage with popular new consumer platforms that offer a wide range of content.

The broad adoption of MOOCs increases the **added value of intermediaries** that offer a platform for peer learning, mentoring networks, co-study, collaboration and informal support. This change applies to both online and face-to-face methods.

**Open Access to scientific publishing** makes millions of peer-reviewed articles globally available, helping scientists share and build upon each other's discoveries. Innovations in health, infrastructure and commerce are born from their collaboration.

Online resources and adaptive teaching methods **transform school classrooms**, combining digital tools with human support to tailor each student's learning experience.



## TREND 3:

# THE BOUNDARIES OF PRIVACY AND DATA PROTECTION WILL BE REDEFINED

**Expanding data sets held by governments and companies will support the advanced profiling of individuals, while sophisticated methods of monitoring and filtering communications data will make tracking those individuals cheaper and easier. Serious consequences for individual privacy and trust in the online world could be experienced.**

## LIKELY DEVELOPMENTS

**More sophisticated profiling** of individuals and social groups is better enabled by expanding data sets collected by governments and companies. Advanced capacity to process data from a wide range of sources increases opportunities to connect anonymous information with a specific person or group.

Governments find it easier and cheaper to track their citizens' activities and filter information through the mass **monitoring of communications data** and metadata from various platforms and devices.

**Commercial monitoring and tracking** also increases in sophistication, with emotional metering and retina-movement analysis growing alongside the use of traditional mouse-click tracing and browser cookies.

The **challenges of regulating a global borderless Internet** at an international level while satisfying different national regulations continue to make it difficult to offer consistent standards of online privacy and data protection.

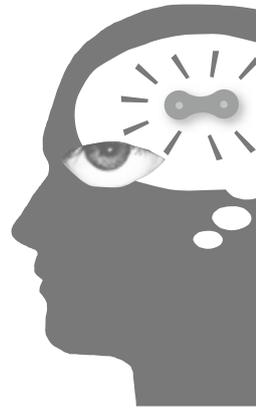
Without improved legal safeguards, **governments increase pressure** on multi-national web companies to surrender communications data, associated metadata, and online activity records. This scenario has precedent in the recent controversy over the US PRISM programme.

Discriminatory pricing of goods and services based on detailed knowledge of a person's online activity intensifies, with an increase in companies offering the same products and services at different prices to different people based on their personal data.

Levels of **trust in the online world** flatten or significantly decrease. Many people are presently comfortable with sharing large amounts of personal information online through social networks or online activity tracking systems. This behaviour changes as individuals begin to realise exactly how much of their activity is being monitored.

Increasing numbers of commercial online platforms include encryption and security within their services, as **privacy becomes a more attractive selling-point**. Despite competition between online tools with more privacy and those which support greater monitoring, many Internet users continue with interactive and user-friendly services without major concerns over security.

In situations where posting information online effectively surrenders future control over that information, people have to balance their desire to engage, create and communicate against any **risks connected with leaving a permanent digital footprint**.



## TREND 4:

# HYPER-CONNECTED SOCIETIES WILL LISTEN TO AND EMPOWER NEW VOICES AND GROUPS

**More opportunities for collective action are realised in hyper-connected societies – enabling the rise of new voices and promoting the growth of single-issue movements at the expense of traditional political parties. Open government initiatives and access to public sector data will lead to more transparency and citizen-focused public services.**

## LIKELY DEVELOPMENTS

The size of the **digital universe** is predicted to **double every two years**, with its content increasingly shaped by different social, political, and commercial agendas. Technology that drives better communication and collective action continues to support **positive outcomes**: empowering individuals, increasing civic participation and commercial accountability. **Negative outcomes** can also arise from use of the same technology: empowering cyber criminals, terrorists and extremist networks.

Democratic countries benefit from **greater transparency, access to public sector data** and a growing momentum behind **open-government initiatives** designed to empower citizens, reduce corruption and strengthen governance through new technologies.

Traditional political parties are weakened as **voters increasingly gather around single issues which support their values and interests**. One major effect may be a bridging of social, political, generational and geographical divides.

Wide-reaching digital resources **transform the status of women** by expanding access to health, business and related social network information. The same resources **offer a global voice for many citizens** to endorse or condemn policies and politicians from other countries – and **empower diaspora and migrant communities**.

Commercial lobbyists and political elites adopt approaches that have yielded success for online activists in **mobilising mass popular sentiment** around single issues – but using more systematic, less organic methods.

**More use of simulated virtual environments** enables people to test potential decisions in a simulated context before application in the real world. Consequently, voters can project the likely social and economic impact of political party policies before deciding which to support. The same process helps governments to determine policy.

Future governments do **not just gain legitimacy through elections** – their ability to deliver on open government and transparency objectives supported by digital technologies could also become major new sources of political and institutional credibility.

Effective use of open government data requires greater **professionalization of information management skills in the public sector**. Services that are increasingly digitised by governments may need to rely on **intermediaries who can help disadvantaged citizens use evolving digital services** and platforms.

Big data supports **more effective evidence-based policy-making** in many fields – including health, social care, environmental conservation and climate change.



## TREND 5:

# THE GLOBAL INFORMATION ECONOMY WILL BE TRANSFORMED BY NEW TECHNOLOGIES

**Proliferation of hyper-connected mobile devices, networked sensors in appliances and infrastructure, 3D printing and language-translation technologies will transform the global information economy. Existing business models across many industries will experience creative disruption spurred by innovative devices that help people remain economically active later in life from any location.**

## LIKELY DEVELOPMENTS

**Mobile devices** become the main medium for access to information, content and services. As a result, new social and economic groups are empowered through increased access to health and education resources, as well as e-government and financial services..

Advances in **artificial intelligence** enable networked devices to combine speech recognition, machine translation and speech synthesis to support **real-time multilingual voice translation**.

The capacity of **3D printing technology** to create usable objects from digital blueprints transforms the value of information access, and triggers creative disruption in global manufacturing industries.

Progress in telecommuting, networked Telehealth and Telecare systems, wearable computer devices and intuitive user interfaces – activated by voice, retina movements or touch – helps **people remain economically active** longer in life.

Individuals and businesses increasingly are able to **participate in the global information economy from anywhere** on the planet. This connectivity reduces some competitive advantages linked to physical location.

Rising competition from developing economies creates a need for increasingly **protectionist economic policies** from the developed world. Overly-complex requirements and compliance regulations become more common.

By the year 2030, **70 per cent of the world's population is projected to live in cities**. But a possible longer-term trend exists for people to exploit hyper-connectivity to **relocate back to smaller communities**. A reactivation of the economic, social and cultural fortunes of those settlements could result.

As many developing countries benefit from growing youth populations, much of the developed world continues to face the economic challenges of an aging workforce. Developing world firms have **increased opportunities to replace the developed world businesses** which currently occupy the most high profit areas of the global economy.

The number of networked sensors embedded in devices, appliances and infrastructure nears 50 billion by the year 2020. This "**Internet of Things**" leads to a further explosion in recorded data with major implications for future public services and data-driven policy-making, as well as new challenges for individual privacy.

## TREND REPORT TIMELINE IN 2013

# BUILDING THE TREND REPORT

During the last year IFLA asked a broad range of experts and stakeholders from different disciplines (social scientists, economists, education specialists, lawyers and technologists) to help identify the high level trends which will affect our future information environment. The timeline shows the key components which have been drawn together to develop the Trend Report.

In November 2012 IFLA commissioned a comprehensive literature review which surveyed recent studies and reports on emerging trends and compiled an extensive bibliography of relevant documentation which was hosted on the Trend Report online platform in January 2013.

In February a panel of ten key experts were then asked to prepare submissions based on these materials to participate in a March round table meeting in Mexico City. Further questions emerging from the round table meeting were then discussed via the online discussion forum by the expert panel in May, and in June these questions were opened up for further input from a wider group of invited experts.

In July all these different elements were drawn together to produce an Insights Document, highlighting five top level trends. The compiled report was launched at the World Library and information Congress in Singapore in August 2013.

The overarching objective is not to produce a static report but to create a dynamic and evolving set of online resources to foster further discussion and debate about future priorities within the global library community. We hope you can be part of the next phase of this project going forward, by engaging in discussions on the online forum and picking up key questions for further conversations at national level.





## TREND REPORT

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