Machina Research

THE IMPACT OF REGULATION ON THE INTERNET OF THINGS

Webinar, January 2015

About Machina Research

About Machina Research

- **Machina Research is the world's leading provider of market intelligence and strategic insight on the rapidly emerging Machine-to-Machine (M2M), Internet of Things and Big Data opportunities.**

- **We work in two ways:**
  - Our **Advisory Service** consists of a set of Research Streams covering all aspects of M2M and IoT. Subscriptions to these multi-client services comprise Reports, Research Notes, Forecasts, Strategy Briefings and Analyst Enquiry.
  - Our **Custom Research and Consulting** team is available to meet your specific research requirements. This might include business case analysis, go-to-market strategies, sales support or marketing/white papers.

Research Streams

Stream	Description
IoT Strategies	Analysis of the evolution and impact of the emerging concept of the Internet of Things. Topics covered include software platforms, application development, data management, and key players in this new emerging field.
Connected Car	Vertical sector analysis of the 11 Application Groups related to connected road vehicles including Fleet Management, Stolen Vehicle Recovery, Usage-Based Insurance, and Vehicle Diagnostics. Includes analysis of both factory-fit OEM connectivity and services, as well as aftermarket applications.
Connected Health	Vertical sector analysis of the 8 Application Groups related to healthcare, spanning from consumer-oriented 'Worried Well' applications, through to clinical implementations.
Connected Cities	Vertical sector analysis of the 5 Application Groups that support the concept of the Smart City. Specifically this comprises Public Transport, Road Traffic Management, Electric Vehicle Charging, Environment & Public Safety (including CCTV and Street Lighting), and Environmental Monitoring.
Connected Industry	Vertical sector analysis of a diverse range of 16 Application Groups related to industrial sectors including Agriculture, Extractive Industries, Smart Grid, Retail, Vending Machines, Manufacturing, Public Space Advertising and Supply Chain.
Connected Living & Working	Vertical sector analysis covering 17 Application Groups related to connected home and office environments, including Smart Metering, Building Automation, and Consumer Electronics.
M2M Forecast Database	Our comprehensive quantitative guide to the growth of the M2M market, featuring forecasts of connections, technology, traffic and revenue for 200 countries across all 60 application groups covered in our 'Connected' programmes as mentioned above.
M2M Strategies	Covering commercial and technical best practice in all aspects of the provision of connected solutions, including devices, networks and service providers. Covers topics such as new technologies, standards, value chain positioning, pricing and M&A.
Smarter Cars	Focuses on key issues for the evolving connected car, including analysis of operating systems, OEM strategies, new business models, alternative vehicle-related applications and new developments such as autonomous driving.
Future Wellness	Addresses the corporate wellness market, examining how organisations can apply technology to improve healthcare amongst stakeholders, including employees, customers and patients. Includes analysis of non-M2M healthcare applications including mobile phone applications.
Smart Cities	Looks at smart city initiatives from the perspective of the would-be user. Provides city managers with analysis of smart cities overall, recommendations over thresholds and context for deployment of different smart city applications, best practice for implementation and case studies of deployments.
Enterprise IoT	Examines how enterprises should prioritise and approach selecting and implementing IoT applications and solutions in various domains. Explores the potential partnerships and collaborations, enabling (data) technologies and protocols, and how enterprises can secure IoT solutions with SLAs.
M2M & IoT Regulation	Country-by-country analysis of the regulatory issues relevant to M2M and IoT. Each country profile examines issues such as licensing, roaming (including permanent roaming), numbering, spectrum availability, and data sovereignty. Also includes analysis of overall trends.

Machina Research's Thought Leaders

Godfrey Chua
Principal Analyst
Focus areas: Americas, carrier strategies, industrial, connected home and workplace

Jim Morrish
Founder & Chief Research Officer
Focus areas: Enterprise IoT, M2M application software, M2M & IoT platforms

Andy Castonguay
Principal Analyst
Focus areas: Americas, M2M/IoT devices & modules, wearables, healthcare

Emil Berthelsen
Principal Analyst
Focus areas: Enterprise IoT, big data, mobile enterprise application platforms, procurement, SLAs, QoS

Jeremy Green
Principal Analyst
Focus areas: Automotive, M2M and IoT technology ecosystem, key IoT players

Emma Buckland
Principal Analyst
Focus areas: M2M forecasts, consumer electronics, connected living, regulation

Matt Hatton
Founder & Chief Executive Officer
Focus areas: Operator M2M and IoT strategies, channels, M2M technologies, regulation

Alex Chau
Research Director, Head of Asia
Focus areas: smart cities, privacy and security, the Asia-Pacific region

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Some of our clients

Research Stream: M2M & IoT Regulation

Topics Covered

- **Permanent roaming – Offering services globally is critical one for supporting M2M. Regulatory prohibition of permanent roaming will fundamentally influence how connectivity is provided.**
- **National roaming – Regulation varies in how easy it is to use this useful tool for M2M**
- **Spectrum licensing – Issues of availability and use of spectrum. Includes TV White Space, LPWA and unlicensed spectrum**
- **Numbering – What are the pros and cons of using this.**
- **Data sovereignty – What are the rules on how data can be stored and sent overseas?**
- **Data privacy – Implications of data privacy rules.**
- **Other regulatory issues –Including subscriber registration and taxation.**

Our M2M and IoT Regulation Database provides country-by-country analysis of the legal and regulatory position regarding the provision of M2M and IoT services:

Permanent roaming	The ability to offer services globally is a critical one for supporting many vertical sectors including automotive and consumer electronics. Regulatory prohibition of permanent roaming will fundamentally influence how connectivity is provided.
National roaming	The ability to make use of multiple networks within a territory will be useful for many M2M and IoT applications. However, regulatory positions vary with some countries prohibiting the use of national roaming.
Spectrum licensing	Technology choices may depend on what, how, and how much, spectrum is made available. Availability of White Space might have an influence of how M2M/IoT evolves. There are licensing issues related to the use of unlicensed spectrum, e.g. for LPWA.
Data sovereignty	Different countries have starkly different rules about how data needs to be managed, for instance restrictions on whether the data can leave the country, and if so, which elements.
Other regulations	There are a number of other regulatory issues, including numbering, service provider licensing, mandating of technology choices, subscriber registration and taxation, that will have an impact on M2M and IoT.

Deliverables

- **New and updated country profiles of the regulatory position regarding M2M and IoT across the key themes mentioned above, in over fifty of the top global markets.**
- **Approximately six Research Notes (4-6 pages) examining the key trends in regulation of M2M and IoT.**

Lead Analyst

Emma Buckland

There are a number of regulatory issues that have the potential to hinder the growth of the Internet of Things, including permanent roaming, national roaming, spectrum licensing and data sovereignty. Based on Machina Research's extensive research in this area, this Research Stream provides analysis of the current regulatory landscape, identifies expected future developments and assess the critical factors that may affect adoption of M2M and IoT.

Introduction to M2M and IoT

Many motivations for connecting devices

Smart Meters

eCall

PS Vita

Connected Car

Big Belly Solar

Tractors

Sealed Air

Zipcar

1. join

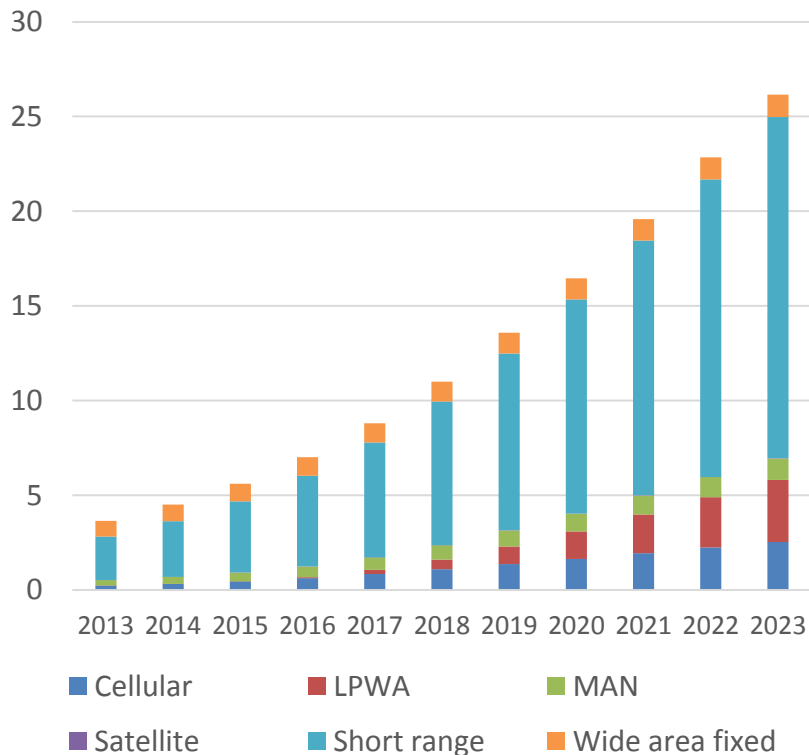2. reserve

3. unlock

4. drive
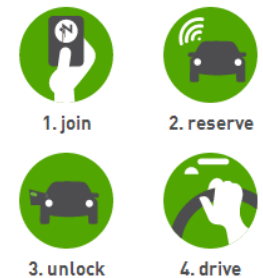
Efficiency gains

New business models

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M2M connections will grow from 4 billion in 2014 to 26 billion in 2023

Global machine-to-machine connections 2013-23
Source: Machina Research M2M Forecast Database, 2015

- **Machina Research defines M2M as "Connections to remote sensing, monitoring and actuating devices, together with associated aggregation devices"**

- **Based on this definition there are 4 billion M2M connections today and this will grow to 26 billion in 2023**

Evolution from M2M to IoT

M2M

- Connected devices and associated applications
- Fixed solution parameters
- Rigid solution architecture
- 'Speed' designed in where necessary
- Applications in the context of verticals and niches
- Data is meaningful in context
- Structured data
- Predictable growth (in connections and data generated)
- Data ownership often clear

IoT

- Complex applications and data analysis
- Heterogeneity and flexibility of solution components
- Distributed and federated processing, storage and querying
- 'Speed' needs to be supported as and when requirements emerge
- Data disassociated from any source
- Semantic richness, shared context and ontologies
- Semi-structured and unstructured data
- Unpredictable growth driven by network effects
- Data ownership often very unclear

Ten predictions for M2M & IoT in 2015

1. **Enterprises will get cracking in IoT**
2. **More productised offerings**
3. **More M&A**
4. **Breakthroughs in smart city service deployments**
5. **Major OS vendors disrupt the connected car market**
6. **Mobile phone as the gateway for IoT**
7. **A year for avatars**
8. **A crunch on regulation**
9. **Segmenting for success and identifying role in IoT**
10. **Privacy and security reach the top of the agenda**

M2M and IoT Regulation

Our M2M and IoT regulation research

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Numbering

- **A number of regulators have opted to implement a dedicated E.164 mobile number range for M2M**

- **Ultimately addressing of all connected devices will be handled by IPv6**

- **CEPT has sought to encourage adoption of dedicated numbering – most EU countries have adopted**

Adoption of dedicated numbering schemes for M2M
Source: Machina Research M2M & IoT Regulation Research Stream, 2015
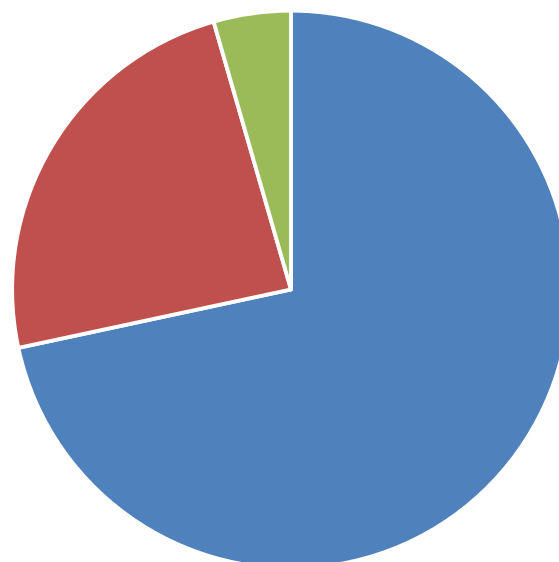

- No M2M numbering
- Dedicated M2M numbering
- In discussion

n = 67

Numbering

- **Wide variation in size**

- **If some regulators are providing 1 trillion numbers (200k/person), how can those allowing only 10 million (2/person) have enough?**

- **Identification of M2M devices may be useful, but no outstanding benefit**

Size of dedicated M2M number ranges for those countries where implemented
Machina Research M2M & IoT Regulation Research Stream, 2015
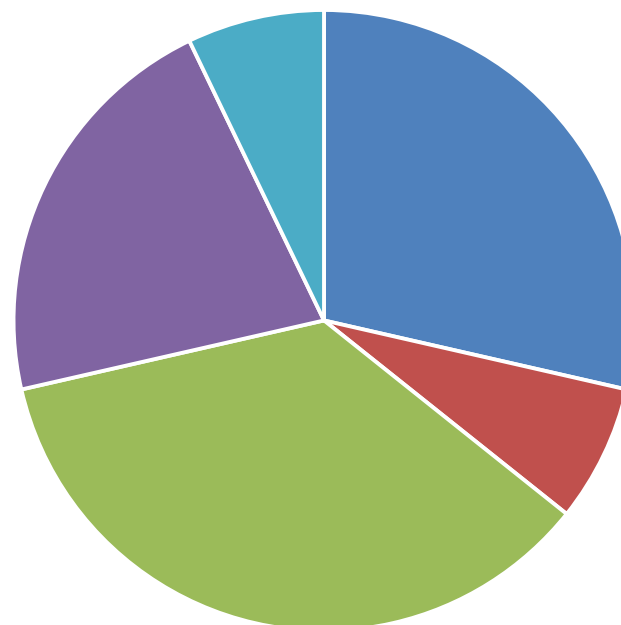
Legend:
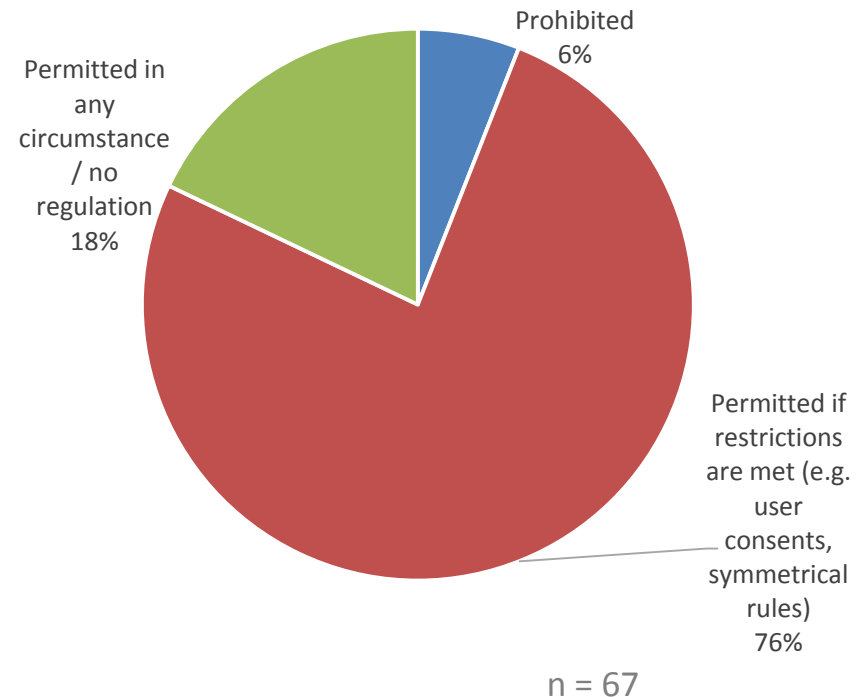- up to 100m
- 100m-999m
- 1bn-99bn
- 100bn-999bn
- 1tn+

n = 14

Data management

- **Rules on data management are taken very seriously by governments and regulators**

- **Laws changing fast and not clear the impact on IoT**

- **Data sovereignty is the critical issue**

- **Distinctions are important and difficult:**
  - comms vs content
  - private vs machine

- **EU introducing new General Data Protection Regulation – anything related to a 'natural person'**

Country regulation on sending personal data across international borders

Machina Research M2M & IoT Regulation Research Stream, 2015

Prohibited 6%

Permitted in any circumstance / no regulation 18%

Permitted if restrictions are met (e.g. user consents, symmetrical rules) 76%

n = 67

Permanent roaming: uncertainty persists around the world

- **"Extra-territorial use of e.164 numbering"**
- **Probably the thorniest issue in M2M regulation today**
- **Supporting overseas connections is critical and existing large installed base of permanent roaming SIMs**
- **Regulatory situation is unclear, and changing**

Regulation of permanent roaming around the world
Source: Machina Research M2M & IoT Regulation Research Stream, 2015

- Explicitly prohibited
- Unclear/ no regulation (probably prohibited)
- Unclear/ no regulation (probably permitted)
- Permitted
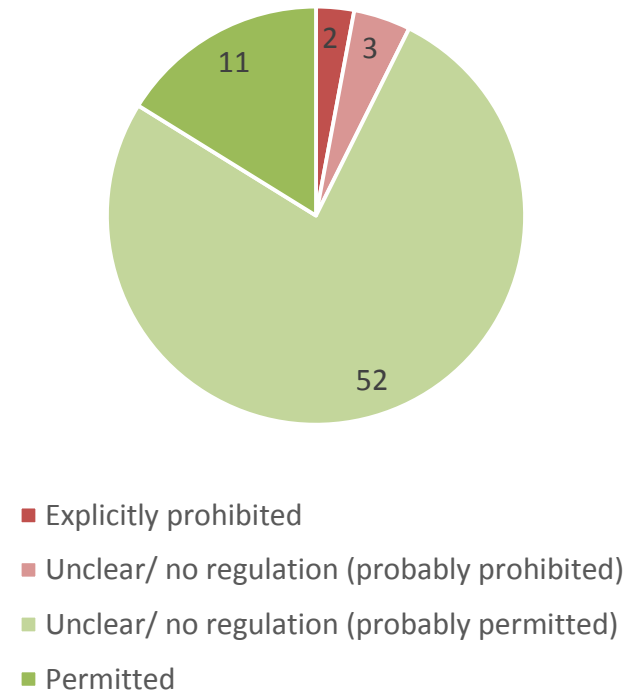
n = 68

The arguments in favour of permanent roaming bans

Argument	Strength
National regulatory oversight	Strong. Foreign operators are not directly licensed to operate in the domestic market.
Exhaustion of number resources	Medium. Depends on available resources and evolution to subscription management.
Consumer protection	Weak. Very few B2C contacts in the M2M world.
Lawful intercept	Weak. No fundamental difference in lawful intercept rules.

The arguments in favour of permitting permanent roaming

Argument	Strength
OK so far	Medium. 10x growth coming over the next ten years.
Free movement principles (EU)	Medium. National regulation may end up in opposition to EU-level harmonisation.
Massive disruption	Medium. Large numbers of M2M connections supported by roaming today. Costly and painful to switch.
Permanent roaming = temporary tool	Strong. The problem is going away. IPv6 addressing in long-term and subscription management in short.

Conclusions on permanent roaming

- **There are legitimate regulatory concerns, but prohibition is disproportionate**
- **Clarity is valued above all things**
- **MNOs need to put in place contingency plans**
- **MNOs need to lobby against permanent roaming bans**
- **Accelerate (if necessary) plans for subscription management**

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Q&A

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Next webinar: 19th February

Q&A

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