Detecon, Thailand

Policy and Regulatory Issues on 5G and Next Generation Services
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www.detecon.com
1. Detecon – Who we are?

2. 5G Background and Selected Regulatory Issues

3. 5G and Services
Partner and Head of Delivery Detecon Asia Pacific: Dr. Werner Knoben

Dr. Werner Knoben
Partner

Area of studies
- PhD in Mathematics: RWTH Aachen University, Aachen

Professional Experience
- T-Com / Deutsche Telecom / Detecon – Partner: Bidding and Auction Strategies; War gaming; Regulatory strategies; Due Diligence; Scenario Analysis

Key Qualifications
- Regulatory and wholesale strategy, market liberalization, competition law, regulatory costing and accounting separation
- Auction Design, Auction Strategies, Game Theory, War gaming, Communication Strategy, Bid Strategy
- Consumer and B2B strategy, Business Cases, Scenario Analysis

Selected Project Experience
- TRA Oman: Setup of a 4G spectrum auction
- NCC Nigeria: Setup of SMS and Data Interconnection Regulation
- NBTC Thailand: Development of an Accounting Separation Framework
- SingTel, Singapore: Auction and bid strategy and 4G license valuation
- TMMK/MKT, Macedonia: Regulatory Costing
- Advisor for Deutsche Telekom subsidiaries in Croatia, Hungary and Slovakia for regulatory strategies
We are part of Deutsche Telekom Group, the number one ICT provider in Europe. Our goal is to leverage the strengths of the group in international markets.

Key Facts Deutsche Telekom Group

- USD 75 billion net revenue
- 239,000 FTE employees
- 1,500 headcount in group innovation and partnerships
- 50.5 million fixed network lines
- 123 million mobile customers
- Number one ICT provider in Europe
- Number one cloud provider outside US
- Strong international footprint
- Group vision: The customers’ first choice for connected life and work
Detecon’s global presence ensures that clients get access to the knowledge and know-how of telecommunications experts worldwide.

Key Facts Detecon International GmbH

- Foundation:
  1954 – Diebold
  1977 – DETECON

- Restructuring:
  2002 – Detecon International GmbH

- Shareholder:
  T-Systems International GmbH

- Employees:
  More than 1,000 worldwide

- Turnover 2012:
  EUR 168 million

- Locations Germany:
  Cologne (head office),
  Dresden, Eschborn, Munich

- International Locations:
  Abu Dhabi, Almaty, Ankara, Bangkok,
  Beijing, Jakarta, Johannesburg,
  Moscow, Riyadh, San Francisco,
  Vienna, Zurich

Detecon Asia-Pacific Ltd. is focusing on wider South East Asian markets. We can build on successful client relationships that have developed over 25 years.

Key Facts Detecon Asia-Pacific Ltd.

- Business Activities in Asia: Since 1985
- Foundation of Detecon Asia-Pacific Ltd.: 2005
- Major Shareholder: Detecon International GmbH (99%)
- Employees: 45
- Turnover 2012: EUR 7 million
- Regional Headquarters: Bangkok
- Regional Branch Offices: Jakarta, Kathmandu
- Webpage: www.detecon-asia-pacific.com

Presence in Asia

- Detecon Asia-Pacific Ltd.
- Detecon China
- Regional Head Office
- Branch Office
We combine a rich service portfolio with a unique approach to consulting and in-depth knowledge of the industry.

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We support regulatory authorities and operators since 1977 with our deep regulatory and sector reform knowledge and experience worldwide.

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<td>▪ Licensing and Authorization</td>
<td>▪ Media, IT, telecom convergence regulation (e.g. for content and applications, IPTV, PPV, …)</td>
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<td>▪ Examination of political, legal and economic implications</td>
<td>▪ Universal service policy</td>
<td>▪ Technical and economic regulation in an NGN environment, e.g.</td>
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<td>▪ Elaboration of guidelines and policies for sector reform</td>
<td>▪ Tariff policy and tariff regulation</td>
<td>▪ VoIP regulation,</td>
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<td><strong>Communication and Competition Legislation</strong></td>
<td>▪ Interconnection and Access Regulation</td>
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<td>▪ Analysis of existing legal situation</td>
<td>▪ Numbering</td>
<td>▪ NGA industrial policies,</td>
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<td>▪ Primary and secondary legislation</td>
<td>▪ Dispute resolution</td>
<td>▪ Next Generation Data Centre,</td>
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<td>▪ Regulations and calculation models (price squeeze, margin squeeze, predatory pricing)</td>
<td>▪ Market Monitoring and enforcement regulation</td>
<td>▪ Network Resilience and QoS,</td>
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<tr>
<td>▪ Anti-competitive conduct (ex-ante and ex-post)</td>
<td>▪ Consumer, Data and Privacy Protection</td>
<td>▪ OTT</td>
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<td>▪ Frequency spectrum allocation and management</td>
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<td>▪ Standardization and type approval</td>
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**Regulatory Strategy and Telecommunication / Broadcast / Spectrum Master Plans**
Our Asian client base includes donor institutions, regulatory bodies, industry suppliers and telecommunications carriers across the whole region.
A country view on completed projects proves that we are industry experts capable of dealing with strategic challenges as well as detailed implementation tasks.
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Drivers leading to 5G are based on the experience in today’s cellular mobile networks and a projection of the needs in the future.

According to public sources, the following evolutions characterize the mobile trend until 2020, when 5G is supposed to get commercially launched:

- **The number of mobile connections** grows between 2013 and 2018 from 7 billions to 10.2 billions.
- **The mobile data traffic** grows between 2013 and 2018 from 1.5 exaBytes to 15.9 exaBytes; 1 exaByte = 1 Mio teraBytes.
- **The mobile cloud traffic** share shall grow between 2013 and 2020 from 35% to 70% of the mobile data traffic.
- **The number of things connected** grows between 2010 and 2020 from 12.5 billions devices to 50 billions devices.

The above increasing demand leads to a three-fold requirement to 5G:

- A better end-to-end performance
- A better support of non-traditional applications
- A reduced energy consumption to enable the IoT (Internet of Things)
The vision about 5G, even though expressed differently by technology influencers as vendors, OpCos and their R&D partners, can be summarized in few keywords.

### 5G – Application domains

- **Everything on Cloud:** Desktop-like experience on the go
  - Source: Samsung DMC R&D Communications Research Team, 2014

- **Immersive Experience:** Lifelike media everywhere

- **Ubiquitous Connectivity:** An intelligent web of connected things
  - Source: Samsung DMC R&D Communications Research Team, 2014

- **Intuitive Remote Access:** Real-time remote control of machines

### 5G – Overall vision

The vision from different mobile cellular technology vendors, OpCos and their R&D partners about 5G use cases can be summarized as follows:

- **Everything on cloud:** in future, applications, computing power, memory and storage shall be made available in the cloud, enabling desktop-like experience on the go. A necessary condition for cloud architectures is a fast network technology with low latency like a technology of the 5th Generation.

- **Immersive experience:** 5G shall make more bandwidth available than 4G can do, enabling augmented reality applications and life-like media everywhere.

- **Ubiquitous connectivity:** with increasing number of connected things, information exchange can be made more efficient when devices communicate in an ad hoc mode. This leads to an intelligent web of connected things.

- **Intuitive remote access:** real-time remote control of machines
Spectrum availability/efficiency is of highest relevance to meet throughput requirements. Considering requirements of 5G in spectrum decision/policies has to start today.

**Immersive Experience**

- Constant Ultra High Quality Experience
- 8K UHD > 100 users

**Requirement Spectrum**

- Cell throughput up to 10Gbps requires beside new innovative technologies and small cell solutions also
  - more spectrum available
  - higher spectrum efficiency
  - spectrum interference management

**Regulatory Areas**

- New spectrum bands allocated to mobile and related re-farming activities
- Redesign of spectrum trading and sharing policies
- Step 1: Increasing efficiency of spectrum allocation policies (reconsideration of set-aside spectrum policies, rigid spectrum caps, …)
- Step 2: Introduction of innovative spectrum allocation mechanisms (spectrum spot markets)
Intuitive Remote Access

Making a high user throughput and a low end-to-end latency available, 5G shall enable long range remote control and augment the remote control experience.

**Requirement Latency**

- 5G shall provide a superior network performance with an end-to-end network latency of around 5 ms corresponding to an air latency of 1 ms
- Latency requirements requires decentralization of services which define high latency requirement

**Regulatory Areas**

- Backhaul might become the new bottleneck (also due to throughput requirements) which might require regulatory attention in terms of sharing and RAN virtualization
- Additional decentralized infrastructure likely coming with higher CAPEX/OPEX and access issues (one network for all?)
The discussion around network coverage and service interconnectivity are getting a new push with 5G. But also considerations around public safety are necessary.

**Ubiquitous connectivity**

An intelligent web of connected things (IoT)

- Personal
- Home
- Retail
- City, Transportation
- Manufacturing

**Requirement Public Safety, Coverage & Interconnection**

- New technologies might impact public safety guidelines (example: device to device communication)
- More customer centric network impact network resilience
- Service interconnection?

**Regulatory Areas**

- Redesign of public safety requirements necessary to reflect new technical capabilities (Example: Blackberry 2010) with clear guidance for the industry
- Decentralization necessary to fulfill latency requirements requires reconsideration of network resilience codes and disaster recovery practices
- Network coverage (USO?) and service interconnectivity must be discussed
Increasing trend of cloud services require globally effective data protection mechanisms to increase consumer trust in 5G services.

### Requirement Data Protection

- Personal data are stored globally in data center but also in locations closer to customer reflecting latency requirements
- Data exchange between different organization / instances over borders of increasing importance

### Regulatory Areas

- Global data protection standards in terms of
  - Right to be forgotten
  - Privacy by default
  - Data portability
- Consistent mechanisms, same rules for all providers and globally effective enforcement power

### Everything on the cloud

**Instantaneous Cloud Service**

**Latency**: \( \sim 5 \text{ ms} \)

**\( \sim 9.6 \text{ sec} \)**

To download HD movie (1.2GB)

**Requirements for Mobile Cloud Service**

- E2E NW Latency < 5 ms
- Data Rate > 1.0 Gbps

**Access Time**

<table>
<thead>
<tr>
<th>HDDMB</th>
<th>8.5 ms</th>
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**Transfer Rate**

| 1.2 Gbps |
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The current apparent imbalance regarding market and market entry conditions between licensed operators and OTT players needs solutions to pave the way for 5G.

### The (un)-Level Playing Field

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<th>Regulation</th>
<th>Licensed Network Operators</th>
<th>OTT Players</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licensing</td>
<td>Subject to license and license fee</td>
<td>No license required</td>
</tr>
<tr>
<td>Quality of Service</td>
<td>SLAs included in the license</td>
<td>No quality requirements</td>
</tr>
<tr>
<td>Interconnection</td>
<td>Interconnection mandated</td>
<td>No interconnect requirements</td>
</tr>
<tr>
<td>Universal Service</td>
<td>Usually subject to universal service obligation</td>
<td>Not subject to universal service regime</td>
</tr>
<tr>
<td>Consumer protection</td>
<td>Subject to (enforceable) consumer protection policy</td>
<td>No or little enforcement power</td>
</tr>
<tr>
<td>Legal interception</td>
<td>Usually license condition</td>
<td>Country dependent</td>
</tr>
<tr>
<td>Taxation</td>
<td>Subject to national tax regime</td>
<td>Service dependent</td>
</tr>
</tbody>
</table>

### Comparison of market conditions

- Network operator’s **business model** is determined by regulatory requirements
- **OTT Players** are usually **free** of such **limitations**
- Current market setups have **not yet adapted** to the new competitive situation
  - Competition is **dysfunctional**
  - Regulators **punish** network operators that invest in local **infrastructure**, are an important source for local **employment** and are local **tax payers**
5G is leading to the convergence not only of services and business areas, but also of regulations and laws. The coordination of previously separate bodies is vital.

At a minimum regulation of the following should be closely coordinated:

- Financial services
- Data privacy and protection regulation
- Broadcasting/publishing
- Communications/ICT.

Beyond this the integration of broadcasting, communications (and publishing?) regulatory bodies should be assessed and implemented if appropriate.
Thanks for your attention

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