The M2M Adoption Barometer 2014

A detailed insight into the changing world of machine-to-machine communications and the Internet of Things

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Foreword

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While machine-to-machine (M2M) communication is not new, the market has undergone massive transformation in the last few years, and continues to do so. Given all this change, it's important to have solid information to help guide your decisions on the use of this technology. That's why we've invested in this, our second, global survey of what companies think about M2M, what they are doing now and have planned for the future.

At Vodafone, we're strong believers in the power of robust, impartial data to provide insight and guidance. This year's M2M Barometer follows in the footsteps of last year's research, but you'll find that we've expanded it to reflect the evolution of the market itself, with more focus on industry use of M2M and detailed discussions about return on investment and security, two of the topics most on the mind of those embarking on their M2M journey.

As well as data from our own global survey and interviews, we've included insights from one of the world's most respected M2M analysts, Matt Hatton from Machina Research.

Whether you're just starting to think about M2M, or expanding your use of M2M across your business, we hope it gives you an insight into the experience of your peers and some of the areas that you should consider during your initiative.

We had fantastic feedback on last year's report, and I hope that you find this edition even more useful. If you have any comments, including questions or ideas for how we can improve future editions, we'd love to hear from you. You can contact me and my team via email at m2m@vodafone.com.

Yours,

Erik Brenneis
Director, Machine-to-Machine, Vodafone

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The 2014 M2M Barometer

Executive summary

The 2014 Barometer asked over 600 executives from companies around the world about their use of M2M today and their plans for the future.

Key findings

Adoption is high: 22% and growing

M2M means many things to many people — there's no agreed definition among our respondents and plenty of competing terms, such as Internet of Things (IoT). Whatever term you prefer, nearly a quarter of the organisations already use it. And 42% of the rest expect to have an M2M solution in place within two years. To find out more about global adoption levels, see page 8.

The Americas are lagging behind

When we looked at regions last year there wasn't much between them. Since then there's been growth across the board, but it was most pronounced in Africa, the Middle East and Asia-Pacific (AMEAP), which grew 15 percentage points; the Americas just four. To find out more about variations in adoption by region, see page 9.

Industries fall into two groups, for now

The levels of adoption vary quite considerably by industry. Last year automotive was the clear leader on 19% compared to other industries, which bunched together at around 12%. This year automotive remains a front runner, but has been joined by consumer electronics and energy and utilities. This leading group has adoption of nearly 30%; the other four industries that we looked at are all around 18%. But based upon what our respondents said, these two neat clusters won't last for long. To find out more about adoption by industry, see page 10.

Hot topics

Internal versus external focus

Most organisations that have adopted M2M are using it for projects with an internal focus — like predictive maintenance of factory production equipment or optimising inventory — but that's changing. Within three years, 75% of organisations said they will have a strategy to implement M2M for external-facing projects that deliver benefits like more consistent customer service, increased revenue and greater competitive advantage. To find out more about this shift in focus, see page 14.
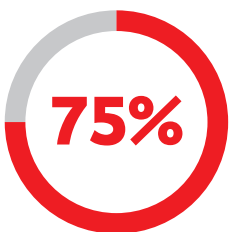
Importance of return on investment (ROI)

Expectations are very high: over half of companies close to implementing a project expect to see a return within a year. However, when we talked to companies that have already implemented, 66% said they'd seen returns within a year — and 89% within two years. To find out more about expectations and experiences of ROI, see page 20.

Security concerns being addressed

Security has become synonymous with any big IT-led transformation, and M2M is no exception. But as the high adoption rates show, companies see security as one of several challenges to overcome, not a showstopper — just 12% said it was their main concern. To find out more about what our respondents said about security, see page 25

22%

Over a fifth of companies that we spoke to already have at least one M2M-based solution in place.

55%

55% of organisations that we talked to said that they expect to have an M2M solution in place within two years.

75%

Within three years, 75% of organisations said they will have a strategy to implement M2M for external-facing projects.

About our survey

The Barometer's qualitative and quantitative research was conducted by an independent research firm, canvassing a representative sample of the market.

We asked more than 600 executives in 14 countries on five continents about their experiences with M2M and their expectations for the future of this technology.

Geographic spread of respondents in this year's Barometer

177 **110** **10**

199 **120** **5**

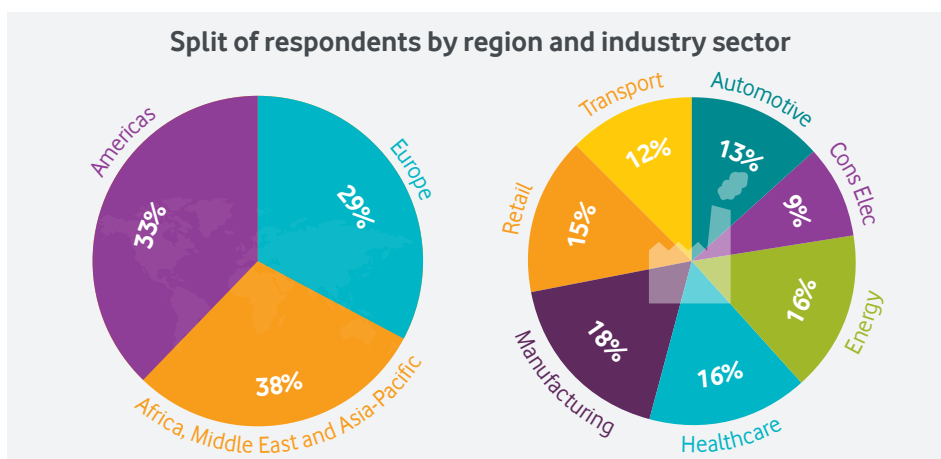**227** **135** **5**

603 Quantitative interviews

365 Qualifying quantitative interviews

20 In-depth qualitative interviews

■ Included again this year
■ New in this year's study
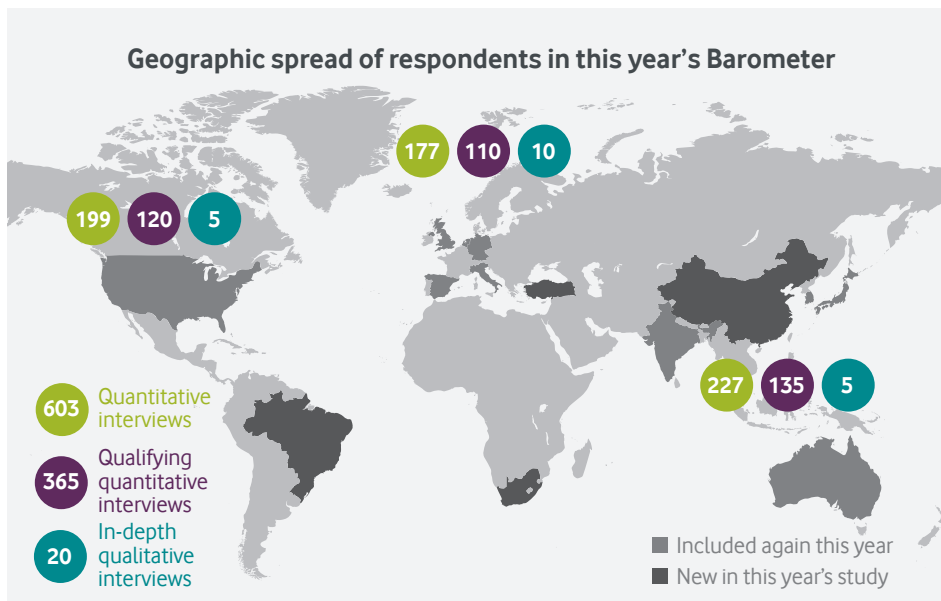
"Our nation has defined a policy to promote the 'smart city' in which 'IoT' is always mentioned – therefore, 'IoT' has become more popular."

Retail, China

Figure 1
The countries in this year's survey: Australia, Brazil, China, Germany, India, Italy, Japan, the Netherlands, South Africa, South Korea, Spain, Turkey, the UK, and the USA

We surveyed representatives of seven industries, and carefully balanced our sample for an even vertical and geographic split.

Split of respondents by region and industry sector

Americas **33%**
Europe **29%**
Africa, Middle East and Asia-Pacific **38%**

Transport **12%**
Automotive **13%**
Cons Elec **9%**
Energy **16%**
Healthcare **16%**
Manufacturing **18%**
Retail **15%**

Figure 2
Split of 2014 Barometer survey participants by region and industry

For full details of our methodology, see page 32.

A first-hand view of M2M

The data in the Barometer — including our statistics on adoption, benefits seen, and risks anticipated — comes directly from what our respondents told us during the survey. This ensures that the Barometer is an unbiased view of how businesses are using M2M.

Review of 2013

Before we get started with this year's findings, let's take a look back at our predictions from last year and see how they compare to this year's findings.

We're pleased to say that two of our three major predictions were proved accurate. We think that's a strong showing in a market that's so diverse and evolving so quickly.
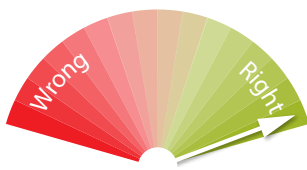
Falling costs will speed adoption

We were right that adoption would increase — from 12% to 22% — but did falling costs make that happen? It was certainly a factor: 28% of respondents said so. And it was particularly important in some of the sectors that are growing most quickly. For example, 45% of respondents in consumer electronics said that declining costs had prompted their M2M investment — up from 27% last year.

Smaller organisations will embrace M2M faster

In last year's survey, 12% of smaller organisations (250–1,000 employees) said that they'd already adopted M2M compared to 26% of companies with more than 10,000 employees. But smaller companies were much more likely to say that they would launch within two years; 31% said they'd launch within 12 months. So we predicted that small companies would embrace M2M faster and catch up with big ones. Adoption today stands at 18% in small companies and 29% among the largest enterprises. So while our prediction hasn't come to pass quite yet, smaller companies are indeed closing the gap.
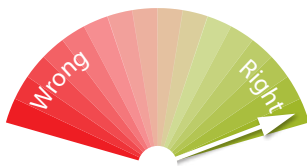
Manufacturing/consumer electronics will lead growth

This year we separated out the manufacturing and consumer electronics sectors in our findings, as their adoption profiles diversified significantly. Consumer electronics is undeniably becoming a leader: its percentage of adoption has increased to 29%; and based on this year's responses it should maintain that lead until at least 2016.

"M2M is, effectively, the plumbing for the Internet of Things."

The analyst's view

Machina Research

Machine-to-machine (M2M) or Internet of Things (IoT)?

Although the terms are often used interchangeably, Machina Research sees a very definite distinction between M2M and IoT. M2M is, effectively, the plumbing for IoT.

M2M involves connecting devices and transferring data. This is something that the IoT depends on. However, M2M typically involves an application developed to solve a particular need. IoT replaces these 'stovepipes' with common application platforms, where data from lots of different sources can be 'mashed-up' together, and where developers can build new apps without having to start from the ground up.

To give an analogy, M2M is like your mobile connection, while IoT is Facebook, Google, and all the apps that you use on your PC or phone. With IoT, developers no longer need to do the equivalent of inventing the iPhone every time they want to create an app.
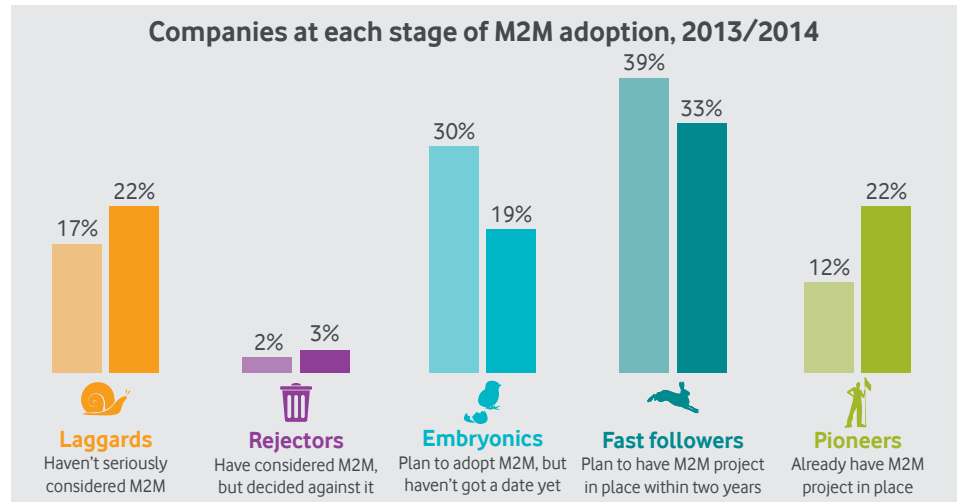
1 M2M goes mainstream

The big picture

55%

55% of organisations that we talked to said that they expect to have an M2M solution in place within two years.

Figure 3
Stages of M2M adoption, using data from 2013 and 2014 Barometers. "Embryonics" and "Fast followers" are declining as they convert into "Pioneers". (n_{2013}=653, n_{2014}=603)

Based upon what the respondents to this year's survey told us, within two years more than half of organisations will have at least one live M2M project in the field.

On average across all regions and industries, 22% of organisations have adopted M2M, an impressive increase of over 80% on last year, as Figure 3 shows.

Companies at each stage of M2M adoption, 2013/2014

Laggards — 17% / 22%
Haven't seriously considered M2M

Rejectors — 2% / 3%
Have considered M2M, but decided against it

Embryonics — 30% / 19%
Plan to adopt M2M, but haven't got a date yet

Fast followers — 39% / 33%
Plan to have M2M project in place within two years

Pioneers — 12% / 22%
Already have M2M project in place

So why has the laggards group grown by five percentage points? We think it comes down to overconfidence last year. In the 2013 Barometer, only 17% of respondents called themselves laggards.

This year, we asked the exact same respondents how they would rate their M2M maturity as of last year. With the benefit of 12 months' hindsight, 34% said they would have been laggards. Companies are reassessing what M2M projects involve.

"M2M is gloriously diverse, to such an extent that it's almost impossible to think of it as a market in its own right."

The analyst's view

Machina Research

M2M is a diverse and still-evolving market

What is evident from the data is that M2M adoption is growing rapidly, which is certainly our experience. The interesting thing is that there is a high degree of variation in terms of what is driving that growth.

It's not a single type of application that is being adopted universally. Whether it's usage-based insurance in Italy, stolen vehicle recovery in South Africa or smart cities initiatives in China, certain countries, and regions, have particular quirks in terms of which verticals have seen the most substantial growth.

Part of the reason for the regional variation is regulatory. There are a number of applications where M2M connections are mandated. Some of these are potentially huge implementations such as smart metering, eCall in Europe or the Contran 245 regulation for vehicle tracking in Brazil. Smart metering continues to generate significant spikes in adoption, while the other two promise to do so in the very near future. There are also many localised regulations that give rise to demand for M2M, for instance the requirement to connect cash registers in Hungary.

M2M consists of hundreds of micro-markets each of which has its own dynamics, growth trajectories and implications.
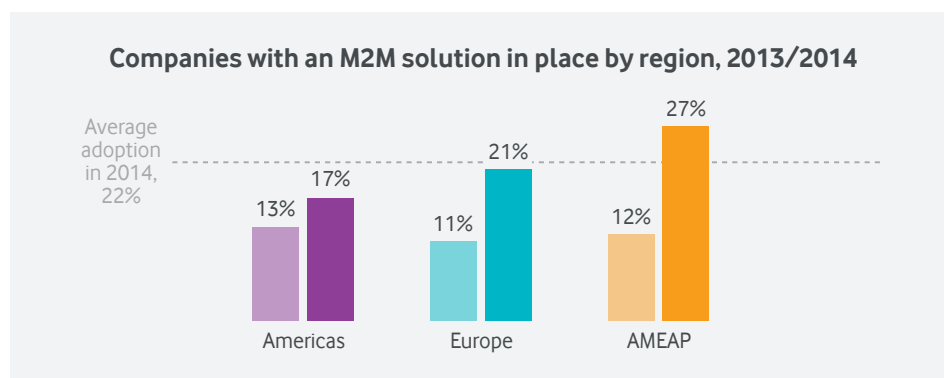
The variation by region

Europe and the Americas are lagging behind

Adoption in Africa, the Middle East and Asia-Pacific (AMEAP) has leapt 15 percentage points since 2013. Europe wasn't far behind, but the Americas saw relatively sluggish growth of just four percentage points, as Figure 4 shows.

Companies with an M2M solution in place by region, 2013/2014

Average
adoption
in 2014,
22%

13% 17% Americas
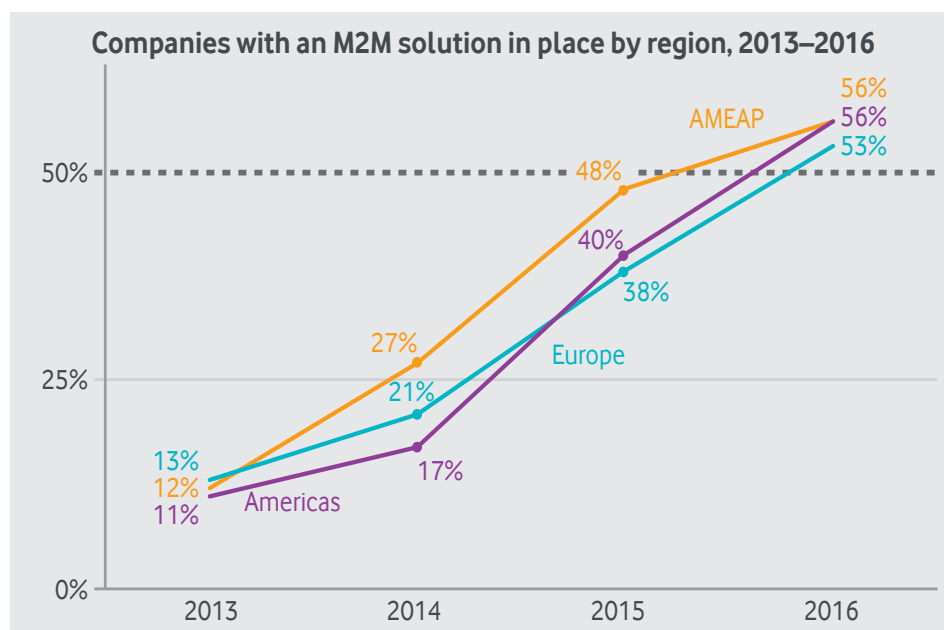11% 21% Europe
12% 27% AMEAP

Figure 4
Adoption of M2M by region —
Americas, Europe and AMEAP (Africa, Middle East and Asia-Pacific), — using data from 2013 and 2014 Barometers. AMEAP is growing fastest. (n_{2013}=653, n_{2014}=603)

Clearly there will be diversity within each region — Japan will have very different adoption profiles to India, and very different economic and regulatory climates. The EU too has great economic diversity. Furthermore, many companies operate on a global or regional basis, limiting how directly we can compare individual countries or regions. But, generally speaking, Asian and Middle Eastern countries, particularly China, have strong public sector backing for M2M applications such as smart cities and smart metering.

In two years' time, the differences will be negligible

We looked not just at those that have already adopted M2M, but those that say they will adopt it within 12 months and within two years. While plans can change, these statements of intent give us a useful forecast. As you'd expect, the rate of adoption levels off as penetration increases. But by 2016, more than half of all organisations in all regions will have adopted M2M, and the regions will be much closer again, as Figure 5 shows.

Companies with an M2M solution in place by region, 2013–2016

AMEAP
56%
56%
53%

50%
48%
40%
38%

Europe

27%
21%

25%

13%
12%
11% Americas

17%

0%
2013   2014   2015   2016

50%+

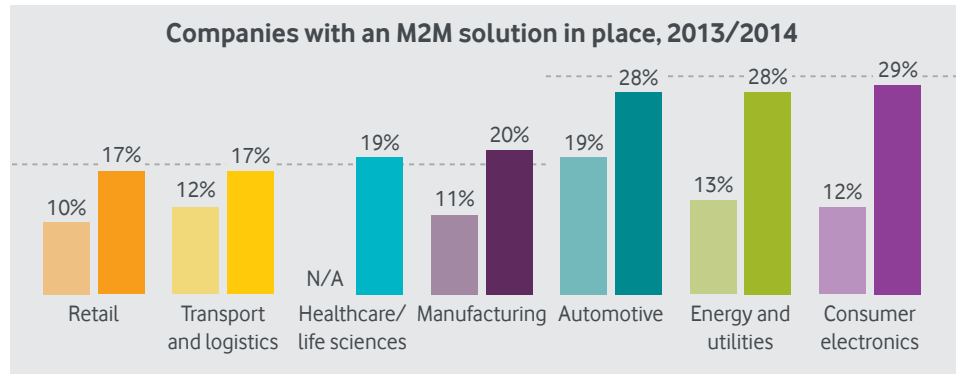According to our respondents, by 2016 adoption in all regions will exceed 50%.

Figure 5
Adoption of M2M by region using data from 2013 and 2014 Barometers. (n_{2013}=653 and n_{2014}=603)

The change by industry

Industries fall into two clusters — for now

Three sectors have emerged as front runners, with nearly 30% adoption: consumer electronics, energy and utilities, and automotive. The remaining four sectors form their own cluster at around 18% adoption, as Figure 6 shows.

Companies with an M2M solution in place, 2013/2014

	Retail	Transport and logistics	Healthcare/ life sciences	Manufacturing	Automotive	Energy and utilities	Consumer electronics
2013	10%	12%	N/A	11%	19%	13%	12%
2014	17%	17%	19%	20%	28%	28%	29%

Figure 6
Adoption of M2M by sector, using 2013 and 2014 Barometer data (n_{2013}=653 and n_{2014}=603)

Looking ahead, consumer electronics will increase its lead, reaching 74% adoption by 2016. Manufacturing will be furthest behind, with 43%, as Figure 7 shows.

Companies with an M2M solution in place, 2013–2016
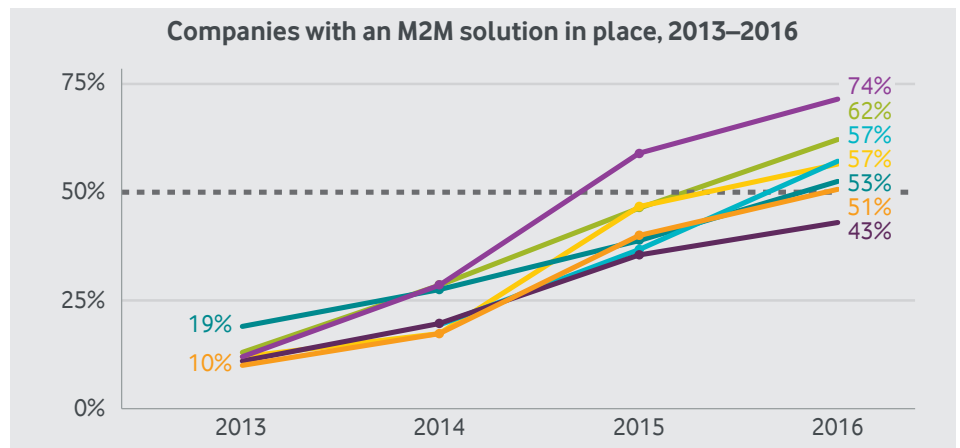
Figure 7
Adoption of M2M by sector through 2016 (n_{2013}=653 and n_{2014}=603)

Figure 8 shows that high adopters cited cost savings and productivity as drivers. Competitive advantage and innovation were cited by all sectors. We discuss this more from page 14.

## Top three triggers for adopting M2M solutions, by industry

Consumer electronics	Cost saving via automation (**50%**)	Opportunity for innovation (**47%**)	Declining costs of M2M (**44%**)
Energy and utilities	Cost saving via automation (**52%**)	Opportunity for innovation (**40%**)	Process and productivity improvements (**38%**)
Automotive	Process and productivity improvements (**51%**)	Need for competitive advantage (**41%**)	Opportunity for innovation (**41%**)
Manufacturing	Process and productivity improvements (**50%**)	Opportunity for innovation (**48%**)	Cost saving via automation (**43%**)
Healthcare and life sciences	Demand from end users (**40%**)	Opportunity for innovation (**38%**)	Cost saving via automation (**35%**)
Retail	Opportunity for innovation (**57%**)	Cost saving via automation (**46%**)	Process and productivity improvements (**42%**)
Transport and logistics	Opportunity for innovation (**43%**)	Need for faster decision-making (**41%**)	Need for competitive advantage (**33%**)

Figure 8
Three most popular drivers for M2M adoption per sector in 2014 (n=365)

# In two years' time, adoption will range from 43% to 74%

Consumer electronics — solidly above average; rising to 74% by 2016

Consumer electronics firms have already embraced the connected device, building M2M into the products they sell. And we expect them to increase their lead, with nearly three quarters of firms adopting M2M by 2016. We attribute this to greater consumer awareness of the potential for connected devices, such as thermostats and kitchen appliances.

74%
55%

'13   '14   '15   '16
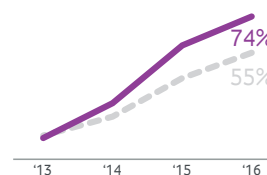
Energy and utilities — slightly above average; rising to 62% by 2016

This sector is naturally being driven by regulatory mandates, explaining why smart grid and smart metering solutions were the most widely adopted among our respondents. They were also the most popular choice for those planning their first M2M initiative. Once an energy and utilities provider has adopted smart grid or smart metering, we believe it's well placed to adopt M2M more widely across the organisation.

62%
55%

'13   '14   '15   '16
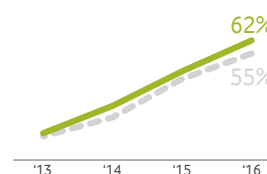
Transport and logistics — tracking the average; rising to 57% by 2016

Managing fleets and tracking assets are perhaps the simplest business cases for M2M. Yet adoption was just 12% last year and only 17% this year. This may be partly due to under-counting — users may not think of fleet management solutions that they've had since before the term became popular as "M2M". We see this sector quickly catching up.

57%
55%

'13   '14   '15   '16
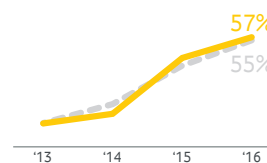
Healthcare and life sciences — in line with the average; rising to 57% by 2016

Traditionally a very cautious adopter of new technology, healthcare companies forecast strong growth in M2M by 2016. In many countries, the existing healthcare model is under enormous strain, with care services at capacity and costs growing unsustainably as the population ages. M2M presents many opportunities to do things differently.

57%
55%

'13   '14   '15   '16
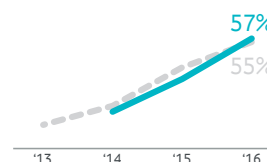
Automotive — growing steadily, but falling behind the average; 53% by 2016

OEMs and their partners have continued turning the car into a connected platform, supporting a wide range of services. The premium sector is now well established and M2M is seen as an enabler for very valuable services for manufacturer, dealer and driver alike. The adoption in other segments has slowed, largely due to delays in eCall regulation, but is still growing.

55%
53%

'13   '14   '15   '16
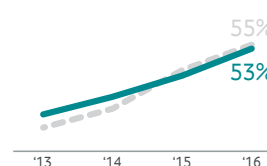
Retail — falling slightly behind the average; rising to 51% by 2016

There are many uses for M2M in retail, both in store and in the back office, from stock management to digital signage. But the low adoption and slow growth rate suggests that many retailers are still yet to see the ROI. While some projects have received heavy media attention, these have mainly been "cool" demos that may seem irrelevant to retailers' biggest challenges.

55%
51%

'13   '14   '15   '16
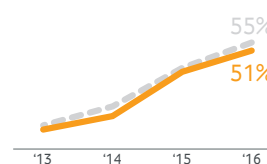
Manufacturing — growing, but more slowly; rising to 43% by 2016

We expected manufacturing to put in a stronger showing, but it's likely that many of the manufacturers with more ambitious M2M plans categorised themselves as being in other sectors, like consumer electronics, automotive or even healthcare. The other explanation is that some respondents don't class what they're doing — for example, production line monitoring — as M2M, because they've been doing it for years.

55%
43%

'13   '14   '15   '16
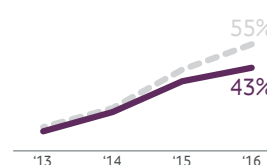
The view by company size

Large companies are still ahead

As last year, more large companies told us that they were already using M2M. Companies with over 10,000 employees enjoyed a seven percentage point advantage over the average level of adoption.

Companies with an M2M solution in place by size, 2013/2014
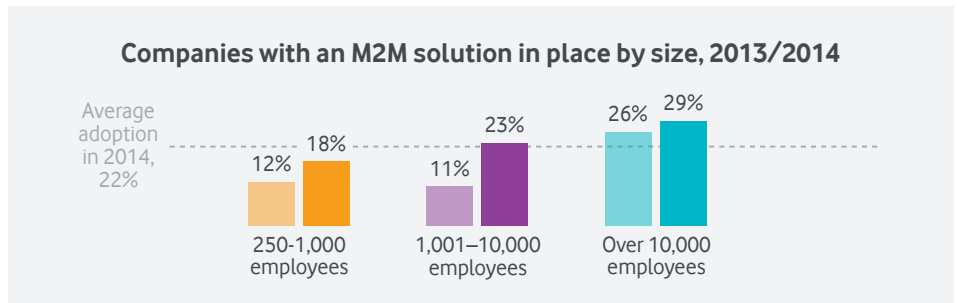
Figure 9
Adoption of M2M by company size, using 2013 and 2014 Barometer data (n$_{2013}$=653 and n$_{2014}$=603)

But smaller organisations are catching up

By 2015, companies with 250–1,000 employees will lead in adoption, but only just. As the technology becomes more mature, variations by company size will become insignificant.

Companies with an M2M solution in place by size, 2013–2016
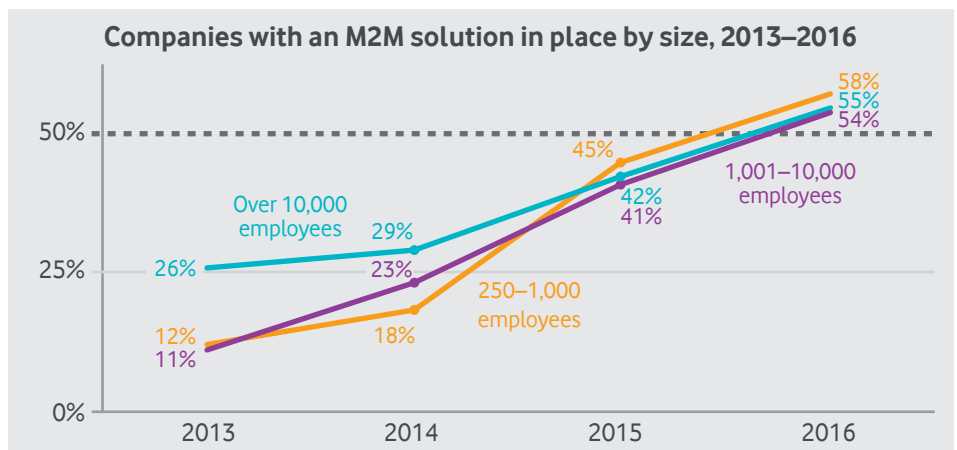
Figure 10
Adoption of M2M by company size, 2013–2016 (n$_{2013}$=653 and n$_{2014}$=603)

There's a clear message in what people said triggered their interest , as shown in Figure 11. Larger enterprises have been early adopters as they have the most to gain from automating existing complex manual processes. But whatever the size of the company, innovation is seen as an important reason to consider M2M.

Top three triggers for adopting M2M solutions, by company size

250–1,000 employees	Opportunity for innovation (**47%**)	Process and productivity improvements (**41%**)	Cost saving via automation (**39%**)
1,001–10,000 employees	Opportunity for innovation (**44%**)	Process and productivity improvements (**42%**)	Cost saving via automation (**39%**)
Over 10,000 employees	Cost saving via automation (**52%**)	Opportunity for innovation (**48%**)	Need for faster decision making (**38%**)

Figure 11
Top triggers for adopting M2M, 2014 (n=365)

Innovation is of course a huge corporate buzzword that has grown in popularity over the past decade; many businesses are looking for ways to differentiate themselves and disrupt their markets through new ways of doing things. Many see M2M as an important tool to achieve that.

2 Focus is moving to external projects
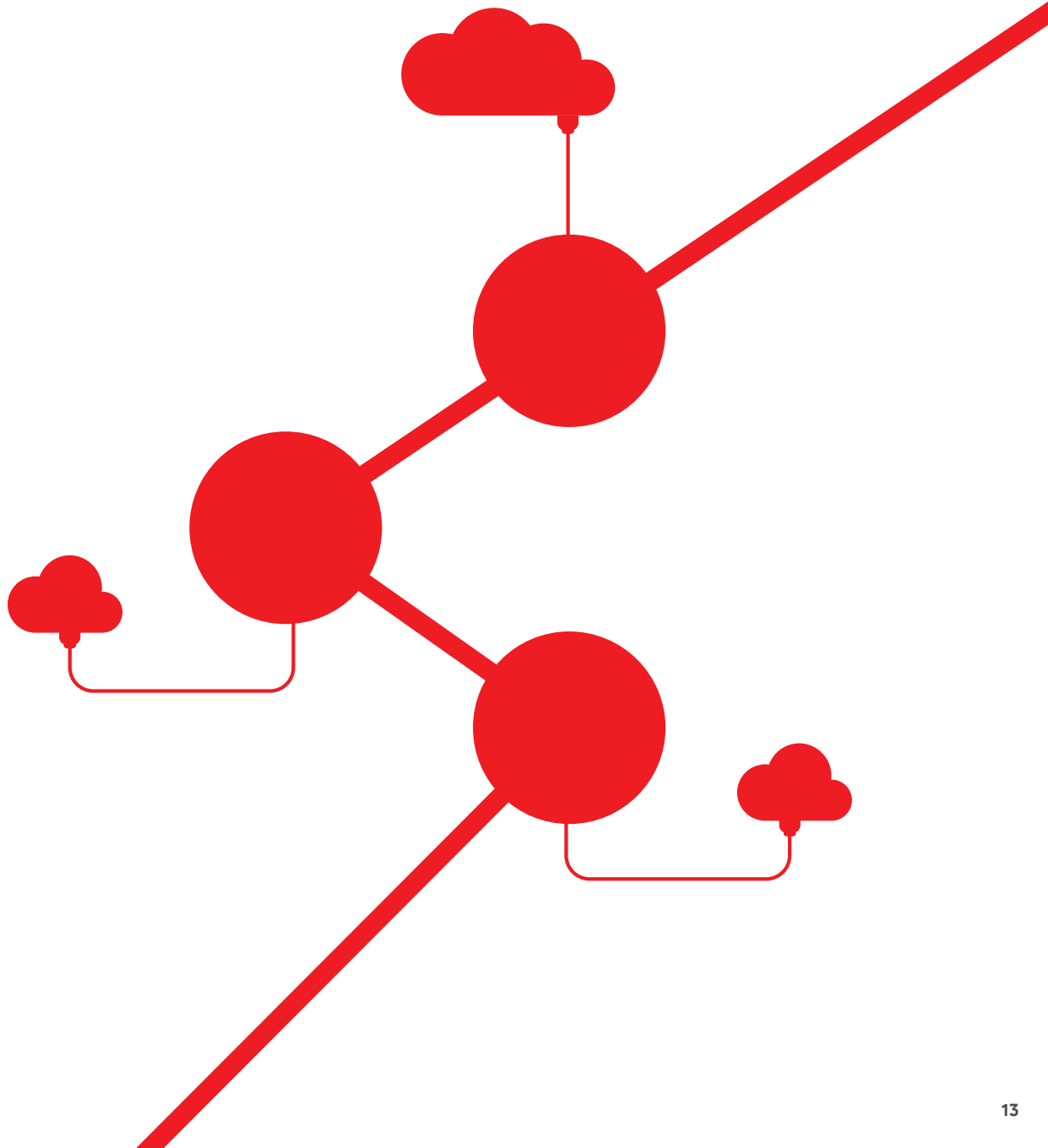
From internal to external

Most organisations with M2M are using it for projects with an internal focus — but that's changing.

As Figure 12 shows, the first wave of M2M adoption focused mainly on "internal" projects, ones involving processes and infrastructure that are essentially invisible to customers, partners, and the rest of the outside world. This includes using M2M for predictive maintenance of factory production equipment, keeping employees safe in hazardous environments, optimising inventory levels and cutting energy use across offices and stores.

Why start with internal applications?

There are two very good reasons to start with internal applications: the risk of disruption to mission-critical processes is much lower; and it's often easier to establish ROI because the benefits are easier to measure within the organisation's existing control and reporting setup.
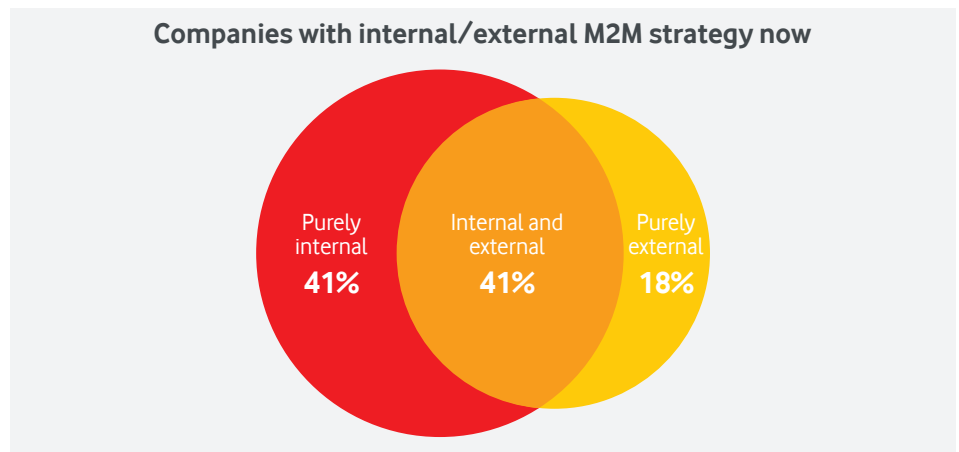
Figure 12

The breakdown of companies with M2M strategies focusing on all internal, all external and a mix of both (n_{2013}=603)

Companies with internal/external M2M strategy now

Purely internal
41%

Internal and external
41%

Purely external
18%

The rise of "external" M2M

But within three years, 75% of organisations said they will have a strategy to implement M2M for external-facing projects, as Figure 13 shows. External applications are those that touch customers (or other external stakeholders) directly — they're built into the company's products and services.
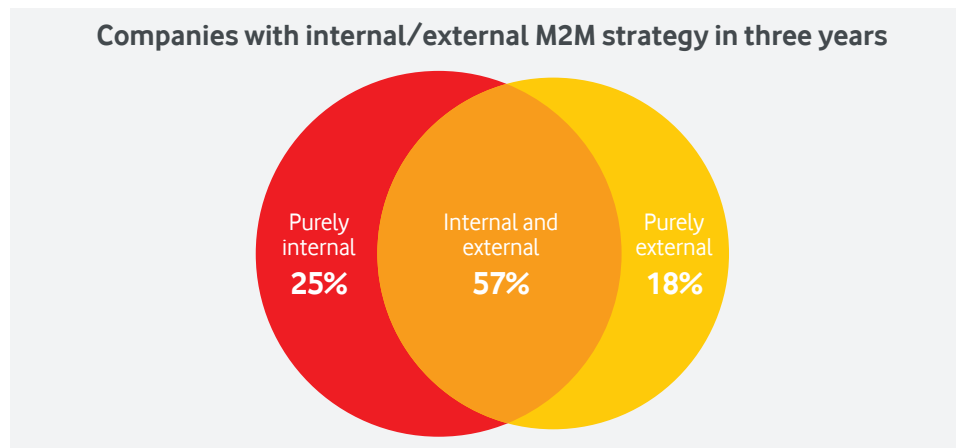
Figure 13

Forecast split of companies with M2M strategies focusing on all internal, all external and a mix of both in three years' time (n_{2014}=603)

Companies with internal/external M2M strategy in three years

Purely internal
25%

Internal and external
57%

Purely external
18%

The customer-facing nature of these solutions ups the stakes for organisations. If there's a problem, customer satisfaction may be affected; and to implement solutions like this

effectively requires transformation of the core service-delivery processes of the company. Furthermore, ROI is harder to forecast and measure. How do you quantify the ROI in terms of, for example, customer satisfaction? We believe that the fact that so many organisations are turning to external-focused strategies indicates confidence in the maturity of M2M and its ability to deliver significant benefits.

A question of strategy

Many external-facing solutions are industry-specific, because they're tailored to the kinds of interactions and customer experiences in that particular sector — for example, smart metering, remote healthcare, or digital signage. At the risk of generalising, internal solutions address processes and challenges that are common across industries — such as managing fleets of vehicles or monitoring facility energy use.

But it's important to note that the line between internal and external solutions can blur, and in many cases whether a solution qualifies as internal or external or both is simply a question of where the particular organisation is choosing to focus. For instance, an M2M-connected fleet management or inventory management solution may appear to be purely operational and internally focused. But if those same solutions are used to give customers an accurate, real-time view of when their delivery driver will turn up, or how much stock is in their local store, M2M is playing an external role. Depending on the organisation's goals and level of ambition, the same solution may require very different degrees of process integration, and produce very different kinds of ROI.

This ties in to the triggers we talked about in Figure 8. One can see M2M as a way to save money by optimising existing processes, or as a way to innovate new processes and new customer experiences.

89%

89% of transport and logistics companies said that they expect to have an external-focused strategy in place within three years.

The next wave of M2M evolution

The most interesting set of findings from the M2M Barometer in 2014 relates to the use of M2M for internal versus external purposes. What is clear is that there are distinctly different motivations in M2M, between implementations that are internal, and predominantly aimed at efficiency, and those that are external and aimed at a range of things, from adding new product features through to creating new business models.

The research indicates that far more companies are focused on M2M to support internal initiatives, rather than external. This is logical. Efficiency applications, such as manufacturing automation, logistics or supply chain, have a very simple motivation: reduce cost. It is relatively easy to determine the return on investment and it is therefore a simple decision for any enterprise to make. However, when it comes to externally focused initiatives, it requires more than the simple sign off from the CFO. They have the potential to totally disrupt the way in which a company does business. For instance, a number of heavy industrial equipment manufacturers have already made the shift across to "servitisation" of their business model, i.e. changing from selling machines to selling the service. This is a fundamental shift in the way a company works and requires substantially more consideration than the simple efficiency application.

The first wave of M2M came from using connectivity to make business processes more efficient. The next wave will see products and business models change. This will require a more considered approach from the buyers, hence the relatively lower prevalence of externally focused M2M initiatives today. However, it will have a much more significant impact on how that company does business in the future. While there's some hesitation today, competitive pressures will ultimately necessitate the embracing of M2M.

"The first wave of M2M came from using connectivity to make business processes more efficient. The next wave will see products and business models change."

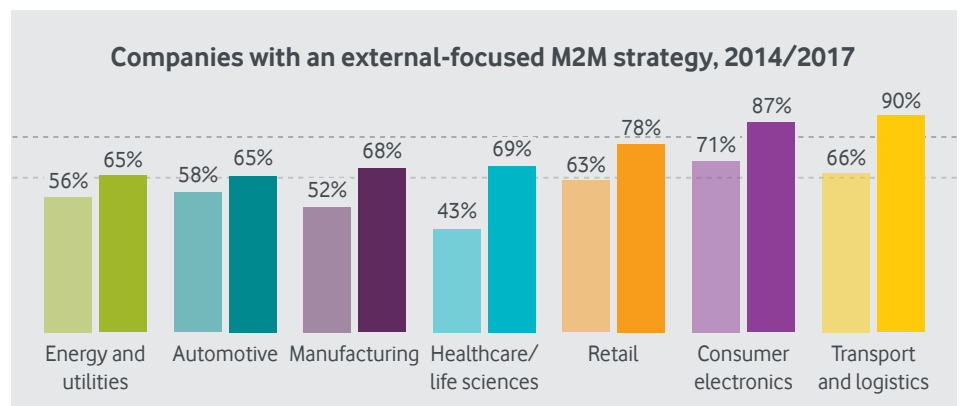The analyst's view

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Applications by industry

Some industries are making the jump to external-focused strategies faster than others. The solutions that they're adopting are often sector-specific, but common themes are emerging.

Transport leads the way in adopting external strategies

Figure 14
The percentage of companies saying that they have an external-focused strategy today (left) versus those saying that they expect to have one in three years' time (right). Dotted lines show the 2014 and 2017 averages (n_{2013}=327, n_{2014}=365)

Companies with an external-focused M2M strategy, 2014/2017

Energy and utilities	Automotive	Manufacturing	Healthcare/ life sciences	Retail	Consumer electronics	Transport and logistics
56% 65%	58% 65%	52% 68%	43% 69%	63% 78%	71% 87%	66% 90%

Automotive

Applications in the automotive industry focus on connected car services. Once the car has connectivity and sensors, this opens the way to selling the owner a range of additional services — from remote maintenance to infotainment and safety services. Safety and security applications are the leading uses of M2M in automotive (20%) — partly because in many regions they are being driven by regulation, such as the eCall programme in the EU.

Consumer electronics

This industry is the leading adopter of M2M. It's also the one claiming the highest adoption of external-facing strategies today (71%). Organisations in this sector are focusing primarily on tracking mobile assets (27%), which could include shipping containers of products. But one in five of all companies we surveyed in this sector are already selling connected devices direct to consumers.

Case study: from internal supply chain to external connected products

This large Asia-based consumer electronics manufacturer is about to launch an M2M-based inventory and warehouse management system to improve supply chain quality and drive down costs. It's moving to a system that will support real-time data visualisation of every product's exact location and status. Although the system isn't yet live, the manufacturer expects ROI in the order of 50–60x initial investment through avoided costs.

With the horizontal solution on its way to going live, the manufacturer is looking ahead to connected products. It wants to understand how consumers are using its products to improve engagement and guide future product development.

Case study

Energy and utilities

Operationally, energy and utilities firms are looking at asset tracking solutions (21%). These are a natural fit for the industrial side of the sector.

In terms of delivering services to customers, this sector is continuing its adoption of smart grid and smart metering (20%), in many cases due to regulatory demands. 17% have also adopted smart home and smart office solutions — a category that includes home automation, intelligent heating, and connected security solutions. This is a logical extension for utilities firms looking to create new revenue streams.

Healthcare and life sciences

Healthcare's internal applications include remote monitoring (14%) — which is important when dealing with high-value, condition-sensitive equipment and controlled substances. But several kinds of patient-facing solutions, including eHealth, are also seeing adoption, with 11% of healthcare organisations already using them. This will grow as home management of chronic conditions becomes the norm.

Manufacturing

Manufacturers (excluding those that identified themselves as consumer electronics, healthcare and automotive) are the slowest adopters of M2M. Popular applications are those that enable the manufacturer to monitor equipment (20%), employees (11%), mobile assets (11%) and fleets (10%), giving a complete view of operational status.

We believe there is a lot of unreported use of M2M in manufacturing — many of our respondents may have excluded from their answers M2M systems operating only within a single factory, or solutions owned and managed for example by equipment manufacturers instead of by internal IT functions.

Retail

Retailers expect to see strong growth in external-facing strategies, and their preferred solutions reflect that. Connected cabinets (16%) lead the charge, along with asset tracking (17%).

Despite the extensive media coverage around solutions such as digital signage, our respondents reported relatively low adoption (9%).

Transport and logistics

This sector illustrates how an M2M solution can be viewed as internal- or external-focused. Transport is making a massive push into external-focused strategies, with 89% saying they will have an external strategy within a year.

This growth is largely being driven by fleet management solutions (10% adoption). We believe that organisations in this sector are looking to fleet management to help them deliver services to customers faster, more reliably, and more cheaply. They are also looking to it to capture the information that they require to demonstrate that they are meeting their sustainability targets, and complying with legislation.

Today's connected fleet management solutions are extremely versatile, and many build in elements of employee protection, such as in-cab cameras. Employee protection is another area with significant adoption (10%).

Most common applications of M2M by industry

Automotive (n=43)	
Safety, security and convenience	20%
Fleet management	19%

Consumer electronics (n=38)	
Asset tracking	27%
Connected devices	20%

Energy and utilities (n=62)	
Asset tracking	21%
Smart grid and metering	20%

Healthcare and life sciences (n=54)	
Remote monitoring of assets	14%
eHealth/remote diagnostics	11%

Manufacturing (n=66)	
Remote monitoring of assets	20%
Asset tracking	11%

Retail (n=54)	
Asset tracking	17%
Connected cabinets	16%

Transport and logistics (n=48)	
Fleet management	10%
Employee protection	10%

Sector-specific applications, but common themes

While each sector demands its specific solutions, the applications that are gaining broad traction fall into three wider themes.

Managing fleets was a focus for companies in retail, manufacturing, automotive, and of course transport. Any company that runs a large fleet of vehicles could benefit enormously from the advantages in routing, job allocation, driving efficiency, maintenance and other areas that the latest fleet management solutions provide.

Tracking assets is popular with any sector that has high-value, mobile equipment or containers — whether that's stock in retail, plant in manufacturing, shipments in transport, or parts in energy and utilities. As M2M connections and terminals get cheaper and smaller, it will become more cost-effective to track cheaper and smaller assets, too.

Monitoring people is a theme throughout — for worker safety in manufacturing, lone workers in healthcare and transport, or workers in hazardous environments as in energy and utilities. Of course, healthcare has its own people-monitoring solutions. It's important to note that the "Internet of Things" is just as much about people as it is inanimate objects.

M2M is driving creative solutions across industries

The **automotive** sector is really starting to gain momentum. Car manufacturers, notably Audi, BMW and GM, are increasingly seeing connectivity as a way to enrich the driving experience, improve the interaction between OEM and customer, and provide additional revenue streams. At the same time, the aftermarket is also increasingly vibrant, driven by applications such as usage-based insurance and stolen vehicle recovery.

The main driver for M2M in the **consumer electronics** sector is to improve the customer experience. A connected version can be as straightforward as a device upgrade. The barriers are simply ones of cost and replacement rate of devices.

Healthcare is an area of nearly unparalleled private and public expenditure. Yet the current infrastructure of most healthcare systems is inadequate to address the growing challenges of demographics, poor access to patients, and steadily rising costs. The innovative usage of M2M offers a way to improve access to services, increase compliance with prescribed treatments, reduce costs and increase flexibility.

Some of the first M2M implementations addressed the automation of industrial processes. Yet if anything, **manufacturing** still offers some of the most interesting opportunities for the innovative use of M2M, particularly in 'servitisation', the switch of business models from selling products to selling an ongoing service.

Adoption of M2M in **retail** has been mixed. In some countries, such as Brazil and Turkey, the growth of connected payment terminals has been a significant driver. Elsewhere there is a lot of talk of innovative POS solutions, but very little has actually materialised.

The use of M2M in the **transport and logistics** sector is pretty straightforward — it's largely about saving costs. Many companies have, of course, already recognised the opportunity here, but with falling prices it will become even more widespread. Furthermore, global adoption is patchy and there's plenty of opportunity for growth.

M2M in the **energy and utilities** sector is driven by regulation. Many governments have set aggressive targets, most notably the EU requiring that 80% of electricity meters are smart meters by 2020. China, the US and many other countries are also pushing smart meter adoption through mandates and stimulus packages.

"The variation of adoption of M2M varies massively by sector, but it's generating almost universal interest, and there are exciting opportunities for the innovative use of M2M in even the most mature industries."

The analyst's view

Machina Research

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3 The rewards outweigh the risks

Strong return on investment

The companies that said they are using M2M are even more positive than last year about the return on investment (ROI) they see. 98% said they have seen some return or significant return.

Expectations are extremely high

We asked companies that were considering adoption how soon after implementation they would expect to start seeing a return on their investment; and companies that had already implemented how long it was before they saw ROI.
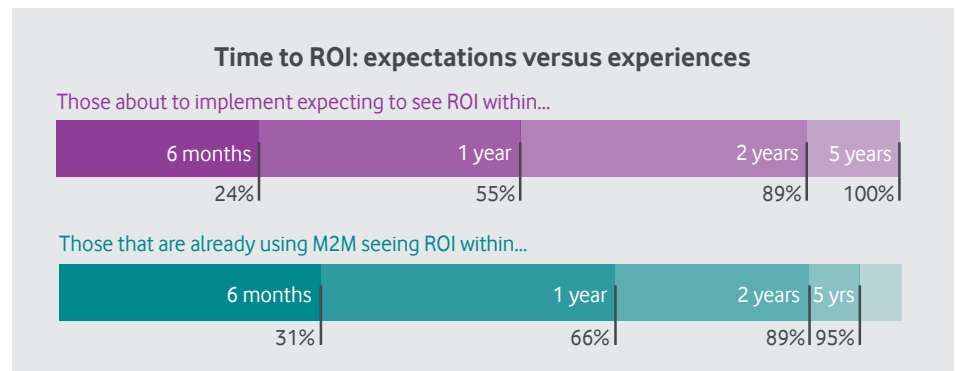
Figure 15
ROI period expectations among "Fast followers" (n=161) versus experiences among those who have already implemented (n=106)

Time to ROI: expectations versus experiences

Those about to implement expecting to see ROI within...

6 months	1 year	2 years	5 years
24%	55%	89%	100%

Those that are already using M2M seeing ROI within...

6 months	1 year	2 years	5 yrs
31%	66%	89%	95%

Expectations are very high, as Figure 15 shows. Over half of companies close to implementing a project expect to see a return within a year — and 89% within two years. However, when we looked at how long it took "Pioneers" to actually see a return, 66% said within a year — and 89% within two years. This is great news, but it needs to be tempered for two reasons.

Firstly, companies with the strongest ROI cases are likely to be the quickest to implement. However, that assumes that companies are aware of the business case. As we know, many companies are still only just beginning to think about M2M.

Secondly, as the kinds of initiatives shift away from contained, internal and measurable projects to core, customer-facing projects, it's likely to take more time to see results.

Despite these mitigating factors, this is still a very positive finding.

89%

89% of those with a live M2M project said they started seeing ROI within two years.

Concerns about ROI are a barrier, at first

And it's important that the news about time to achieve ROI is good, as companies at an early stage of adoption cite ROI-related issues — such as difficulty understanding the benefits, the time to seeing returns, and the balance of cost versus benefits — as the top barriers to progressing with M2M (see Figure 16).

Even those companies that have implemented a single M2M project saw "management resistance" as a barrier, suggesting that senior leadership are yet to be convinced by the return on their earlier investment.

Top three barriers to adopting/expanding M2M solutions

Embryonics	**Considering but no strategy yet**	Don't understand the benefits (**41%**)	Security concerns (**30%**)	High costs versus benefits (**29%**)
	Strategy but no plans in next two years	Long lead time to achieve ROI (**29%**)	High costs versus benefits (**29%**)	Don't understand the benefits (**26%**)
Fast followers	**Plan to launch within two years**	Long lead time to achieve ROI (**29%**)	Don't understand the benefits (**29%**)	High costs versus benefits (**27%**)
	Plan to launch within a year	Security concerns (**36%**)	Difficulties of global solution (**27%**)	Don't understand the benefits (**26%**)
Pioneers	**One project live**	Security concerns (**36%**)	Management resistance (**33%**)	Don't understand the benefits (**29%**)
	Multiple projects live	Security concerns (**50%**)	Difficulties of global solution (**28%**)	Economic downturn (**28%**)

"In terms of timeline, we would certainly make an annual review of this upcoming M2M project. The ROI in the first year must show a satisfactory result if we want to continue this project into next year."
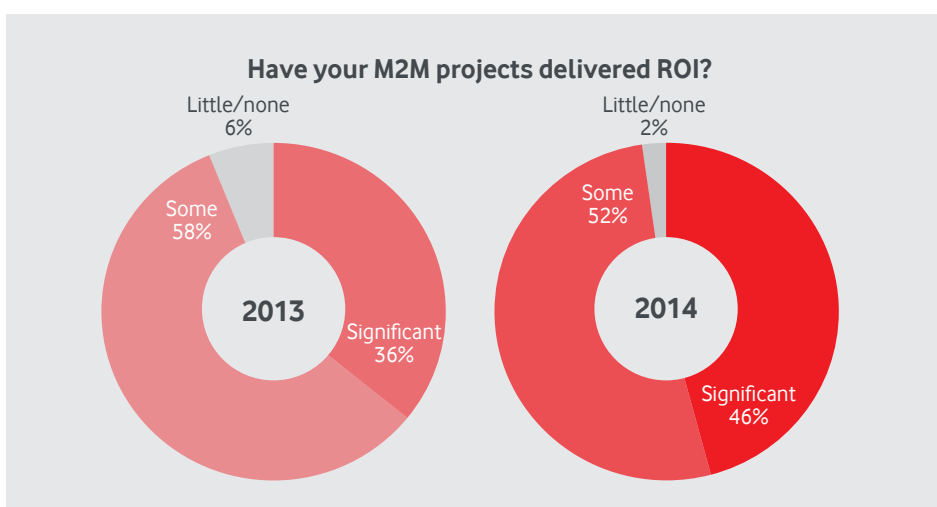
Consumer electronics, Asia

Figure 16
Percentage of respondents at each stage of adoption citing barriers to further adoption. Multiple responses allowed. (n=365)

It's important to note that none of the barriers listed above were cited by more than 50% of the executives in our survey, and that our respondents indicated that the ROI-related issues fade away as they progress towards implementation — they get solved. And, after all, M2M adoption is growing at around 80% a year.

M2M delivers measurable returns...

So what are the returns? The headline stats (see Figure 17) are about as good as it gets, particularly in a market that is still maturing, and where a lot of the success depends on each organisation's approach. 46% of companies said that they'd seen a significant return.

Have your M2M projects delivered ROI?

2013
Little/none 6%
Some 58%
Significant 36%

2014
Little/none 2%
Some 52%
Significant 46%

Figure 17
Percentage of companies using M2M that have seen some or significant ROI, 2013 and 2014 (n$_{2014}$=106)
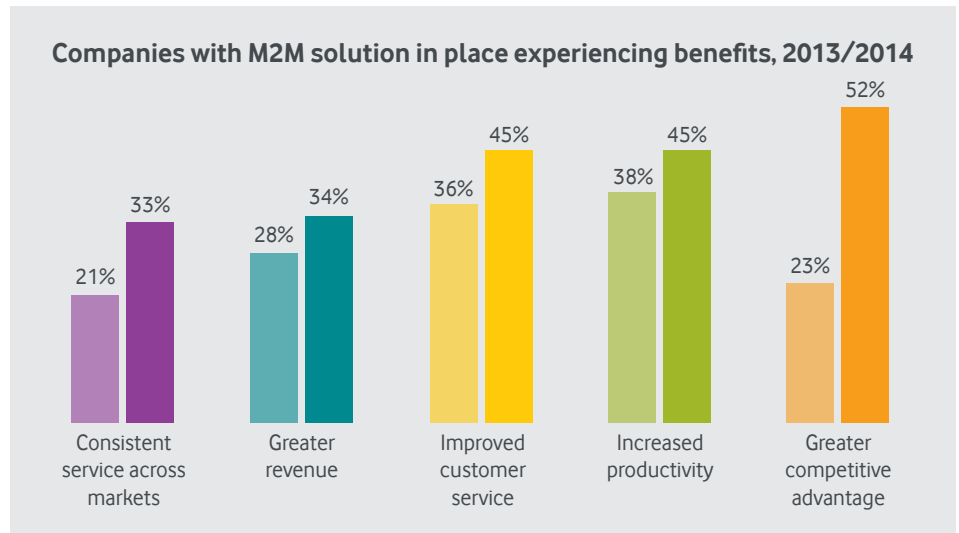
Figure 18
Percentage of adopters ("Pioneers") reporting seeing each business benefit from their M2M projects, 2013 versus 2014. Multiple responses allowed. (n_{2014}=106)

...and other benefits

Our respondents cited expectations for, or experience of, a broad range of benefits (as Figure 18 shows) — many of which have moved beyond efficiency and cost savings and into those benefits that are more clearly associated with "external" strategies, such as improved customer service and greater revenue.

Companies with M2M solution in place experiencing benefits, 2013/2014

	Consistent service across markets	Greater revenue	Improved customer service	Increased productivity	Greater competitive advantage
2013	21%	28%	36%	38%	23%
2014	33%	34%	45%	45%	52%

There's been a significant increase in those saying that M2M is helping them deliver more consistent service across markets, which (assuming the narrow definition of markets as equal to geographies) suggests that more respondents are looking at M2M beyond a local or national level, and are instead looking regionally or globally. Moreover, it suggests that there are few technical and contractual considerations on the providers' side holding companies back from rolling out solutions across borders.

Most importantly, a majority now cite greater competitive advantage as a benefit. M2M has moved from the back office and into centre stage, supporting the core processes that help businesses differentiate themselves.

"It is particularly interesting to see that the idea of using M2M to get 'greater competitive advantage' is gaining significant currency."

The analyst's view

Machina Research

Benefits overcoming initial conservatism

It's very positive news that 98% of M2M projects are delivering a return on investment. That degree of success is perhaps indicative that adoption of M2M has been somewhat risk-averse up until now. Meanwhile, the expectation for ROI being generally 1–2 years is indicative of a conservative market. Companies are, as yet, seemingly unwilling to invest for long-term benefit from M2M solutions. We expect that to evolve. It also indicates a space in the market for companies willing to de-risk M2M projects by funding the initial capital investment in exchange for a share of the returns. In fact, we've already seen this approach in a few markets, for instance for some smart meter and smart city initiatives.

The diversity in benefits is symptomatic of the diversity within M2M. It is particularly interesting to see that the idea of using M2M to get 'greater competitive advantage' is gaining significant currency. This reflects the fact that using M2M is now part of the competitive landscape, rather than being an isolated deployment that a company may try in order to streamline its supply chain, for instance. The growth in that particular metric over the last year indicates that companies are increasingly aware of what others are doing and are seeing their M2M deployment in that competitive context.

Getting your business ready

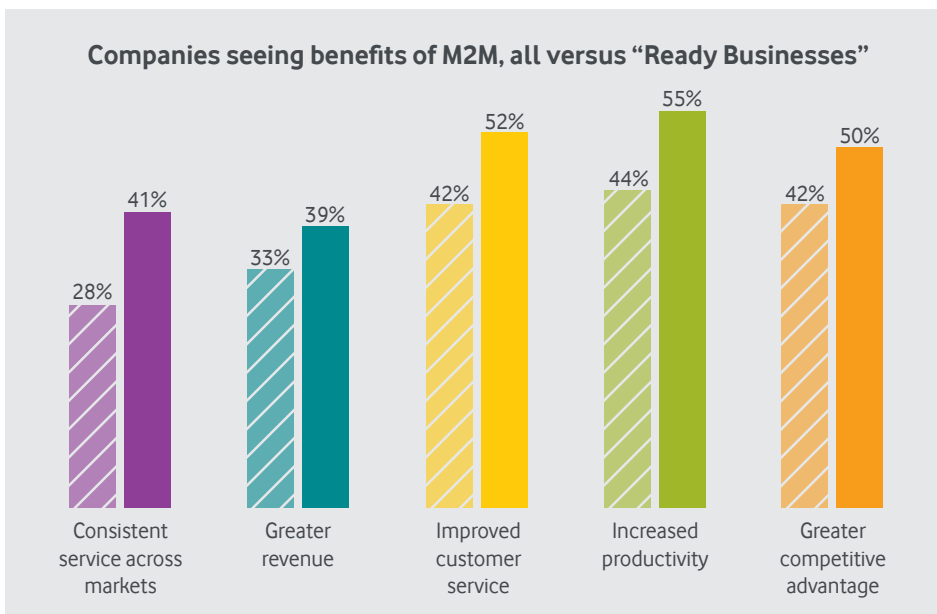How can you ensure that you're ready for M2M, and that you'll achieve the maximum return on your investment?

The ingredients for success

After reviewing both our quantitative and qualitative findings, we found that businesses exhibiting a handful of key characteristics were those that reported the greatest range of benefits from M2M, and were also those that saw the greatest ROI. We asked respondents how strongly they agreed with these statements about their business:
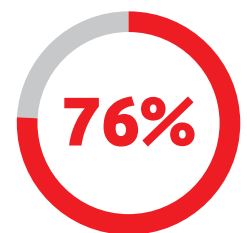
- "My company is well-organised and efficiently run, everyone pulls in the same direction and we have a clear view of our progress." In other words, the organisation has effective **process** and **strategy**.

- "My company is customer-centric, embraces change, is open to new ideas and values its people." In other words, the organisation has an adaptable **culture** and **workforce**.

- "We have modern IT and communications that are fully integrated, flexible and secure with well-managed service levels."

- "Our IT enables mobile working, collaboration, multi-channel customer engagement, makes full use of business information and exploits advanced connectivity." In other words, the organisation is a **leading user of technology** generally, not just M2M.

We call these the characteristics of "business readiness", that is, how able a business is to identify, learn from and adapt to changing market conditions and be prepared for the future.

The most ready businesses — those that agreed most strongly with these statements — reported greater benefits and ROI from investing in M2M, as Figure 19 shows.

76%

Over three quarters of those agreeing strongly with these four statements about their business's performance reported significant returns from investing in M2M.

Companies seeing benefits of M2M, all versus "Ready Businesses"

Consistent service across markets	Greater revenue	Improved customer service	Increased productivity	Greater competitive advantage
28% / 41%	33% / 39%	42% / 52%	44% / 55%	42% / 50%

Figure 19
Percentage of respondents that have seen or expected to see each benefit: all respondents (left) versus those that agreed strongly with the four business readiness statements (right).

To an extent, this should not come as a surprise. If your organisation is badly run, rejects change and has immature IT, it won't be a fertile environment for M2M to thrive — or indeed for any new investment to succeed. It will also be unlikely to be able to measure the returns on a project effectively — which is of vital importance in justifying budget for future investments.

Approaches you can take

Process and strategy: make M2M a strategic priority

Those that see the best ROI make M2M central to their overall strategy, with appropriate resources and funding. One of the companies we spoke to allocated 50% of its total IT budget to M2M. There are also likely to be many projects, both internal and external, underway. Ambition is a big part, too: those that get the greatest ROI are those looking for significant process innovation and major transformation, not just incremental efficiency improvements. The lesson is clear: if you want to achieve, you need to commit.

Culture and people: give M2M board-level backing

Culture is a difficult thing to change. Those organisations that do well with M2M projects are those where a board member, ideally the CEO, is a champion for the initiative. A strong board-level leader can help bring all the different parts of the organisation into line to make change happen, and encourage users to adopt the new solution once it's gone live. If you already have an "innovation culture", this change will be faster and more dramatic. M2M can deliver the strongest benefits when processes change (for instance, how a retailer reorders stock, or how a clinician handles checkups with patients) — but these depend on people making full use of the opportunities these changes afford. The whole organisation has to be willing to work with IT.

Technology: be broad- and open-minded

Nowadays no aspect of technology can be considered independently. M2M generates huge amounts of data, which presents a significant opportunity for insight: for example, data about fleet movements can be combined with weather trends, social media and order data and used to plan staffing schedules, vehicle purchases, and new depot sites. To do this, the data has to be gathered, aggregated and analysed, before being integrated into existing business process applications and made accessible to users and to customers. So as well as the M2M terminals, sensors and networks, you've got elements of big data, cloud platforms, applications, and probably mobility and collaboration tools, too. Organisations that are open-minded about solving their technology needs are those most likely to see benefits.

> "The main scope of our approach is to become market leaders. Everything else is secondary."

Case study

Case study: committing to M2M as a strategic priority

One Germany-based healthcare provider has bet its business on M2M. It was a true pioneer, having started its first M2M projects around six years ago. Today, it devotes 50% of IT investment and around a quarter of the CIO's time to M2M projects — and it has more in the pipeline.

For this company, M2M is all about automating business processes — whether that's monitoring of patient blood glucose levels, or of the supply chain. Analytics is core to what it does. Almost all of the company's M2M projects have delivered ROI within one year, measured on growth pre- and post-implementation. It puts its success down to:
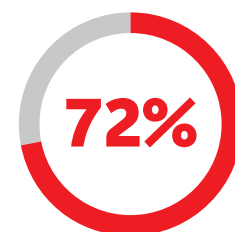
- **A business culture that embraces continuous improvement.** The M2M applications are integrated with each other and with the wider business.

- **An IT-centric organisation.** Users drive requirements and evaluate success; applications are developed in-house.

- **Senior management focus.** Everyone understands what's needed and resources are made available.

- **The right partners.** The company recognises that it must collaborate with hardware manufacturers, network providers, customers and other healthcare providers.

What about security?

Security has become synonymous with any big IT-led transformation. M2M is no exception, particularly as projects get larger and become more external-facing. But as the high adoption rates show, companies see security as one of several challenges to overcome, not a showstopper — just 12% said it was their main concern.
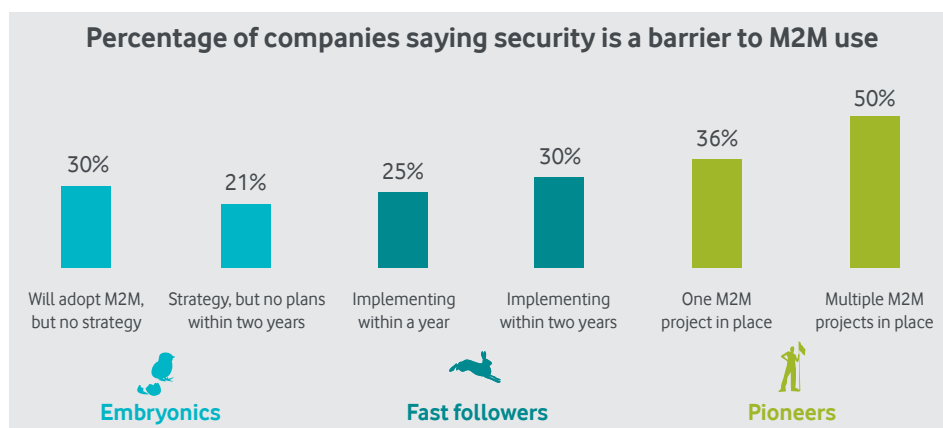
In our study, 72% of companies said that security breaches are a major concern. Of course, the same thing was said about many other technologies when they were new — cloud computing being a good example. Encouragingly, less than one in eight companies said that they saw security concerns as the main barrier to adoption.

Companies are concerned about security...

The fastest-growing sectors — consumer electronics and energy and utilities — were most likely to be concerned about security. And concerns appeared most prominently on the list of barriers for those well underway with planning and implementing their M2M projects, as Figure 20 shows.

Percentage of companies saying security is a barrier to M2M use

30%	21%	25%	30%	36%	50%
Will adopt M2M, but no strategy	Strategy, but no plans within two years	Implementing within a year	Implementing within two years	One M2M project in place	Multiple M2M projects in place
Embryonics		**Fast followers**		**Pioneers**	

...But the rewards outweigh the potential risks

It's important to note that, while the majority of companies said security was a concern, 83% more companies said that they had an M2M solution in place this year than last year.

Security is a concern, as is cost and what to do with all the data, but for the vast majority of companies, none of these concerns is serious enough to stop them implementing M2M. The rewards outweigh the risks, and companies see security as just something that they need to address — and that's true of cloud computing, mobility and many other technologies, not just M2M.

72%

72% of respondents said that security breaches are a major concern.

12%

But just 12% said that security was the main barrier to use.

Figure 20
Percentage of companies at each stage of adoption that cite security as a barrier to their use of M2M. (n=365)

66%

In our study, two thirds of companies said they were worried about the privacy issues connected with big data.

Security means many things

So why do security concerns grow as companies move through the adoption process? We think this reflects changing mindsets as projects develop. Before you develop a strategy, security may well be on your mind, but you don't have anything tangible to worry about. By the time you're implementing a solution, that has changed — you have actual devices, networks and servers to protect.

Our experience suggests that while the term "security" was used throughout, it actually covers three related topics:

- Early on, those considering M2M are most likely to be concerned about **risk**. Thousands of new connections, new applications and gigabytes of new data present new things to worry about, new unknowns. *What's out there?*

- By the time it comes to implementation, those concerns are largely replaced by **practical issues** that need to be addressed. *What precautions do I need to take?*

- And when you've amassed lots of data and are looking at expanding your M2M activities, as well as still having to look after the practical issues, you've also got a growing number of **privacy** issues to think about. *How could somebody misuse this data?*

Securing your M2M project

Just as there are approaches you can take to maximise ROI, there are approaches you can take to secure your M2M deployment.

- **Build it into your planning from the start.** Any security system is only as strong as its weakest point — security is not a "bolt on", and M2M systems need to be constructed with security at the core and end-to-end.

- **Consider both areas of security:** the device estate, including terminals and network access; and data management, including storage, processing and distribution of data.

- **Plan for how you can audit access and data usage in a forensic scenario,** not just for ways to prevent unauthorised access to M2M systems and data.

- **Conduct rigorous testing and checking before going 'live'** or moving from a pilot project to fuller rollouts. Such testing should incorporate all aspects of security, both component-level and end-to-end. Providers can and should help with this testing.

- **Get expert help.** M2M presents unique challenges, but the chances are that you won't be the first to experience them — there are many thousands of live M2M projects that have operated for years without security issues.

The analyst's view

Machina Research

The big security question

It's very positive, and not unexpected, that companies that are in the throes of deploying M2M solutions rank security concerns as their number one issue. If there is anything guaranteed to compromise the future success of connected solutions it's a security breach.

There's no magic wand for ensuring security of solutions, but as long as companies are focusing the necessary attention and resources on resolving it, then we should be optimistic that it won't prove to be too much of a barrier.

4 Looking forward, moving ahead
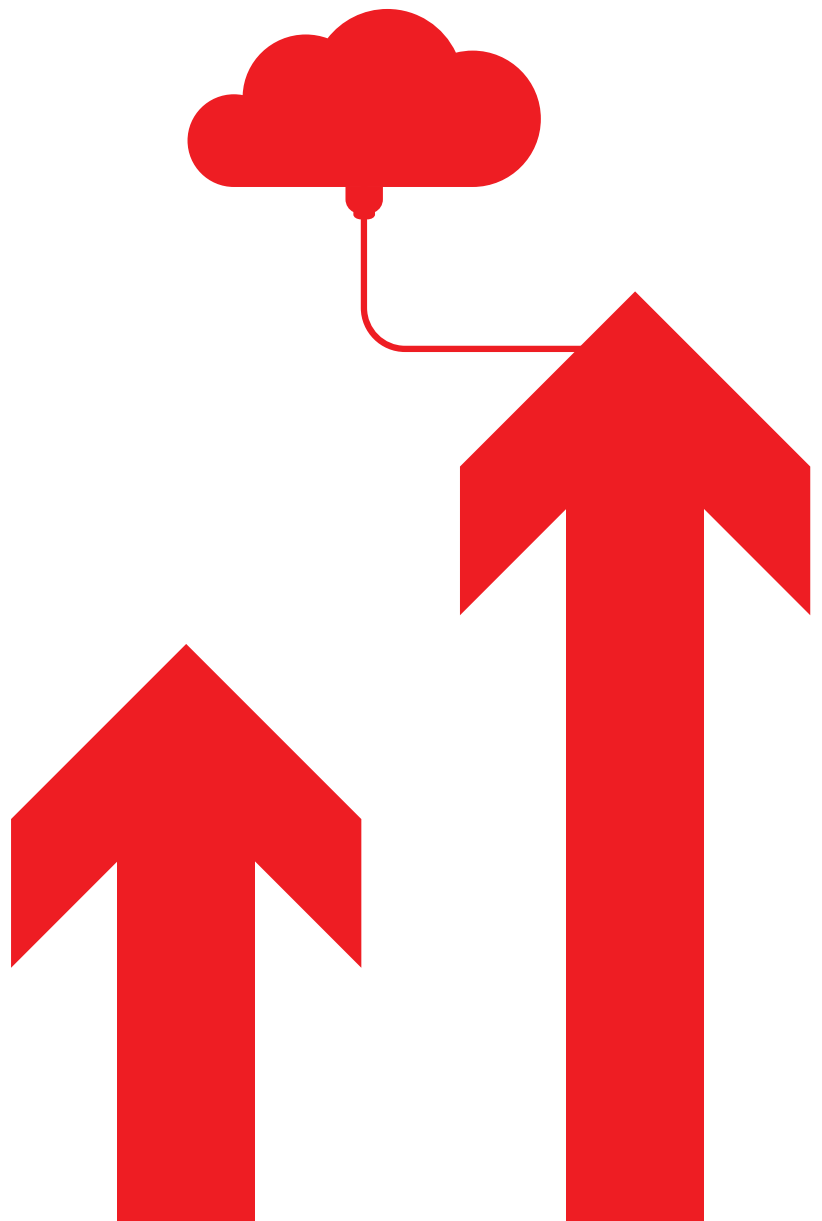
Four predictions

In a market as fast-changing as M2M, it can be hard to predict what's going to happen. But with our experience — and the Barometer data set — we predict that:

"Data analytics – this is the most interesting aspect but also the most problematic. Our senior management do not care about how M2M projects are run, they just want to see the deliverables (the data collected and the analysis) as well as the strategy implications based on this."

Retail, China

1 What you do with the data will become more important (starting immediately)

Early projects were siloed. In the past, companies just used data about stock levels within their supply chains to manage deliveries better. Now they realise that this data has potentially huge value in other business processes — for example, using that same data along with weather data to better forecast sales, set pricing and target promotions.

A lot of the value of M2M sensing is wasted if the "big data" findings remain siloed within a particular area of operations. Today, 75% of M2M adopters say they are using analytics; 88% expect to do so in three years' time. This will reflect a planned big data approach to M2M. The implications are broad, and will be familiar to anyone who has read up on big data: enterprises will need to invest in specialist skills, or bring in outside help to develop the necessary strategies and systems. And governance will be an important issue: the more data you store and make accessible around your organisation, the greater the privacy and security risks you have to plan for.

2 4G will improve the ROI equation for many M2M solutions and enable new ones (2–5 years)

Today companies use a wide range of technologies to connect their M2M solutions — including fixed-line (63%), cellular (60%) and Wi-Fi (56%). But the percentage of companies relying on fixed-line connections will fall — down 15 percentage points to 48% in the next three years. We believe that this is down to the falling costs of mobile broadband and the emergence of 4G — 84% of those currently developing an M2M solution said that 4G was "very" or "quite" important to their project. We predict that 4G will make new kinds of application practical and cost-effective, including video-based security, in-vehicle information services, assisted living and mHealth solutions, and much more.

3 Manufacturers and automotive companies will outperform expectations (next two years)

Our survey suggests that consumer electronics will take a commanding lead, with manufacturing being slowest to adopt M2M.

We think that as understanding of M2M grows, we'll see more manufacturers embrace M2M and adoption figures will surpass what our respondents predicted.

And we believe that next year we'll also see greater growth in automotive companies. Once drivers become familiar with M2M services they will start to demand them in their next vehicle. It doesn't take long for what was a luxury, only available in top-end vehicles to become widespread — like aircon. This will also drive the aftermarket to create solutions for vehicles that didn't have M2M installed at the factory.

4 Security and privacy standards will emerge (2–5 years)

Although there haven't been many high-profile security breaches exploiting M2M applications, it's inevitable that they will become more of a target as the number of deployments and their integration with back-end systems grows.

But we do not believe this will slow M2M adoption in a meaningful way; all it will do is accelerate the maturity of integrated M2M security solutions. From bespoke services, applications and protocols, security will evolve to more standardised and productised hosted services. It will be built-in and will become stronger, easier to manage and more cost-effective. This is what happens with all new technologies as they mature. For instance, if you look at surveys about cloud computing adoption from several years ago, you'll find lots of concern about security and privacy. Now, you're more likely to find customers saying that cloud actually contributes to making their infrastructures more secure.

In the M2M market there is already a huge amount of work going on in the areas of security standards and best practices. And of course M2M solutions, being made up of terminals, network connections, servers and applications, like other IT solutions, are already governed by established security practices, technologies and regulations. For their part, we expect adopters will increasingly compartmentalise critical systems, with private networks being used for very sensitive applications — going forward M2M will support a range of hybrid technology and network models.

The future is exciting for M2M

The cost of deploying is coming down, everyone is more focused on providing the end-to-end global connectivity required, and companies are starting to see the benefits of implementation, with lots of positive case studies. We can argue over which sectors will provide the greatest growth, but ultimately we expect all verticals to make substantially more use of M2M in the coming years than they do today.

The key trend for us over the next few years is the migration away from vertically integrated applications towards the IoT-style "horizontalisation". It will be a gradual shift, but the benefits are substantial. The standardised platform for IoT application development will ultimately result in lower prices, simpler implementation and faster time to market. Also implicit in IoT is having solutions that are deployable globally using whatever is the most appropriate technology.

There are, however, a number of challenges, as highlighted in the Barometer study. Security and privacy concerns could have a substantial negative effect on market growth in certain sectors, most notably anything that touches the consumer such as smart meters or healthcare. It also has significant implications for the monetisation of the data exhaust from M2M applications. As long as issues of privacy and security are high on the agendas of companies implementing and supporting M2M solutions, and they seem to be, then these challenges should be resolved.

"We expect all verticals to make substantially more use of M2M in the coming years than they do today."

The analyst's view

Machina Research

Conclusion

M2M is maturing, and it's increasingly being used to improve customer-facing processes — delivering better, more consistent, service and increasing differentiation to create a competitive edge. So what's next?

Those who commit see the biggest returns

Those that see the greatest returns from their M2M projects are those that are willing to adapt their processes and their culture, leverage the data it gathers more widely, and drive it hard from the very beginning. For these organisations, M2M ties in to trends around big data, mobility, and cloud, to usher in a new age of automation, agility, and competitive edge.

> M2M ties in to trends around big data, mobility, and cloud, to usher in a new age of automation, agility, and competitive edge.

There are barriers, but companies are overcoming them

Security, and the wider areas of risk and governance, will still be cited as reasons to delay by some organisations, but in many cases this is just a sign of cultural resistance to change. Even as the genuine concerns around risk, security and privacy are addressed, some companies will remain laggards and rejectors.

We see a lot of similarities with cloud computing. A few years ago, cost savings were the primary driver for investigating cloud; and security concerns were the main reason for putting off adoption. As the technology — and understanding of it — developed, security concerns have subsided and studies show that companies are more likely to cite increased business agility and competitive advantage as the reasons for switching than reduced costs.

Today, very few companies aren't using cloud in some way. We're already seeing M2M evolve, and companies looking beyond cost-cutting to how M2M can drive innovation and enable new business models.

Four recommendations

Throughout this report we've recommended ways to maximise your ROI, to tackle security, and to understand what's going on in your sector and your region. But there are four key steps you should take to maximise the results you see from your own M2M initiatives.

- Take a good hard look at your own readiness for M2M. Do you have the strategy, culture and technology maturity to make it pay dividends? Changing the course of a whole business may be too ambitious — but you can establish a steering committee or centre of excellence to try to influence and coordinate.

- Think not just about how you can use M2M within your business, but also how it can transform customer-facing processes. But from the same early stage, plan for how you can secure those processes, too.

- Leverage the more mature horizontal applications of M2M (such as fleet management and inventory management) where possible, and use specialist providers who understand your industry to make sure your solutions are well integrated.

- Actively pursue C-level support, and embrace the cultural and process changes as well as the technological. Consider M2M within the context of other major technology transformations, particularly big data. M2M and analytics go hand in hand.

5 Appendices
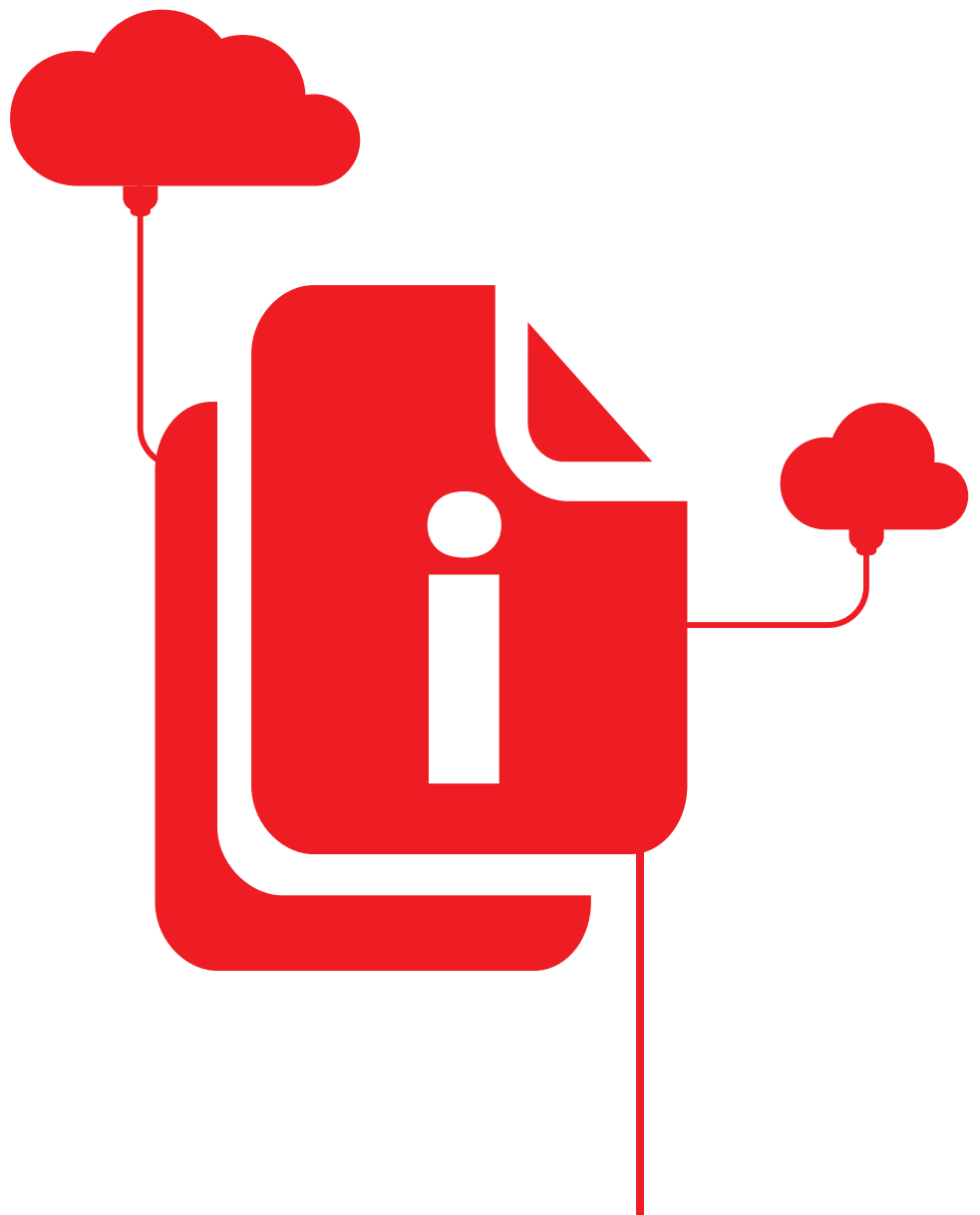
Methodology

Our survey

Circle Research conducted online interviews with 603 people from businesses in 14 countries between April and May 2014. The size of organisations surveyed ranged from 250 employees to more than 100,000; and included national, regional and global businesses. The respondents came from many functions, including IT, R&D, finance, and strategy and planning. They ranged from senior management to board-level.

All interviewees were asked about their:

- Understanding of M2M and attitudes towards it.

- Current use of M2M, including which applications they were using.

- Plans for the future.

This sample (n=603) was used to calculate current and forecast adoption figures for M2M as a whole and for specific industries and regions.

Interviewees that were qualified as M2M decision-makers for their organisation were asked additional questions on their:

- Drivers and barriers to adoption.

- Expected/realised benefits and time to see ROI.

This sample (n=365) was used for most of the detailed quantitative results in this report.

We also held 20 in-depth, telephone-based qualitative interviews. This dataset was used to add further depth to the analysis in this report, and quotes from these interviews are cited throughout the report.

Continuity and change

While maintaining continuity of respondents and questions to enable accurate year-on-year analysis, this year we've broadened our sample to include new countries (including China, Brazil, Turkey and South Africa) and an important new industry: healthcare and life sciences.

We've also expanded and deepened our survey itself, looking in more detail at the nature of each organisation's M2M projects. The M2M market has matured in the last year — now it's not just about whether you're doing M2M, but what you're doing with it.

Changes in samples in any multi-year study can compromise the validity of year-on-year comparisons. To guard against this, we analysed the data based on like-for-like samples, and found that the expanded sample size this year made little statistical difference to our findings: we saw the same trends versus 2013.

Many of our categories rely on self-certification. For regions, we asked companies where their headquarters are based, not where they make the majority of their sales, have the most assets or employ the most people. For industries, that may mean that a medical device manufacturer could describe itself as a healthcare company or a manufacturer. A vertically integrated manufacturer could describe itself as a manufacturer or a retailer.

About our contributors

Machina Research

Machina Research is the world's leading technology research and consulting firm focused on the emerging opportunities associated with Machine-to-Machine (M2M) and the Internet of Things (IoT). Our Advisory Service provides detailed and invaluable qualitative analysis of all aspects of M2M and IoT including commercial best practice, technology, and regulation. Our Forecast Database contains the most comprehensive set of forecasts of global M2M adoption.

Matt Hatton is a widely respected wireless industry expert with over 15 years' experience in the mobile sector. He is currently a Director at Machina Research, a specialist research and consultancy firm focusing on M2M, IoT and Big Data. Prior to establishing Machina Research, Matt worked at 3 UK, Yankee Group and Analysys Mason.

Find out more at machinaresearch.com

Matt Hatton
Machina Research

Circle is the business-to-business market research agency. We create Eureka! moments — deep insights into our clients' brand, customers and market. Insights which will transform their view of the situation and provide a powerful competitive advantage.

What's the secret? Clients say we "get it". Our unique blend of experience and understanding allows us to see things that other agencies miss. We understand their market because we're the business-to-business research experts. We're methodology neutral — skilled in qualitative and quantitative techniques so that we can recommend the very best solution. And we're international: we've conducted studies in over 100 countries, all to the exacting ISO20252 standard.

Find out more at circle-research.com

About Vodafone

M2M and the Internet of Things have the potential to transform your business operations, whatever your size. So your choice of M2M provider is critically important. Here are three good reasons why we think you should choose Vodafone.

Unrivalled experience of business M2M

We have more than 20 years' experience in M2M, and have delivered some of the world's leading M2M solutions for companies including BMW, Amazon and Bosch.

Today we have more than 400 dedicated M2M experts with deep expertise in helping companies achieve better operational agility and better customer engagement, ready to put their experience to work for you.

You can put your trust in Vodafone to transform your business.

M2M global networks you can rely on

Vodafone has mobile operations in 27 countries, partners with mobile networks in 49 more, and fixed broadband operations in 17 markets. As of 31 March 2014, Vodafone had 434 million mobile customers and 9 million fixed broadband customers.

Our scale doesn't just give you the confidence that we operate wherever you do business. It means we can offer competitive contracts and can guarantee the high quality of service you expect.

M2M can be complex. We focus on making it simple

Our range of solutions and services take the complexity out of M2M. We give you a single point of contact to bring together the right mix of our products, partners and professional services for your business.

The result? Unmatched levels of connectivity and service, helping you put M2M to work for your business and delivering a rapid return on your investments.

"Vodafone has been very successful this year ... Its investment over the last couple of years in technology and people has paid off, translating also into service differentiation and the development of new innovative products. ... Vodafone fully deserves to keep its ranking as the market leader."

Matt Hatton, Machina Research

Further reading

To find out more about the changing world of M2M, and the opportunities within your industry, visit the following areas of our resource centre.

Case studies

Read about the experiences of nearly 50 organisations with M2M, representing businesses from the UK to India, from startups to the largest multinationals.

m2m.vodafone.com/casestudies

White papers

Learn about the most important issues and applications in M2M with our growing range of white papers. They cover specific M2M markets, such as security or electric vehicles, and in-depth country-level reports for more varied topics such as mHealth and smart metering.

m2m.vodafone.com/whitepapers

Industries

Discover the broad range of solutions and services we provide for your industry sector. Discover videos, relevant case studies, news and more.

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Start your journey

To find out more about Vodafone's M2M solutions, please contact your Vodafone account manager, email **m2m@vodafone.com**, or visit **m2m.vodafone.com**

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