

1 Executive Summary

M2M is widely recognised as being a significant future growth opportunity for mobile operators faced with otherwise stagnating (or contracting) traditional markets. The number of M2M connections worldwide is expected to grow quickly over coming years, representing a significant opportunity for a wide range of potential market participants.

The majority of wide area M2M connections will be wireless, driven by the ease of deployment of such technologies, the homogeneity of the solutions that they enable and, of course, the potential to support mobile (or 'nomadic') applications. Machina Research predicts that there will be 2.1 billion

In 2020 Machina Research forecasts 2.1 billion cellular M2M connections. The addressable revenue opportunity for MNOs will be USD373 billion.

such cellular M2M connections worldwide by 2020. We also expect that, by 2020, there will be clearly identifiable opportunities for a further 3.6 billion M2M connections where cellular connectivity can either add value to M2M solutions otherwise supported by non-cellular technologies, or for which cellular connectivity can compete on price. In total, we expect that the addressable market for mobile operators in M2M will total USD373 billion in 2020.

As many of the world's leading telcos have realised, the majority of 'value' in the M2M market lies not in undifferentiated connectivity, but in the provision of an overall service. Put another way, telcos need to move up the value-stack to capture a bigger share of the M2M opportunity: the bit-pipe model does not work for M2M. Many of the world's leading mobile operators have recognised this need to move up the value stack and have made significant investments to that end, including establishing M2M competence centres, platform capabilities and partnering initiatives. The first step when adding more value is the provision of a value-added connectivity support capability, allowing MNOs to generate more revenue per connection and also enabling the MNO to focus on generating application revenue directly from customers.

It is clear that M2M represents both an opportunity and a challenge for operators: on the one hand M2M represents a very significant potential revenue stream, whilst on the other hand mobile operators must step significantly outside of core business areas to secure such revenue. As we discuss in more detail in this White Paper, M2M platforms have the potential to significantly enhance a mobile operator's prospects in the M2M space, including:

Machina Research's analysis indicates that MNOs can benefit from a five-fold increase in cumulative profit over an 8-year period by adopting a cloud-based M2M platform

- **Supporting the need of clients, who are looking for partners to integrate into end-to-end business processes, rather than simple providers of connectivity.** To this end, mobile operator clients of cloud-based providers of M2M platform services are also able

to benefit from the exposure that their platform provider has to the requirements of the M2M clients of other client operators in different geographies.

- **Maintaining a leading edge proposition in a rapidly changing, and technically sophisticated, marketplace.** A third-party, cloud based, M2M platform capability can potentially be positioned as a competitive differentiator in this context.
- **Supporting multi-country client solutions.** Clearly, given the level of systems integration that is required between mobile operators and companies offering (or using) M2M solutions, there is a considerable benefit in using the same platform to support solutions in multiple geographies. Again, this highlights the benefits of a third party, cloud-based, platform solution.
- **Reducing operator costs,** in the context of a typically low-ARPU environment. Cloud-based platforms offer operators a low-cost, low-risk entry into providing M2M connectivity and associated services without disrupting or burdening their core lines of business.

Cloud based platform capabilities can help a mobile operator's ability to compete in M2M markets in a number of ways. Machina Research has undertaken a detailed business modeling exercise to quantify the potential benefits of such an approach. We have concluded that the action of adopting a cloud-based M2M platform solution could have the effect of increasing 8-year cumulative profits from M2M five-fold in comparison with a scenario where the same mobile operator does not adopt any form of platform capability¹. The main sources of benefit that we identified include: additional local client wins, additional regional client wins, ARPU uplift, and cost reduction.

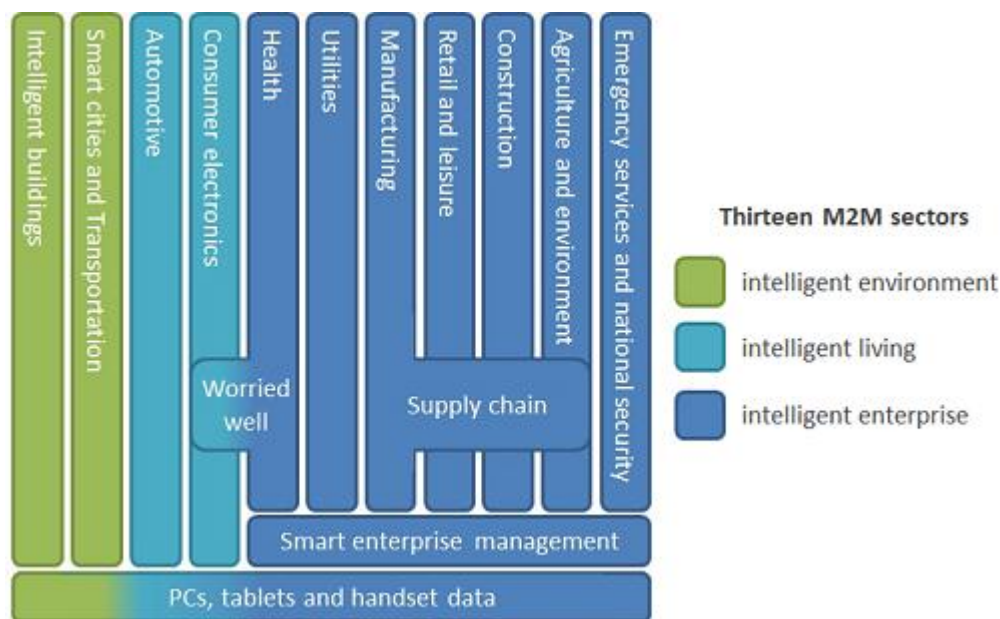
We discuss the dynamics and conclusions outlined in this Executive Summary in more detail in the following sections.

¹ Based on analysis of a mobile operator with operations in Malaysia, only, for illustrative purposes and assuming that no competing operators implement third party cloud based M2M platform capabilities over the forecast period

2 The M2M opportunity

Machina Research has developed a series of comprehensive 10-year forecasts of the M2M and mobile broadband market across each of thirteen sectors (see Figure 2-1 below), based on the analysis of hundreds of individual applications. The full suite of forecasts includes in excess of 1.4 million datapoints.

Figure 2-1: Machina Research forecast sectors [Source: Machina Research, 2011]



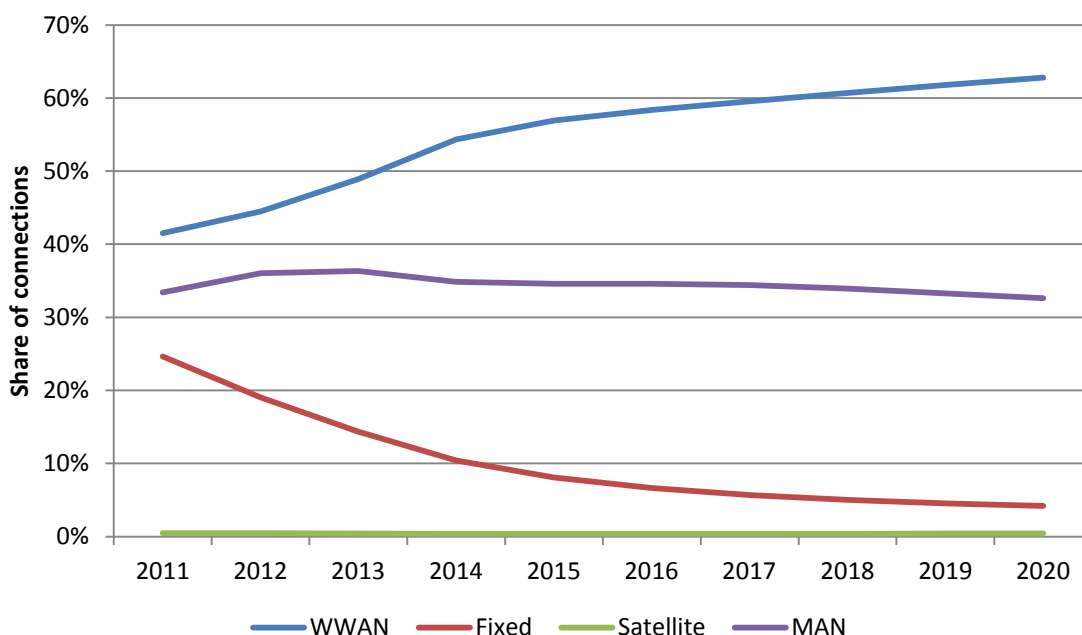
Based on this detailed analysis of the market opportunity, we forecast that by the end of 2020, there will be 3.3 billion active wide-area M2M connections² worldwide, a near nine-fold increase over the 380 million such connections at the end of 2011. This represents an annual growth rate of approaching 30%.

As can be seen from Figure 2-2 (below), wireless wide area network (WWAN) will dominate wide area connections. There are several reasons for this dominance:

- **Ease of deployment.** With near ubiquitous cellular coverage in most populated areas of the world, mobile connectivity is an extremely easy solution to deploy.
- **Homogeneity of solution.** Mobile operators can have complete visibility and control of every device connected to their networks without the need to negotiate the extremely fragmented firewall and VPN environments that can exist in a short-range environment. An example is clinical remote monitoring, which is significantly better suited to connection using wireless wide-area networks than by short-range technologies.
- **Mobile capabilities.** Many of the most significant M2M applications are mobile (for instance, in-vehicle solutions), or, at least, nomadic. Mobile connectivity is an obvious choice for such applications.

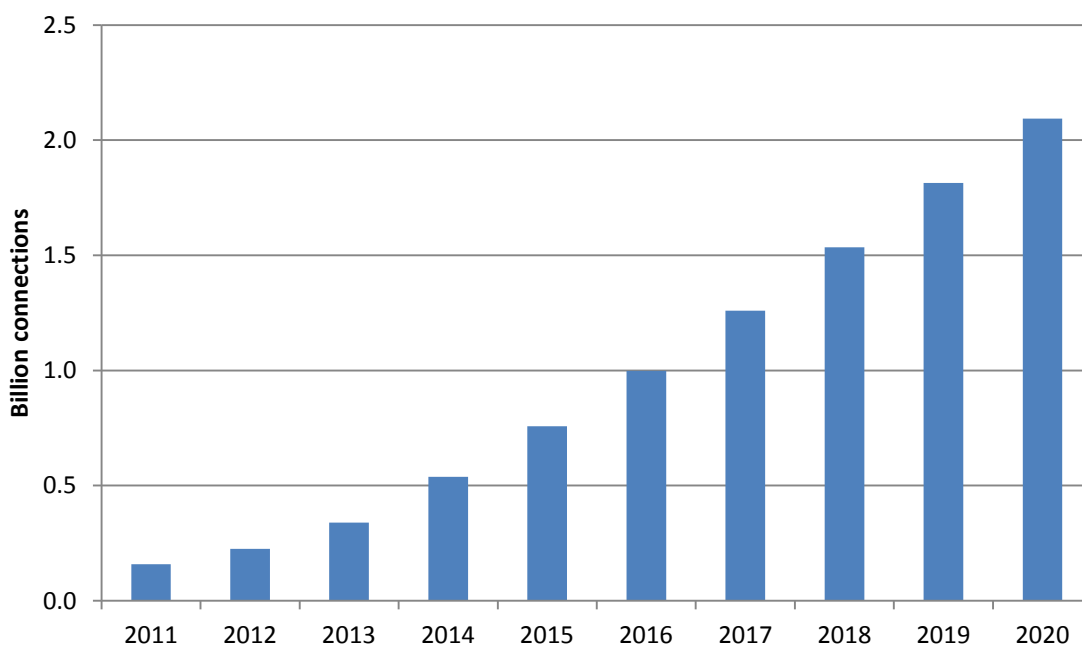
² Defined as: "Connections to remote sensing, monitoring and actuating devices, together with associated aggregation devices", and excluding short range connections

Figure 2-2: Worldwide M2M connections and wireless wide-area mobile connections 2011-2020
 [Source: Machina Research]



Accordingly, and as illustrated in figure 2-3 (below) the total number of wireless wide-area M2M connections will grow from 159 million to 2.1 billion between 2011 and 2020, representing an annual growth rate of 33%.

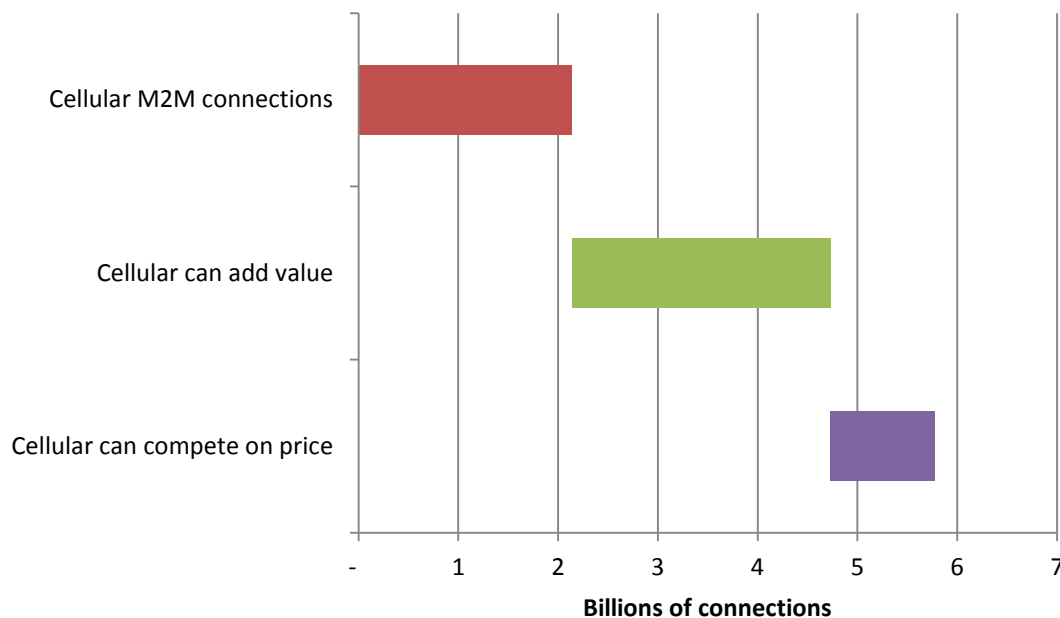
Figure 2-3: Wireless Wide Area Network M2M connections 2011-2020 [Source: Machina Research, 2012]



Beyond the 2.1 billion wireless wide-area M2M connections that are forecast as part of our 'base case' forecasts for 2020 there is a clearly identifiable opportunity for a further 3.6 billion

connections. As illustrated in Figure 2-4, there will be 2.6 billion connections in 2020 where cellular could add value (by improving M2M solutions that we expect to be connected by other technologies³). There are a further one billion connections where WWAN connectivity can compete as a substitute technology on the basis of price.

Figure 2-4: Cellular M2M connections and potential connections in 2020 [Source: Machina Research, 2012]



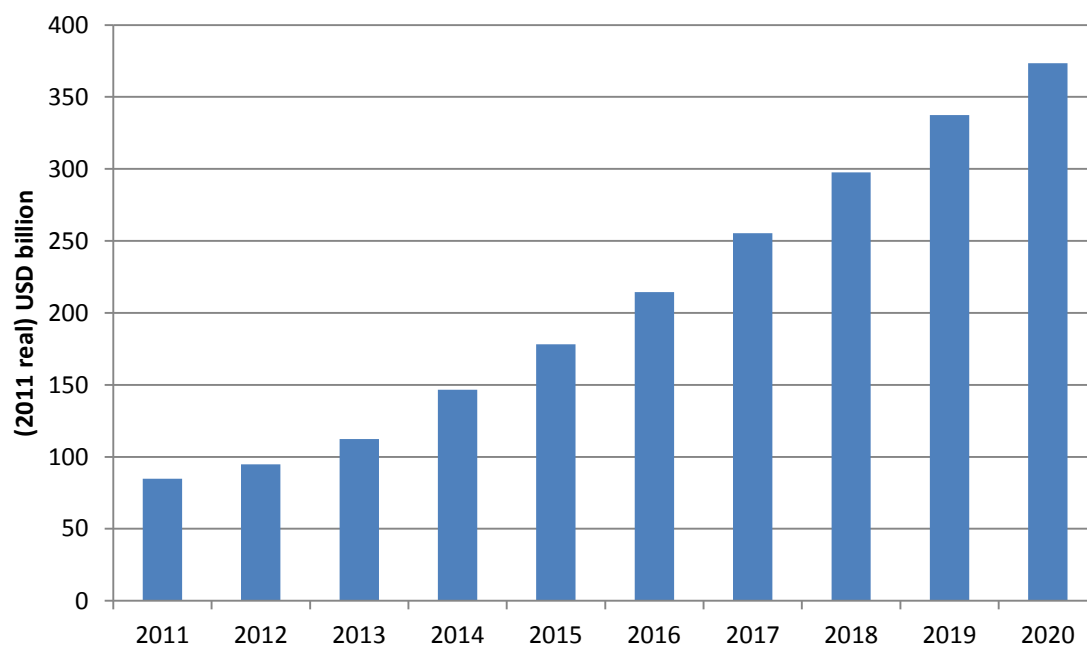
This growth in connections represents a significant potential financial opportunity for mobile operators. Figure 2-5, below, illustrates the total addressable⁴ revenue for mobile operators in 2020: USD373 billion.

A final key dynamic of the M2M market that needs to be highlighted is that the majority of 'value' in any M2M application lies not in the simple carriage of data, but in the provision of an overall service. For example, a wireless wide area enabled home security system represents a significant potential revenue opportunity for a mobile operator, including revenue from device sales, installation and monthly service fees. The data traffic element of such a solution will be relatively small. The story is the same for many other M2M applications: the really big opportunities for mobile operators lie in moving up the value stack and away from the simple provision of data carriage (bit pipe) services.

³ Including short range technologies

⁴ That is, revenue of which mobile operators could reasonably aim to secure a share, and could conceivably be in contention to provide.

Figure 2-5: Total Addressable M2M revenue opportunity for mobile operators [Source: Machina Research, 2012]



3 Operator investments in M2M

Many of the leading mobile operators worldwide have recognised the need to move up the value stack to maximise revenue from M2M opportunities. Such operators have adopted aggressive tactics in their quest to secure a greater share of total addressable M2M revenue, including:

- Establishing M2M platform capabilities.** Including basic connection support⁵ and also service enablement. A first step up the value stack for mobile operators is the development of a connectivity support capability, which brings two key benefits. It allows them to generate more revenue 'per connection' than simple traffic volumes would suggest, through the provision of value-added services. It also provides a baseline capability that enables the mobile operator to focus on generating application revenue directly from customers, unlocking significant potential revenue opportunities. Typically, an MNO will have a single preferred connection support and service enablement platform solution. Such M2M platforms are flexible and have extensive capabilities in terms of solution support, reporting and the provision of a software environment and APIs to facilitate solution development. Increasingly, MNOs are looking to third party providers of M2M platforms to offer consistent interfaces and common solution components to their customers, many of whom may already be using such interfaces in deployments in other geographies. Furthermore, the use of third party connection support and service enablement platforms can potentially lower the costs and risk associated with deploying M2M services whilst also accelerating the time-to-market with such services.
- Establishing M2M competence centers.** Almost without exception the biggest mobile operators worldwide have established M2M competence centers to lead the development of an overall M2M proposition and also to facilitate the exchange of best practices and application specific knowledge between local operating units. M2M competence centers will often be tasked with identifying successful applications that are 'live' in a single local market and that have multi-country potential. The reasoning is that significant value can be generated by bringing proven single country solutions to a wider audience.
- Establishing M2M sales forces.** A M2M sale is often a complex process, requiring the mobile operator to understand and integrate seamlessly with a client's business-critical processes⁶. The overall sales cycle differs greatly from traditional mobile operator sales cycles. In recognition of this fact, many mobile operators have established M2M-specific sales forces, often led from a central M2M competence centre and with capabilities embedded in local operating units.
- Engaging vertical partners.** Almost all mobile operators actively pursuing the M2M market have sought to engage vertical partners, in recognition of the fact that many M2M applications require the kind of sector-specific knowledge that mobile operators generally do not possess. Many mobile operators are adopting a relatively similar approach to developing the vertical partnerships that are required to succeed in the M2M space. It is an approach that could potentially be described as an 'industrialisation' of partner

⁵ Including functions such as connection provisioning, usage monitoring and fault resolution

⁶ See Section 4.2 for further details.

management: mobile operators define their target markets, then define the partnerships required to compete in these markets, and then they set about securing an appropriate set of relationships. Some operators (notably Deutsche Telekom and Telefonica) have added a new element to this typical partnership approach, by seeking to benefit indirectly through catalyzing the overall market environment rather than simply directly through the establishment of bi-lateral partnerships.

- **Partnering to extend reach.** Operator alliances are commonplace in the world of M2M, driven by the often multi-national needs of potential M2M clients, and also the typical homogeneity of M2M applications across international borders. Three major groupings are emerging seeking to enable a seamless global solution for the provision of M2M communications to multi-national customers. Vodafone can offer extensive reach both through 'owned' local business units and also their 'Partner Markets'. A burgeoning alliance between Deutsche Telekom, Orange, Telia Sonera and Everything Everywhere can offer strong European coverage and access to US markets. A third grouping of KPN, NTT DoCoMo, Rogers, SingTel, Telefonica, Telstra and Vimpelcom, based on the Jasper Wireless M2M management platform, announced its collaborative intentions in July 2012.
- **Providing M2M developer tools.** Many mobile operators actively seek to expose network capabilities to potential M2M application providers through the publication of APIs, or the provision of generic software code to support application development.

Overall, it is clear that the big MNOs are taking the M2M opportunity very seriously, and are doing everything that they can to reach out to the marketplace to facilitate and catalyze market growth and development.

4 Challenges for operators

4.1 Introduction

It is clear that M2M represents both an opportunity and a challenge for operators: on the one hand M2M represents a very significant potential revenue stream, while on the other hand mobile operators must step significantly outside of core business areas to secure such revenue. Some of the key challenges are as follows:

- M2M is a new and different business model for mobile operators, and cannot be effectively addressed with existing infrastructure and operational practices.
- Competition is intense. Many of the biggest telecoms operators worldwide are investing heavily in their M2M capabilities, effectively setting a stiff benchmark level of capability required to compete for M2M revenue.
- The demands of many potential M2M customers are regional, or even global, in nature, often extending significantly beyond the footprint of any single mobile operator. The fragmentation of mobile operator systems environments can hinder the deployment of regional solutions, or the adoption of existing M2M solutions for new markets.

As we discuss in the following subsection, M2M platforms have the potential to significantly enhance a mobile operator's prospects in the M2M space. More specifically, purpose built, cloud based, third party platforms can be a particularly effective solution for mobile operators that have aspirations to service customers with global deployment needs. The uniformity of integration interface such third party platforms provide is increasingly proving to be valuable to customers whose M2M service needs span multiple geographies.

4.2 Key benefits of a platform

4.2.1 Supporting client needs

Ultimately, when a client engages a mobile operator to support their M2M strategy, that client is generally looking for a partner that is able to integrate their services into an end-to-end solution and which can add value to and enhance their relationships with their customers and users. Often such a client would be seeking to reduce churn in their customer base, or extend 'transactional' purchase relationships into on-going subscription relationships. This requirement is both more critical and more complex than operator-client relationships have typically been in the past. Firstly, in M2M markets, the operator is often committing to deliver a key aspect of their client's overall service offering to their customers, and secondly the delivery of that key aspect of an overall service often relies on tight systems integration between a mobile operator and their clients.

In this context, mobile operators need to differentiate on the basis of ability to integrate into a process, rather than on the basis of horizontal vanilla M2M capabilities. The flexibility and simplicity

that a purpose-built third party platform solution can provide can significantly assist in this endeavour. Aside from the potential to position a platform capability as a competitive differentiator, there may be potential to import elements of an M2M solution or even tried-and-tested applications essentially off the shelf, from international markets.

Mobile operator clients of cloud-based providers of M2M platform services are also able to benefit from the exposure that their platform provider has to the requirements of the M2M clients of other client operators in different geographies. Effectively, 'best practice' approaches can be identified and communicated to other mobile operator customers of the same platform.

4.2.2 Maintaining a leading-edge proposition

M2M is a rapidly changing marketplace. The needs, expectations and requirements of potential M2M clients are evolving quickly. An M2M platform offers an opportunity to ring-fence systems capabilities that are required to support M2M clients, and to evolve these on a separate but parallel track to wider mobile operator systems. Thus the systems that interface directly to clients can be optimised to support client needs whilst systems that support wider telecoms operations can be optimised for more traditional requirements of operational efficiency.

This flexibility is valuable. One of the consequences of the rapidly evolving competitive landscape in M2M is that competitive differentiators do not last long. The leading edge of competitive differentiation within M2M markets is evolving quickly, and operators need to invest to maintain a competitive market positioning. A M2M platform capability significantly simplifies this process.

Mobile operators that are able to position their platform capabilities as competitive differentiators to potential clients will have a competitive advantage over operators that are not able to match those capabilities. M2M buyers are generally relatively sophisticated, and a mobile operator that is able to offer a full feature set will have relatively little trouble communicating and differentiating on the basis of those capabilities.

Third-party M2M platform providers typically benefit from more scale over which to amortise systems development costs, and so are able to justify greater investment to maintain a leading edge proposition. The scale that third-party providers of platform services can bring also acts to de-risk the process of technology and systems investments.

4.2.3 Supporting multi-country client solutions

Given the level of systems integration that is potentially required between mobile operators and companies offering (or using) M2M solutions, there is a considerable benefit in using the same platform to support solutions in multiple geographies. Such an approach can avert the need to undertake multiple systems integration exercises with multiple M2M platforms, and to maintain these interfaces in the long term. It also favours the awarding of multi-country M2M solution contracts to either operators with operations in each target market or to the 'partners' in an operator group which all use a common M2M platform solution. Operator clients of third-party M2M platform providers also potentially benefit from indirect exposure to a greater number of client solutions already in service with their partner operators. These can potentially be called upon to inform the development of any particular client solution. Essentially a third party M2M platform provider has the potential to act as a facilitator for a constellation of client mobile operators, either

assisting with the coordination of a response to a single multi-country client opportunity, or simply communicating learning and potentially acting as a conduit for the transfer of technical capabilities, or even complete M2M solutions.

4.2.4 Reducing operator costs

Not only is the M2M environment more demanding than has typically been the case for most significant mobile operator markets in the past, but the typically low expected revenue per connection dictate a need for operational excellence on the part of the mobile operator. Mobile operators will be simply unable to turn a profit from M2M with anything other than very efficient operations, given the typically limited revenue opportunity per connection and the intensity of competition in M2M markets.

Cloud-based solutions typically have more scale over which to amortise systems development costs, and so can justify greater investment to enable streamlining mobile operator operations. For a cloud-based platform provider, the ability to reduce mobile operator client operating costs is clearly a strong competitive differentiator, and can result in incremental profits, ensuring that this element of an overall service offering benefits from the close attention of senior management.

5 The business case for a cloud-based platform

Clearly cloud based platform capabilities can be beneficial to a mobile operator's ability to compete in M2M markets, and for a wide range of reasons. The next step is to estimate the potential quantum of such benefits. Accordingly, and in order to assess the real-world impact that a cloud based M2M platform capability can potentially bring, Machina Research undertook a detailed business modeling exercise taking account of:

- Local and regional WWAN M2M opportunities
- The candidate mobile operator's expected share of contract wins with cloud-based platform capabilities and without platform capabilities
- ARPU uplifts that can potentially be achieved through offering cloud-based platform capabilities
- Net cost reductions that platform capabilities can enable

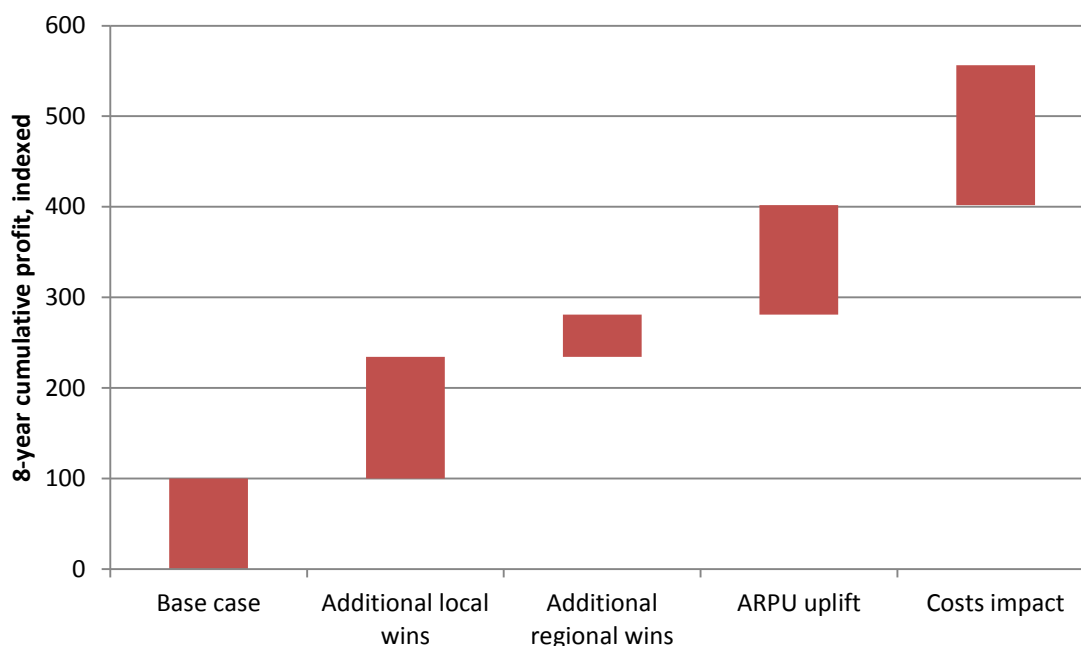
Figure 5-1 below provides a breakdown of the factors that drive the overall benefit for the mobile network operator.

Figure 5-1: Analysis of benefits for a mobile operator adopting a third-party M2M platform [Source: Machina Research, 2012]

Scenario	Description
Base case	<ul style="list-style-type: none"> • Mobile operator with no platform capability
Additional local client wins	<ul style="list-style-type: none"> • Mobile operator can use third party, purpose built, platform capability to differentiate service in its local market • Also benefits from the network effects of becoming the 'country representative' of a platform-centric operator alliance • Securing a greater share of business within footprint
Additional regional client wins	<ul style="list-style-type: none"> • Mobile operator is able to compete more effectively in regional markets • Winning business outside of footprint, potentially within the territories of other operators that are part of a platform-centric alliance
ARPU uplift	<ul style="list-style-type: none"> • Mobile operator is able to secure higher ARPUs for connections in recognition of additional capabilities • Or, conversely, an operator is able to avert the need to discount to secure business in the face of competition from platform-enabled operators
Cost reduction	<ul style="list-style-type: none"> • Mobile operator is able to reduce operational and network costs associated with supporting M2M connections • Offset by estimated costs of a third party, purpose built, cloud based platform solution

Overall, in the case that we examined⁸, we estimate that the action of adopting a cloud-based M2M platform solution could have the effect of increasing 8-year cumulative profits from M2M by more than 450% in comparison with a scenario where the same mobile operator does not adopt any form of platform capability. The biggest impact comes from reduced costs, closely followed by ARPU uplift and additional local wins.

Figure 5-2: Graphical representation of benefits for a mobile operator adopting a cloud-based M2M platform⁹ [Source: Machina Research, 2012]



Whilst it is clear that some level of benefit for MNOs can be secured through the deployment of in-house platform capabilities, it is also clear that in-house equivalent solutions will generally be handicapped by their relative lack of scale over which to amortise development costs and also the potential absence of network effects associated with the presence of identical platform solutions in other regional markets.

⁸ Based on a mobile operator with operations in Malaysia, only, for illustrative purposes and assuming that no competing operators implement third party cloud based M2M platform capabilities over the forecast period

⁹ Clearly, whilst these results are derived from a detailed and comprehensive analysis of both mobile operator and M2M market dynamics, they can only be indicative of the likely impact that adopting a M2M platform may have for any specific operator. The expected benefits of adopting a M2M platform capability can only be assessed for any specific operator on a case-by-case basis.

6 Conclusion

M2M services represent a USD373 billion total addressable market for mobile operators in 2020. The extent to which those operators can capitalize on this opportunity is dependent on their ability to provide value added services in addition to basic connectivity. The logical place for operators to start “moving up the stack” is by providing value-added connectivity support that generates more revenue per connection and also enables the MNO to focus on generating application revenue directly from customers.

For this reason, we recommend that MNO’s invest in M2M platforms, and furthermore, 3rd party cloud-based platforms can give operators a further edge and in sum achieve the following:

- Provide connectivity that is integrated with end-to-end business processes and which leverage best-practices from other geographies and industries.
- Maintain a leading edge in a rapidly changing, and technically sophisticated, marketplace.
- Support the needs of multi-country clients by presenting a common interface by virtue of multiple MNOs standardizing on the same cloud-based platform.
- Reducing operator costs by having access to features that continuously improve operational efficiencies. Development of such features, in turn, is subsidized by multiple operators served by a given cloud-based platform.

All told, Machina Research has found that employing a 3rd party cloud-based platform can increase an operator’s cumulative profits many fold, including up to five-fold over an 8-year period in the case of a particular MNO.

7 About Machina Research

Machina Research is the world's leading provider of strategic advice on the newly emerging M2M, IoT and mobile broadband markets. The company is staffed by mobile industry veterans with extensive knowledge and understanding of these new market opportunities.

Machina Research supports its clients through an annual Advisory Service subscription consisting of the following elements:

- **Forecast Database** – on-going access to this constantly updated forecast of the M2M and mobile broadband opportunity in 54 countries worldwide.
- **Sector Reports** – Approximately 13 reports per year (new and updates) focusing on vertical sectors such as Automotive and Healthcare, consisting of qualitative and quantitative (i.e. 10 year forecasts) analysis.
- **Strategy Reports** – Occasional reports focusing on specific issues relating to M2M cutting across multiple vertical sectors.
- **Research Notes** – 3 shorter reports per month examining key issues in the world of M2M.
- **Strategy Sessions** – On site presentations.
- **Analyst Inquiry** – Direct access to our analyst team.

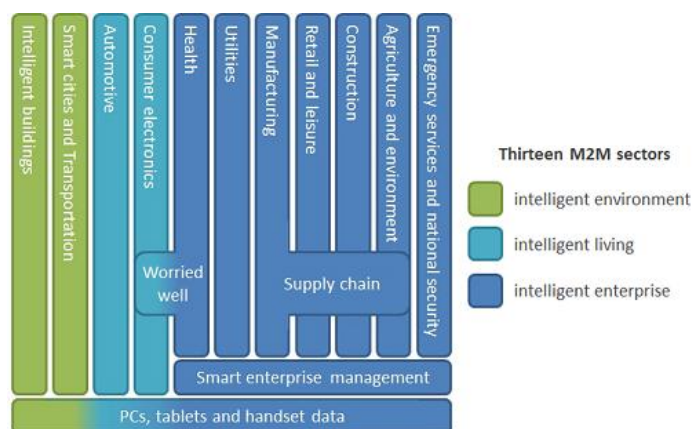
In addition to our Advisory Service, Machina Research frequently engages in custom research projects for our clients.

7.1 Forecast Database

Machina Research's Forecast Database provide comprehensive forecasts of the M2M and mobile broadband market across each of thirteen sectors as illustrated in Figure 4-1.

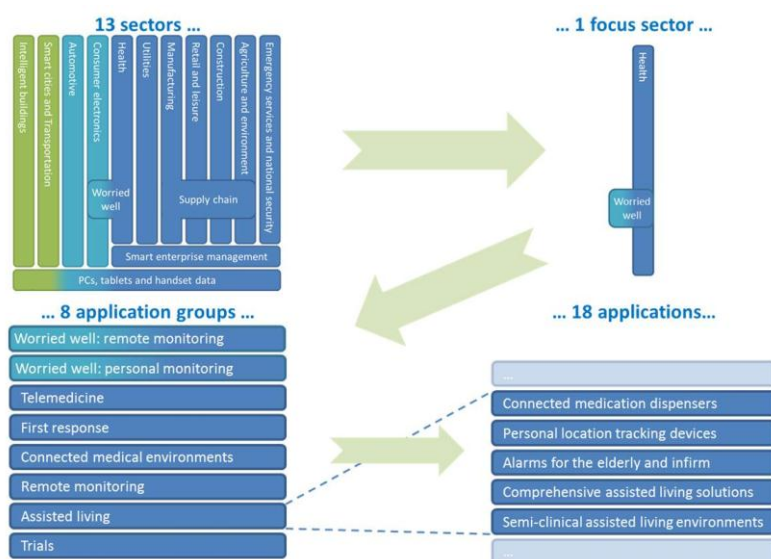
Subscribers to the Machina Research Advisory Service receive full access to the output from the Forecast Database across all 13 sectors.

Figure 7-1: Machina Research's Thirteen Sectors [Source: Machina Research, 2011]



The forecasts cover 54 individual countries and 6 regions and includes granular 10 year market forecasts for multiple applications within each sector (e.g. within the healthcare sector, and as illustrated in Figure 4-2, it includes a breakdown by each of eight application categories each based on analysis of multiple sub-applications, for example the 'Assisted Living' forecasts include consideration of five separate sub-applications). Another example is the utilities sector which has a breakdown between three applications: smart meters, electric vehicle charging and transport & distribution management.

Figure 7-2: Applications in the Healthcare sector [Source: Machina Research, 2011]



Currently Machina Research's Forecast Database covers a total of 60 application categories individually, based on analysis of hundreds of sub-applications. The Forecast Database includes in excess of one million datapoints.

For each application category the forecast includes numbers of devices and numbers of connections and traffic with splits by technology (2G, 3G, 4G, short range, MAN, fixed WAN and satellite). We also forecast total revenue and include a break-out of mobile traffic revenue.

The Forecast Database is delivered in Excel format.

7.2 Reports & Research Notes

Our written deliverables come in two types: Reports and Research Notes. During 2012 Machina Research will deliver approximately 15 Reports (13 new and updated sector reports plus the global forecast report and CSP benchmarking report) and 36 Research Notes.

7.2.1 Reports

These are the backbone of Machina Research's work. There are three forms of reports:

- **Sector Reports:** Based on the Forecast Database these reports provide qualitative and quantitative analysis of the emerging opportunity for machine-to-machine communications in one specific sector. They include analysis of the drivers and barriers and detailed analysis of each of the application groups in the sector.
- **Global Forecast Report:** Drawing on data from the Forecast Database this report examines the total market for global connectivity including detailed analysis of key growth applications, revenue opportunity and total addressable market.
- **Strategy Reports:** These reports are published on an occasional basis. One example is the **CSP Benchmarking Report (January 2012)** which examines the capabilities of major communications service providers (CSPs) and analyses their ability to address the M2M market opportunities across numerous sectors and geographies.

7.2.2 Research Notes

These are shorter reports (typically 1,500-2,500 words) that focus on a specific issue, company, application or event and examine it in greater detail. Machina Research provides subscribing clients with three Research Notes per month.

7.3 Other services

Other services offered by Machina Research include Strategy Briefings, Analyst Enquiry services and Custom Research & Consulting.

7.4 Contact Machina Research

For any enquiries related to Machina Research's Advisory Services in the M2M space, please contact Jim Morrish or Matt Hatton. Jim and Matt are Directors and Co-Founders of Machina Research, and can be contacted by email via: enquiries@machinaresearch.com