

Telenor research on Telco

# TRENDS

2016

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# TELENOR RESEARCH ON TRENDS FOR 2016

In the beginning of each year 'everybody' is trying to predict what will be the next big thing, what will be "in" and what will be "out", what is hot and what is not in the year to come.

In Telenor Research we work to bridge academically interesting issues with business relevant challenges and as a consequence, we are often asked to "predict" what is coming of new technologies, track trends and political sentiments.

In the 'Telenor 2025' project we tried to map out what the future for the telco industry could look like as a function of trends that are apparent today and some thorny, genuine uncertainties. What we saw was that looking 10 years ahead, a lot of what now seems uncertain is sure to happen. The hard part is predicting exactly when it will happen.

It is therefore with some trepidation that we chip in with '2016 according to Telenor Research' where we give our best guess about six important trending areas.

I hope the report will give you new insights.



Bjørn Taale Sandberg  
Head of Telenor  
Research



Everybody says that "The future is digital»; however, have they noticed that the future is already here?

We are experiencing digitalization of many aspects of our daily lives, from buying coffee and bus tickets with the phone to getting advice on when we should start for the airport – basically the smartphone is in the center of it all.

Digitization will transform all aspects of our industry. To help you navigate, we have looked at six trends that we believe will be important in 2016. None are radically new. You may have heard about them before, but we believe that 2016 is the year the adoption or the application of these trends will start to be felt.



## SERVICE DESIGN - CUSTOMERS WILL 'CO-CREATE' SERVICES

Customers are increasingly digital savvy, demanding and empowered. This puts demands on companies to deliver superior digital customer experiences, and be more aligned with the customer's changing behavior than ever before.

This is not a new development, but the businesses' ability to do this has improved significantly in the last few years, and in 2016 the work will start to bear fruit. Companies have matured and are now systematic about the way they involve customers.

It is easy to underestimate the impact this change will have. Service design is now a globally recognized competitive capability and seen as key in creating superior customer value in fast-changing service industries.

All elements in the digital journey are moving faster. The

production of services also needs to move faster. Service design offers a fail-fast iterative processes of prototyping with key actors (including the customer) in early stages of service development. The approach dramatically improves the chance that services will be supported across the 'silos' in the organization, and, crucially - be used by the customer in the markets.



Annita Fjuk, PhD  
Senior Research Scientist at Telenor  
Research and expert in Service design and  
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## LOW POWER WIDE AREA WILL ENABLE A LOT OF NEW IOT SERVICES

Unfortunately, traditional telecom operated cellular networks do not meet the low cost, low power consumption and traffic pattern requirements of the future Internet of Things (IoT) devices. This is where Low Power Wide Area (LPWA) networks come into the picture. LPWA is a collective term for a collection of competing technologies, including but not limited to: Long Term Evolution for Machines (LTE-M), Narrowband Internet of Things (NB-IoT) and LoRa (Long Range).

LPWA technologies got a lot of attention in 2015 and we believe that 2016 will be the year where we will see such networks deployed at large scale and thus making many new and exciting IoT services and platforms possible.

IoT devices such as sensors and actuators can be produced at low cost for LPWA networks. They could be

connected to a LPWA network for less than \$5 a year and have a battery life of up to 10 years in many cases.

LPWA will be one of the enablers for a smart society where we for example will have intelligent health monitoring system, smart facility management and waste management solutions.

As a side step it is also worth mentioning Bluetooth Smart Beacon technology. In 2016 deployments of beacons as part of personalized proximity marketing solutions will be highly visible.

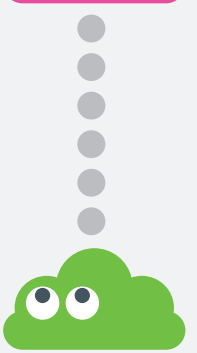
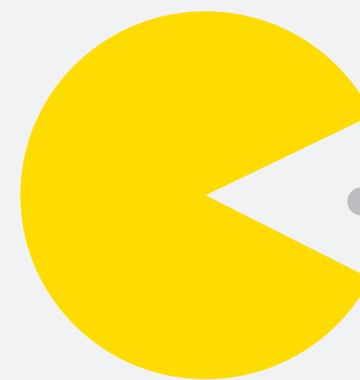


**Arne Munch-Ellingsen, PhD**  
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# SOFTWARE IS EATING THE NETWORKS



When Marc Andreessen stated that “software is eating the world”, he was referring to well established industries being disrupted due to new ways of distributing and consuming products using software. Examples are the new music and movie streaming services like Spotify and Netflix. Today we also see that networks are being softwarized.

In the center of this trend are ‘Network Function Virtualization’ and ‘Software Defined Networking’; technologies that are enabling new ways of designing, implementing and operating networks. The former is about decoupling the network functions from proprietary hardware so that they can run in software for accelerated service provisioning and innovation. The latter makes the network programmable by separating the control and data planes.

In 2016 we are likely to see the early majority of operators start deploying these technologies and we will see new innovative services starting to appear. The trend will have a huge impact on actors in the telecommunications industry including vendors, operators and other service providers.

These technologies can give operators the agility and flexibility to deliver new, and improved existing services much faster than before. Secondly, it promises to improve the operational efficiency of operators by automating many operational tasks.

To realize the benefits of network softwarization there is a need for transformation. Convergence of networks and IT is at the center of this trend and we believe that the operators and other actors in the telecommunications industry will have to start bridging the gap this year.



**Pål Grønsund, PhD**  
Research Scientist at Telenor Research and expert in Network Function Virtualization and Software Defined Networking



# MACHINES WILL UNDERSTAND MORE DIGITAL CONTENT

The last years we have seen breakthrough after breakthrough when it comes to computers' and machines' understanding of digital content. Artificial intelligence is now able to tell you what is in an image, translate text and understand speech better than ever before.

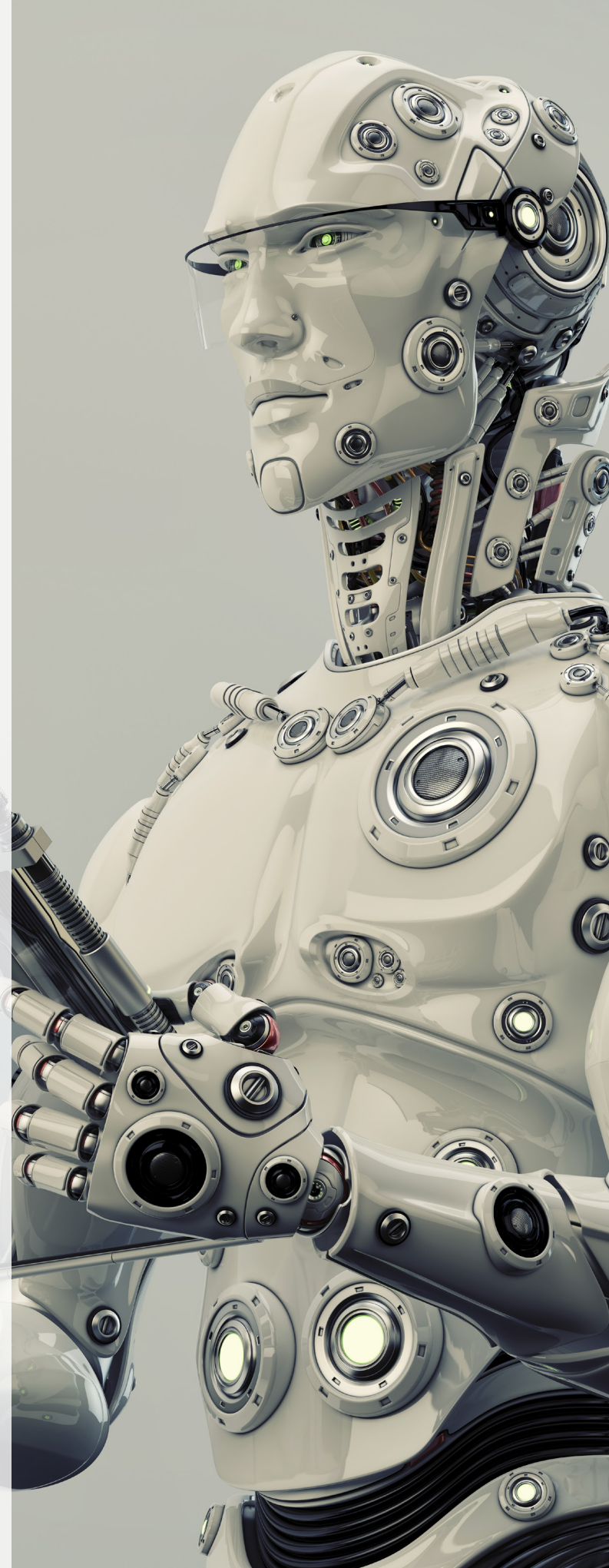
As machine learning techniques continue to get more sophisticated, they will be more deeply integrated into digital services and devices, so you will get services that understand you better and are tailored to your needs. Computers will become more adaptable to humans, and not the other way around. You will have services and devices that have more human-like interfaces. This will enable more users to get online, since the digital barrier will be lowered.

The 'machine learning revolution' is the result of two key enablers; access to massive amounts of data and the continued increase in computing power. Both are growing at an exponential rate and research into machine learning algorithm is massive.

In the next year, understanding digital content will thus advance even further and we will experience this through new services, better digital assistants, better search results, better suggestions and more relevant ads.



**Axel Tideman, PhD**  
Research Scientist at Telenor Research  
and expert in Artificial Intelligence



## LEVELING OUT THE PLAYING FIELD IN THE DIGITAL ECONOMY

In the last few years many new firms have been developing innovative services, products and new business models in the digital space that compete with traditional actors serving the same needs. Well known examples are Uber, Airbnb and WhatsApp. As a general rule, frameworks have not been adjusted to the new competitive environment and they are outdated in many respects. For instance, the traditional communication service providers are subject to sector specific rules on privacy and contract terms that internet based providers of communication services do not have to comply with. Moreover, it is not clear whether the taxation principles that are in place now are fit for purpose. Also, sharing economy jobs changed the way in which middle-class workers are employed, but the way in which our society provides work benefits and insurance have stayed the same.

There is growing attention on these issues. We expect that in 2016 the debate on how to adjust the legal frameworks will intensify. Policymakers and regulators will start to discuss concrete ideas on how to adjust to the changes in the society. How the legal frameworks should change will depend on the sector and the characteristics of the services under scrutiny.

We believe that a leveling out the playing field between the traditional businesses and the new comers will benefit the consumers and will foster innovation in our industry.



**Anna D'Annunzio, PhD**  
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Research and expert in Service design and  
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## DATA FOR SOCIAL GOOD

For 2016 we believe that telecom big data will be used more tangibly to help society -for the purpose of social good.

There are many forces wanting the big corporations that collect data, to start using these data when addressing the greater societal challenges we face – issues and problems that can only be solved through cooperation between the private and public sector.

Telenor Group has experience in using Telenor's big data in privacy-conscious ways. One example is by helping understand how human mobility impacts the spread of dengue fever in Pakistan. For this study we took great care to make sure all data was anonymized and aggregated before doing any analysis. The result has been concrete 'heat maps' that help the authorities better predict the outbreak of dengue in Pakistan and thus know where to send aid. Doing more of these kinds of activities is important for society, simply because it can save lives. Doing it right in terms of privacy is critical to keep the trust of our customers.

Over the last few years we and others have contributed with examples of 'Data for Good' projects. The awareness of the potential is now growing with policymakers and industry. For this reason we predict that 2016 will be the year where this approach will go 'mainstream' and we will be able to make a real impact by using our 'big data' core competence in addressing some of society's 'big questions'.



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Senior Data Scientist at Telenor  
Research and expert in Big Data  
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**Sidsela Nyebak,**  
Director Group Sustainability,  
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## CONCLUSION

2016 will be an exciting year for Telecoms. We are embarking on our change journey, prodded on by evolving customer expectations, competition, regulation and accelerating technological change. Change that in our opinion brings more opportunities than it does challenges.



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