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ENABLING GROWTH:
Horizontal opportunities for the ICT sector

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Executive summary

In the information technology and telecommunications (ICT) markets, collaboration among industry participants has been an important catalyst for growth. But will such collaboration within and outside the ICT sector still be a promising strategy in the future? After all, in many segments, competition is intensifying, forcing companies to focus on entering each other's markets. Is there room for a concerted, cross-industry agenda to "grow the pie" collectively? The short answer is: yes. This report, produced with the World Economic Forum, outlines key collaborative solutions ICT industry stakeholders should focus on to unlock further growth in ICT markets.

While the ICT industry has not been immune to the financial and economic crisis, it has been exploring many potential growth opportunities, from the expansion of existing offerings in financial services and news and entertainment to new applications in healthcare, energy and transportation, and government services. However, none of these vertical markets by themselves promise to be the unique, breakthrough growth engine of the future for the industry. Only the combined impact of these opportunities will deliver the growth potential.

Each of these opportunities faces one or more hurdles to widespread adoption and monetization, and none of the issues can be resolved by one single sector of the industry acting alone; at the same time, the rewards can be substantial for the industry as a whole, if ICT companies decide to collaborate to find solutions. When these hurdles were discussed by representatives of the World Economic Forum's IT and telecommunications industry partners, three major potential concerns were identified in the adoption and introduction of new services:

- The risk of lack of incentives for infrastructure deployment;

- The risk of businesses not using the full potential of personal digital data;
- The risk of inadequate rewards for content developers and creators.

There was consensus that these hurdles could be overcome through collaborative solutions:

I. Provide incentives for infrastructure investments in ICT

This would ensure that the ubiquitous high-speed connectivity, upon which most of these growth opportunities are based, is deployed at the right pace. There are divergent viewpoints within the ICT sector on how to make investments in communication networks more attractive—and thus enable the further development of new markets.

We propose that ICT companies should consider a common agenda to:

- **Monetize Quality of Service (QoS) in network infrastructure.** Enable customers to choose their QoS preferences individually, or reserve bandwidth for content providers that pay for guaranteed QoS;
- **Work with policymakers to nurture ICT infrastructure investments.** The goal is to take into account both the commercial interests of industries as well as social responsibilities and develop practical solutions that enable the further development of intelligent networks and promote investment. Policymakers should consider creating a forum where they can share best practices on this topic;
- **Develop pilots in emerging "intelligent infrastructure" markets such as smart grids or e-health.** Successful pilots will collectively demonstrate the potential of ICT solutions in less-complex markets and show the promise of scaling those solutions for mass markets.

II. Protect personal data and bring its use to full potential

So many new services—based both on aggregated, anonymous data as well as individual data—could take off if the ICT industry earned the consumers' trust to use that data appropriately. That will take time, and no single industry participant can achieve that alone. Without a doubt, the use and protection of personal data go hand in hand—and that, in fact, can provide significant opportunities. We identified three areas for collaboration:

- **Create mechanisms that will win consumers' trust in the way personal data is handled.** Consider developing an industry-wide code of conduct or setting up a central intermediary in charge of sharing anonymous, personal data with commercial entities;
- **Give customers more control over their personal data.** Increasingly, industry participants feel it is time the ICT sector let users easily opt in or out of how their personal data is used. Companies should also inform consumers of the implications of their choices in a brief and easy-to-understand manner;
- **Aim for international policy alignment on data privacy and processing.** Bilateral, international agreements are a good start. An existing example is the "Safe Harbor Agreement" between the US and the EU. It allows data originating from the EU to be used internationally, as long as the user complies with EU law. The next step in this process should be to create a forum that harmonizes data-protection laws internationally.

III. Ensure both industries and individuals have incentives to create content

Increasingly, content is created, distributed and used in the digital version. Clearly, in its current form, digitization is associated

with more-challenging monetization models. However, solutions can be found to create economically sustainable models for digital content. We suggest that industry participants should consider three areas:

- **Increase availability of digital content protected by "smart" DRM.** Consumer demand for digitized content is increasing constantly. The sooner the legal availability of content for consumers is increased and solutions are developed that prevent piracy while meeting customers' "fairness" expectations—such as "smart" digital rights management (DRM) solutions—the faster content can be monetized;
- **Create revenue-sharing mechanisms that align incentives of content creators and downstream distributors.** Often issues of poor monetization in the digital world arise from poorly aligned incentives along the value chain. An attractive option is to create win-win models benefiting not only content creators but also other participants in the value chain, similar to the revenue-sharing models implemented by new device platforms. This is critical in order to reward content creators and ensure the continued growth of digital goods and services;
- **Add consumer education, warning systems and awareness-building to legal actions in order to fight piracy.** In order to combat illegal copying and its adverse effects on digital media markets, several approaches will need to be taken. Legal actions alone are not sufficient and need to be integrated into a comprehensive approach, including consumer education campaigns and methods such as "graduated response systems" that issue warning notifications to Internet subscribers when they infringe on copyright.

Progress in addressing these challenges will not be easy. There are no obvious solutions, and a critical mass of ICT industry participants, as well as public and regulatory authorities, will

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need to be aligned on a common agenda. The short-term economic rewards of such initiatives are uncertain, particularly for individual companies. But ignoring these challenges will undermine the stable growth of ICT markets in the future. The World Economic Forum Annual Meeting 2010 in Davos will be a key opportunity to collaborate and generate momentum on the required changes.

Introduction

In the information technology and telecommunications (ICT) markets, collaboration among industry participants has been an important driver of growth. Innovations such as the rise of the personal computer or the creation of the Internet would hardly have been possible without private firms, across very different industry segments, working together and building upon one another's results.

Now, with the global economy slowing down, collaboration becomes even more important—but also, in some ways, more difficult. ICT companies need to balance the need for investments in future growth with the hard realities of the recession. But while the hurdles are many, there are also new opportunities emerging. After an extensive review of all the possible areas of collaboration, we identified three priority areas the whole ICT industry can benefit from by working together to develop collaborative solutions to common problems.

I. Provide incentives for infrastructure investments in ICT

In many markets, inside and outside the ICT sector, ubiquitous high-speed connectivity is a precondition for further growth. In addition, the next generation of public infrastructures

in health, energy or transportation can become more “intelligent,” that is, more efficient and effective through further digitization. Increasingly, communications networks will need to meet the unprecedented, growing demand for the secure and reliable transport of rich data in real time.

However, currently, the further extension and upgrade of networks is stagnating, and there are concerns that private investments could even decrease in the years to come.¹ Network operators face several issues: the steady commoditization of data-transport services and the increasing complexity of next-generation network architectures. In addition, markets such as smart grids in energy or e-health in healthcare are still in their infancy. Very often, they are fragmented with many stakeholders, the technologies are complex and the regulatory environment is still evolving. For many ICT companies, the potential revenues from those markets are high—but they are far from certain. It is, therefore, a challenge for ICT companies to make investments up front in improving the underlying network infrastructures.

Not surprising, there are divergent viewpoints within the ICT sector on how to encourage investments needed to upgrade communication networks and thus enable the further development of new applications in other sectors. Based on discussions with the World Economic Forum's IT and telecommunications industry partners, we propose three areas that would benefit immediately if industry participants were to follow a concerted approach.

Monetize the Quality of Service (QoS) in network infrastructure

Many operators are exploring how they can achieve this goal by getting consumers and content providers to value—and subsequently

¹ According to IDC reports, worldwide telecom equipment revenues rose from \$90 billion in 2006 to \$100 billion in 2008, while equipment revenues are expected to drop in 2009. (Emberley, David, Griliches, Eve, and Chua, Godfrey. “Worldwide Telecommunications Equipment 2009–2013 Forecast.” IDC #218026, Vol. 1, May 2009.)

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pay for—different levels of service quality. Currently, network operators differentiate between the QoS they provide to different consumers based on the quality of access to the network: They price Internet access at various speed or latency levels.

But other additional revenue sources are possible. Network operators could reserve bandwidth for content providers that pay for guaranteed QoS to reach their customers. Vodafone, for example, announced in November 2009 that it will consider a model where “content providers pay network operators to guarantee that their content is carried over the network without disruption.”²

Operators could also enable customers to choose their own QoS preference, based on their unique needs. For example, a possible scenario could be to allow customers to order shorter latency for a certain time period—for applications like playing Internet games—or to order high-speed access to certain websites or to download large files. It has been noted by some industry leaders that the telecommunications industry could offer customers the choice of paying for increased bandwidth or secure data transfer on the Internet—and thus contribute to financing infrastructure investments in the future.³

Work with policymakers to nurture ICT infrastructure investments

As operators and industry participants propose new monetization models, inevitably they need to take into account the concerns of policymakers and regulators, and seek alignment. For example, policymakers have a number of objectives that need to be addressed:

- They want to make sure tiered-service models do not result in a digital divide and that, despite differentiated pricing, all users are able to afford broadband access;

- They prefer to foster continued competition within the ICT industry by preventing network operators from locking in consumers into uncompetitive services;
- They want to ensure that access to content is not unilaterally blocked or undermined by political or commercial interests.

These priorities need to be tackled when, for example, the topic of QoS is addressed—both in terms of traffic management practices and monetization models. One challenge is how to allow network traffic management for legitimate purposes (such as prioritizing data packets related to remote health monitoring), while precluding anti-competitive practices. The other is how to allow for differential pricing in a manner that allows private operators to generate reasonable returns on investment and continue to encourage innovation.

It is, therefore, in the best interests of the ICT industry to work collaboratively with policymakers to develop thoughtful solutions on issues like monetization and investment incentives. One approach could be to increase the proactive sharing of the various national regulatory approaches across the public and private sectors, develop deeper insights into the impact on industries and consumers and capture the key lessons.

Addressing the issues will not only help reduce regulatory uncertainties, but also it is a precondition for developing the next generation of intelligent infrastructures in health, energy or transportation. Although still in their early stages, many of these emerging applications rely on some sort of QoS differentiation and the corresponding network traffic management if they are to serve consumers well. For example, in e-health, the data traffic associated with remote patient monitoring needs to be transferred securely, reliably and

² Holton, Kate. “UPDATE 1-Vodafone Eyeing New Internet Revenue Options.” Reuters, November 19, 2009.

³ WiWo. “Alcatel-Lucent: Sicherheit im Internet sollte etwas kosten.” April 18, 2009.

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in a highly prioritized manner, so that health-care providers can react immediately in the case of an emergency.

Develop pilots in emerging “intelligent infrastructure” markets

The next generation of intelligent public infrastructure offers promising market opportunities, but these emerging markets are technologically complex and fragmented. An early, visible success would help to establish proof of concept and encourage broader efforts. To that end, ICT participants can prioritize one of the less-complex opportunities in this space and use a more collaborative approach to tackle the issue and then share the success of the pilot. One candidate for the pilot might be the deployment of an automated meter infrastructure (AMI). A majority of planned AMI deployments will take place in the next two to three years and will play a critical role in the creation of smart grids. Smart meters will allow utility companies to manage and forecast demand better, while helping consumers save money. By working together to develop interoperable communication protocols, software and hardware solutions, ICT participants can develop that market.

II. Protect personal data and bring its use to full potential

The use of personal data is still in its infancy and has enormous potential to fuel further growth in ICT markets. As digitization and connectivity increase, more and more data is accumulating on individuals’ profiles and their activities. Such data is generated by individuals themselves as they interact in the digital world, but increasingly, also by the devices they use. As data processing and data storage costs decrease, it becomes easier for companies to use sophisticated techniques to mine that data. In particular, patterns in mass, anonymous data bear a significant

commercial potential for companies offering individualized products and services.

But first, in order for this potential to be realized, some very real, multifaceted challenges—ranging from technologies to policies to user education—must be overcome. The Forum’s IT and telecommunications industry partners singled out several pressing concerns:

- Many companies have inadequate security provisions in place in terms of policy, process or technology;
- Consumers cannot control—or, indeed, even access—all the data they generate today in areas like energy consumption or medical records;
- Consumers have very different levels of privacy sensitivity. It is a challenge to specify policies that address those diverse needs;
- Consumers often lack a detailed understanding of the implications of sharing their data. In part, that is because many companies do not make their policies easy for consumers to access and understand. But many consumers also do not invest time in understanding the information companies do make available;
- The ICT industry participants have several views on how to aggregate, disguise and mine individual data patterns appropriately for their collective value. They are all deeply concerned about how best to protect personal data of customers, commercial partners, employees and shareholders in an increasingly digital and networked environment.

The World Economic Forum’s IT and telecommunications industry partners agreed that the industry needs collaboratively to act to address these challenges. A few potential solutions that can be considered are:

Enabling growth: Horizontal opportunities for the ICT sector**Create mechanisms that will win consumers' trust in the way personal data is handled**

Transparency is the first critical step toward gaining the trust of consumers. One area to be explored is the creation of a third-party “identity bank,” an intermediate entity managing the interface between individuals and companies utilizing data—which merits further discussion among industry participants. While different architectures are possible for such an intermediary, there is complexity in creating an architecture based on the key principles of transparency and anonymity to ensure that personal data cannot be traced back to individuals.

An additional proposed solution is the adoption of an industry-wide code of conduct accompanied by some level of certification by an independent entity. Industry participants could then use the certifications to signal to consumers their trustworthiness with regard to data privacy and data processing. Naturally, such certifications would need to have a sufficient level of rigor in assessing a company's privacy and processing standards. Such initiatives have already begun to emerge—for example, the European Privacy Seal (EuroPriSe).⁴

Give customers more control over their personal data

At the heart of many recent flare-ups over personal data misuse is the notion that some consumers feel surprised by how their personal data is used.

A vivid example is Facebook's “beacon” advertising system. The system tracked the shopping activities of Facebook users even

outside the Facebook site. A user's friends then received shopping recommendations based on the user's purchases; in other words, the system worked like an automated referral mechanism. The issue was that users participating in the system were not fully aware of being tracked, despite Facebook's efforts to inform them and provide an opt-out mechanism. As a result, users felt that Facebook was inappropriately making their shopping behavior public to a wider audience. Following the customers' reactions, Facebook first changed its system to a model where users proactively opt in⁵ and later shut the whole service down.⁶

The industry could avoid such incidents by offering customers more control over how their data is used. “Control” in this context means that customers have explicit opt-in or opt-out choices on how their personal data is used. Control also implies that customers may determine to what degree their data is shared with others. The continued development of privacy-enhancing technologies will augment the ability of companies to facilitate increased levels of protection and control, but consumer education and communication will remain of paramount importance. Customers need to be aware of the implications of their data opt-in/opt-out choices. That means data privacy statements need to be written in a brief and easy-to-understand manner and must figure prominently on a company's website. Such measures would reassure customers that they have control over the use of their data.⁷

Aim for international policy alignment on data privacy and processing

Companies with international customers face the additional challenge of regulatory

⁴ EuroPriSe (European Privacy Seal).

⁵ Nakashima, Ellen. “Feeling Betrayed, Facebook Users Force Site to Honor Their Privacy.” *Washington Post*, November 30, 2007.

⁶ McCarthy, Caroline. “Facebook Beacon Has Poked Its Last.” *CNET News.com*, September 18, 2009.

⁷ The challenge to implement such measures is illustrated by the spirited discussions on Facebook's recent changes to its privacy policy. In December 2009 a complaint against Facebook's new privacy policy was filed at the Federal Trade Commission (Stone, Brad. “Privacy Group Files Complaint on Facebook Changes.” *The New York Times*, December 17, 2009.)

complexity. While some countries, such as the US, currently have little to no data privacy legislation in place, others, such as EU members, have more stringent laws with active enforcement. Companies, therefore, need to adapt their internal rules about how consumer data is used based on the individual's country of residence. It is easy to envision how that could quickly get more complex. Another glitch: EU regulation does not allow data exports to non-EU countries without sufficient privacy protection in place, posing a limit on applications based on data aggregation. Thus, EU regulation has an impact beyond Europe's actual borders.

The US and EU policymakers have begun to address this issue, notably through the establishment of the "Safe Harbor Agreement," an alignment of privacy policy regulation between the US and the EU. US companies adhering to the privacy standards of the Safe Harbor Agreement also fulfill the EU's privacy requirements and may process data (originating from the EU) from outside the EU's borders.⁸

The ICT industry should focus on establishing similar, bilateral agreements—for example, with economies of the Asia-Pacific region—in order to achieve a stable regulatory environment for privacy-related issues. The next step in this process should be to create a forum aimed at harmonizing data-protection laws internationally. That task is easier said than done, given different cultural norms around the issues of privacy—but a standardized global code would be a significant step forward in winning the consumers' trust.

III. Ensure both industries and individuals have incentives to create content

For the past decade we experienced an unprecedented shift in the creation, delivery and consumption of media from the physical to the digital world.⁹ Not only is content increasingly distributed and consumed in digital form, but individuals can now easily create and distribute their self-produced content on many platforms. However, the digitization trend is accompanied by disruptions and challenges for all market participants because the old mechanisms for monetizing content do not currently carry over to the digital world. Concurrently, newer models, while emerging, do not guarantee the same profitability levels for all participants.

The disruptive development of shifting from physical to digital raises two questions: how to monetize the intellectual property of digital content effectively, and how to create incentives so corporate and individual content producers continue to develop and create content. There are three solutions that could help industry participants and policymakers as they seek to address these challenges.

Increase availability of digital content protected by "smart" DRM

If content is not legally available in a digital format due to the piracy concerns of content producers, consumers switch to illegal channels. A Bain & Company analysis of CW

⁸ Export.gov. "Welcome to the Safe Harbor." 2009.

⁹ For the US, IDC estimates consumer-generated Internet traffic will grow from approximately 14,000 Terabytes/day in 2008 to 36,000 Terabytes/day by 2013, of which approximately 50 percent will be media-related (Davis, Matt. "U.S. Consumer Internet Traffic 2009–2013 Forecast." IDC #217920, Vol. 1, April 2009.)

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Network's *Gossip Girl*, a network television show popular with teenagers, showed that piracy spiked when episodes were removed from CW's website in an attempt to force television viewing.¹⁰ The same patterns of behavior emerge if consumers perceive the terms of consumption for digital media to be "unfair."¹¹ That occurs when consumers find that, despite paying for content, their consumption options are excessively limited due to particularly restrictive forms of digital rights management (DRM).

At the same time, as they make digital content available more easily, both corporations and individual content creators have a legitimate interest in—and the right to see—their content protected from piracy. The best approach is for the industry to embrace "smart" DRM to protect content. What we mean by "smart" is that DRM is implemented in a way that consumers deem fair, while still serving the industry's needs.

Pertinent examples include iTunes' new Home-Sharing features, where a file may be copied on five different computers in a consumer's home, or the music subscription service Napster, which allows consumers to download an unlimited amount of music as long as the subscription is maintained. Other more subtle DRM options include creating psychological barriers to illegal content sharing. For example, a company can "watermark" content by embedding hidden, non-removable information in media data that allows the identification of the individual who bought the file.

Finally, the industry may want to evaluate opportunities of broad "standardization" of platforms relying on generally accepted media formats or industry standards. Creating and

adopting industry standards has positive effects for the industry as a whole. It creates an environment where the market is not fragmented into subscale niches based on competing standards, encouraging more companies to participate and raise the overall level of innovation. Although it might be tempting for an industry player to foster "ownership" of customers—with the ambition of leveraging the scale of the proprietary solution—in the long term, lock-in effects create extra cost for content providers and potentially decrease the richness of the user experience.

Nevertheless, we should acknowledge that often a "walled garden" approach may facilitate the development of a digital market by offering a vertically integrated and more controlled (and thus better) user experience—particularly in the early stages of market development. Apple, for example, was successful in accelerating the digital music market by pursuing a proprietary system encompassing the device (iPod), media format, DRM system and even self-owned retail stores. However, now iTunes offers DRM-free music, and an increasing number of online stores offer digital music in the non-proprietary MP3 format.

Create revenue-sharing mechanisms that align incentives of content creators and downstream distributors

Often, issues of poor monetization in the digital world arise from poorly aligned incentives along the value chain. An attractive option is to create win-win models benefiting not only content creators but also other participants in the value chain, similar to the revenue-sharing models implemented by new device platforms. One example is

¹⁰ Bain & Company. "Trends in Telecommunications." 2009.

¹¹ McQuivey, James with deLussanet, Michelle, Wilkos, Dan, Garon, Abe K., and Florentino, Remy. "How to Keep Casual Video Piracy at Bay in 2009." Forrester Research, December 2, 2008; Morgan Stanley. "Media: The Pause Button 2: YTD DVD Sales Down Less Than Expected, Rental Revs OK." July 16, 2009; Helberger, Natalie (ed.), Dufft, Nicole, van Gompel, Stef, Kerényi, Kristóf, Krings, Bettina, Lambers, Rik, Orwat, Carsten, and Riehm, Ulrich. "Digital Rights Management and Consumer Acceptability: A Multi-Disciplinary Discussion of Consumer Concerns and Expectations." Indicare, December 2004.

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NTT DoCoMo's revenue sharing with content providers on its i-mode service;¹² another is the software stores for smart phones, such as Apple's App Store for the iPhone or Google's Android Marketplace. There, developers can upload self-developed programs and earn 70 percent of the revenue generated, while the other 30 percent remains with the device manufacturer (Apple) or the network operator (the model Google adopted for its Android platform). An added benefit for developers is that the store "operator" handles all the billing, and can help to promote applications to interested user segments. In September 2009, Vodafone introduced a similar service with *Vodafone 360*.¹³

Apart from the immediate advantage, the industry also benefits as the virtuous cycle kicks in: More consumers create services and applications, thereby increasing the overall value of the ecosystem. Corporate content producers need to develop similar models for revenue sharing across the value chain. Newspapers or press agencies, for example, could participate in ad revenues displayed alongside their content.¹⁴ Similar models, with the network operator included in the revenue sharing, can also be envisioned, particularly where they can help execute advertising campaigns in a targeted manner.

Add consumer education, warning systems and awareness-building to legal actions in order to fight piracy

The illegal copying of digital content continues to have adverse effects on digital media markets. Therefore, the industry must continue to combat piracy using several different approaches. Recourse to the legal system—whether through anti-piracy legislation or the pursuit of digital pirates via the courts—remains a viable option, but it is not sufficient.

Legal actions do raise consumer awareness of the illegality of content sharing and downloading—when Sweden introduced its new anti-piracy law, file-sharing-related Internet traffic in Sweden dropped significantly for a certain time period.¹⁵ But legal actions may have the downside of negative publicity for the industry, particularly when the perception is that individuals are prosecuted by large, powerful corporations.¹⁶

Legal action, therefore, needs to be integrated with more sophisticated methods to address the problem of piracy. One potential option involves consumer education campaigns. Another potential option is the implementation of "graduated response systems." Such systems issue warning notifications to Internet subscribers who are heavily infringing copyright. After two warnings, for example, further sanctions, such as blocking Internet access, are taken.

Conclusion

To unlock further growth in ICT markets, three key hurdles need to be addressed collectively by private industry participants and public authorities: the risk of lack of incentives for infrastructure deployment; the risk of businesses not using the full potential of personal digital data; and the risk of inadequate rewards for content developers.

Solutions exist—but no single sector can achieve significant progress in isolation. Representatives of the World Economic Forum's IT and telecommunications industry partners acknowledge that and concur that these hurdles could be overcome by collaborative solutions:

¹² NTT DoCoMo *Mobility*. "The i-mode Revolution, Ten Years On." April 2009.

¹³ Wood, Nick. "Vodafone Opens up with LiMo-based Handset for Social Network Aggregator." Total Telecom, September 24, 2009.

¹⁴ Newspaper Association of America. "Platforms for Monetizing Digital Content." September 2009.

¹⁵ BBC News. "Piracy Law Cuts Internet Traffic." 2009.

¹⁶ Calefati, Jessica. "Illegal Downloading Costs Grad Student \$675,000." *US News & World Report*, August 5, 2009.

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- ***Provide incentives for infrastructure investments in ICT*** by monetizing QoS in network infrastructure; working with policymakers to nurture ICT infrastructure investments; and developing pilots in emerging “intelligent infrastructure” markets such as smart grids or e-health;
- ***Protect personal data and bring its use to full potential*** by creating mechanisms that will make consumers trust in the way personal data is handled; giving customers more control over their personal data; and aiming for international policy alignment on data privacy and processing;
- ***Ensure both industries and individuals have incentives to create content*** by providing consumers with easy and legal access to digital content and services; sharing revenue generated from content along the value chain; and protecting industry- and user-generated content.

In these three areas, by walking in step, the ICT industry can make great strides forward. The commitment of various stakeholders, both private industry participants from different ICT sectors as well as public authorities, will be necessary to define and implement next steps in the immediate future. Though the short-term economic rewards of such efforts are uncertain, the long-term benefits for the private and the public sector are undeniable. 

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MUMBAI • MUNICH • NEW DELHI • NEW YORK • OSLO • PALO ALTO • PARIS • ROME • SAN FRANCISCO • SÃO PAULO • SEOUL • SHANGHAI
SINGAPORE • STOCKHOLM • SYDNEY • TOKYO • TORONTO • ZURICH