**The bottom line:** It is now possible to link almost any type of remote machine or device to critical information systems and gather real-time field intelligence that can be used to improve efficiency, reduce costs, introduce new services and gain competitive advantage. This paper explores the key business drivers behind machine to machine (M2M) wireless communications, the different hardware, software and communications elements involved, and describes how to introduce M2M technology effectively on a global scale.

**Key concepts:** The potential of M2M communications is almost unlimited: fleet and asset tracking; smart metering; industrial, building and home automation; improved security, and more. With the needs of the global business in mind, we explain the benefits of M2M and why it’s crucial to take an enterprise-wide view when implementing solutions.

**Who should read:** This paper is of particular relevance to CEOs, Senior Management, CIOs and IT managers as well as regional decision-makers.
Machine to machine communications, commonly known as M2M or telemetry, connects communications-enabled remote machines or devices, allowing key information to be exchanged automatically.
Executive overview

Anytime, anywhere access to real-time intelligence from remote machines or devices is changing the way that multinational businesses operate. Over the next five years we’re going to see a dramatic breakthrough in new applications as organisations realise the unheralded potential M2M represents – not just for increased efficiency and cost reduction, but also for revenue generation and improved customer satisfaction.

M2M communications is the networking of intelligent, communications-enabled remote assets. It allows key information to be exchanged automatically without human intervention, and covers a broad range of technologies and applications which connect the physical world – whether machines or monitored physical conditions – to a back-end IT infrastructure.

These remote assets, which can be fixed or mobile, include cars and truck fleets, utility meters, copiers and printers, kiosks and wireless displays, ventilation and air-conditioning sensors, home medical devices, fitness monitors and CCTV cameras.

The physical conditions they monitor can include temperature, location, consumption, heart rate, stress levels, light, movement, altitude and speed.

M2M communications can be used to gain immediate feedback on how a particular remote asset is being used, which features are most popular and what problems such as errors or breakdowns typically arise. This information is useful for shortening the lead time to an improved or updated version, thereby providing a competitive edge.

M2M communications are made possible by the use of intelligent sensors or microprocessors that are embedded in the remote asset. These sensors include a SIM card – albeit slightly different to the one you have in your mobile device – that is able to receive and transmit data wirelessly to a central server where it can be analysed and acted upon.

Wireless communications technologies used to enable this connectivity include GSM, GPRS, EDMA, 3G, LTE, or WiFi and WiMAX. Some of these connections occur over a relatively short range, some over a distance of many miles.
With the implementation of ‘actors’ it is then possible to influence physical status, such as water levels, remotely without being on site.

The widespread availability and decreasing cost of wireless communications, economies of scale and improvements in bandwidth have redefined what’s now cost effective to connect.

As a result, multinational businesses can consider M2M not just for their most important production assets, but for almost every remote asset they own or service for customers. When that networking is conducted on a global scale, it can translate into dramatically improved efficiency and significantly reduced operating and maintenance costs.

In addition to commercial pressures to differentiate, new stringent legislation is requiring companies in many sectors to be accountable for product tracking and management.

In 2009 the M2M industry finally gathered real momentum with the delivery of numerous robust, mature projects that provided far greater insight than we’ve ever had before into the life cycles of products, assets and people.

In 2010 M2M will have an even bigger impact on hundreds of organisations across a diverse range of markets, helping to improve revenue, margins, market share and most importantly customer satisfaction. It holds the key to energy efficiency, reduced greenhouse emissions and improved quality of life.

Over the next few years, M2M could be a key enabler in helping to restore confidence after the world economic crisis, providing the next leap forward in global productivity in much the same way as the mobile phone did in the latter part of the last century.
It’s hard to imagine a time when M2M wasn’t a vital part of the transport and logistics industry. At the end of 2009 there were more than 3.2 million passenger cars in Europe with an on-board telematics device.

M2M is now being used to add new in-car functionality such as ‘infotainment’ and navigation services and to enable the vehicle to self-diagnose and warn the driver of potential difficulties before a journey is undertaken.

In the event of an accident, the vehicle’s M2M system can notify emergency services of its location and establish communications directly with the occupants. Following a breakdown or accident, roadside assistance can be informed immediately with details of the problem and the vehicle’s precise location.

Other applications in this market include: usage-based vehicle insurance (also known as pay-as-you-drive); vehicle tracking to aid the recovery of stolen vehicles and increase driver safety; measurement of driving behaviours including the G-forces resulting from hard braking and fast starts, and instances of speeding; as well as value-added services such as car concierge and location positioning.

When used in conjunction with satellite-based Global Positioning System units and Location-Based Services, M2M can provide real-time information such as vehicle location, driver speeds, miles driven, fuel consumption and employee work time.

M2M is also being used to manage and dispatch fleets and resources, and to enable supply chain companies to deliver cost-efficient goods to the doorstep of their customers. Delivery at the door can also be confirmed and paid for using M2M technology.

Metering is a fundamental enabler for the utilities industry, helping to monitor plant and field equipment and to reduce the cost of supplying energy and water to customers.

As part of the efforts to build a sustainable energy system, the traditional mechanical utility meter can now be replaced by a smart meter that can improve efficiency and reliability in energy distribution and better optimisation in the allocation of resources.

Energy regulations and smart-grid funding are likely to push the number of smart meters installed worldwide to more than 100 million during the next five years.

Smart metering solutions incorporate a wide range of applications in the fields of remote meter reading, customer relationship management, demand management and value-added services such as home automation.

The deployment of automatic meter reading applications will help customers to gain better visibility over their energy usage and spending. Similar technology is needed to ensure the automotive and transport markets do their part by transitioning smoothly from fossil fuels to hybrid and electric cars.
Smart grid technology enables utilities to connect wirelessly to their grid assets, such as circuit breakers, transformers and other sub-station equipment. This wireless monitoring capability allows them to develop interactive utility networks that are more intelligent, resilient, reliable and self-balancing.

Health care
Recent reports project the global telemedicine industry to be worth US$18 billion by 2015, boosted by new M2M functions in radiology, cardiology, dermatology, psychiatry, dentistry, paediatrics and pathology.

Currently there are nearly one billion people around the world with at least one chronic disease and the number is rising. By 2020 diabetes is expected to double and deaths caused by heart disease and stroke will increase to more than 20 million a year.

M2M is becoming an integral part of patient care, helping to cut costs as well as save lives. Sensors in the bathroom, by the bed or near the door can collect information without compromising the individual’s privacy. Remote monitoring devices can be used to allow physicians to remotely monitor information about patients with heart conditions and diabetes.

The ability to monitor patients remotely delivers more cost-effective healthcare management and reduces costs by safely reducing patients’ hospital stays and visits.

Patient sensors act as extra eyes and ears for doctors treating chronic illness such as cardiac disease, high blood pressure, diabetes and obesity. Continuous two-way data feeds over the M2M network provide detailed monitoring information that allows doctors to spot early warnings of medical deterioration and apply treatment earlier than physical diagnosis allows.

Patients can learn to monitor their own vital signs and better administer their own treatment regime, and elderly relatives can be monitored remotely by their families to make sure they are safe and healthy.

Healthcare providers can immediately see whether patients have complied with their physicians’ instructions and treatment regimes. M2M can be used to dramatically improve the quality of life for patients, helping them to regain their mobility and independence from the hospital environment.

Statistically, about half of all hospital beds are occupied by patients who have chronic illnesses that could equally well be monitored using M2M technologies if they were at home.

By communicating proactively, healthcare providers can help prevent medical emergencies that result in additional visits to the hospital or emergency room.

So, not only does telemedicine promise better quality patient treatment, it also reduces costs and refocuses resources on face-to-face treatment and allotting bed space to patients with life-threatening conditions or intensive treatment needs.
Manufacturing
The industrial sector has always needed to closely monitor and control plant and field equipment and processes to ensure production is maximised while all machinery operates within safety limits.

The introduction of remote monitoring and adjustment capabilities from M2M has seen companies increase their productivity and profitability while expanding their services into new areas. It has empowered expansion and increases in efficiency and productivity by recognising performance issues just before or as they happen, thereby minimising downtime.

Remote machines and robots controlled by M2M can undertake routine repairs and maintenance, while emergency repair crews can arrive at a site fully briefed to resolve an issue quickly, with the right tools.

Over time, industrial businesses can learn more about the causes of equipment malfunction and downtime, and build detailed performance analysis models from M2M data feeds that allow them to stay one step ahead and increase performance levels and the value of field assets.

Most importantly, M2M offers the industrial sector the opportunity to transform from a hardware-based business model to one that is more customer service orientated.

Retail
Retail was one of the first sectors to see significant breakthroughs for wireless M2M. Radio Frequency Identification tags have been used for many years to provide retailers with real-time visibility into their inventory and allow individual items to be monitored and tracked to the doorstep of the final delivery.

In service-driven industries M2M will make the difference in revenue generation by providing immediate information on the required items to be replaced. M2M goes beyond this, enabling new business models and market approaches such as pay-per-print.

Today’s wireless terminals can process a transaction in a fraction of the time associated with dial-up phone lines, while meeting all of the robust security standards of IP connectivity and cutting communication costs.

With no fixed infrastructure required, wireless terminals are one of the fastest growing segments of the payment industry and are being used for applications including point of sale terminals, ATM machines, retail kiosks, vending units, ticketing systems, lottery machines and parking meters.

Meanwhile, retail outlets are becoming savvier in their use of M2M to boost sales through up-to-the-minute in-store shopping discounts based on personalised consumer needs powered by M2M.

M2M will start to seep through every aspect of people’s lives, though they may not always be aware of it.
M2M can be used to push news or eye-catching advertisements to remote kiosks, electronic display boards and mobile screens displaying information such as location, time of day and passing traffic.

As environmental considerations become more pressing due to legislation about power consumption and the need to make businesses more cost effective and competitive, retailers are also looking to M2M to help them monitor how they consume the energy that powers their business.

**Security and surveillance**
The market for security products and services has grown rapidly in recent years, with the government leading strategic warfare overseas to limit potential terrorist impacts at home.

Individuals have become more aware of their own responsibilities towards security and have renewed efforts to stem a rise in vandalism, theft and violence.

The use of wireless communications to automate remote security solutions provides a more efficient and cost-effective means of monitoring intrusion or CCTV images, allowing remote surveillance and access to control systems, motion detectors, lighting and access points.

The control station can remotely authorise access to controlled areas with the ability to open and close locks, doors and gates via the wireless network. It can generate alerts for security breaches that trigger appropriate actions such as locking doors or calling for assistance.

**Consumer products**
Personal navigation devices, fitness monitors, eReaders, track-and-trace animal collars and networked digital photo frames are just some of the innovative consumer products and services that are changing people’s lifestyles. M2M consumer products are limited only by what device developers can imagine.

**Merchant services**
M2M solutions provide quick and easy payment methods for couriers and remote trades people, while also providing cost-effective, secure and easy-to-install payment solutions at trade shows, exhibitions and sporting events. Supermarkets, service stations, convenience stores and retail outlets can also use M2M to reduce ongoing running costs of electronic point of sale terminals due to the low-cost tariffs available.

**Service businesses**
M2M enables an asset, such as an elevator or vending machine, to immediately advise its service centre if there is a fault. The service centre can then interrogate the product remotely to determine the fault and ensure that technicians are equipped with the correct parts before making a visit to the site, reducing the number of site visits and technician time whilst improving the service response time.
Key drivers and enablers

The drivers for M2M will vary depending on the specific business and its needs, but generally include:

**Cellular network coverage is expanding worldwide**
As digital cellular coverage has expanded, there has been a corresponding shift away from satellite connectivity towards terrestrial cellular connectivity.

**Cost savings**
Cost saving remains one of the primary drivers for businesses to adopt M2M solutions. The recovery of one misplaced diesel generator, for example, can cover the installation and running costs of a tracking deployment.

**Enabling new business models**
While cost saving is still very important and valuable to businesses, this represents only one aspect of the potential of M2M. The most powerful driver for M2M is that it can enable new business models.

Increasingly, M2M solutions are being used to enhance business operations, improve functionality and environmental stewardship, and to connect the business with its end users.

At this point the M2M solution moves from simply being part of business processes, to a key part of the overall business operation and customer experience.

Take, for example, a manufacturer of commercial air-conditioning systems. It sells its products through distributors and building integrators, and may receive equipment fault information only second hand. It would be unable to track usage and performance data, with no view of who is using its equipment or where it is installed.

By integrating an intelligent monitoring and control M2M system into their air-conditioning assets, the manufacturer gains direct, ongoing access to field intelligence about its units.

This information can be used to ensure that manufacturing faults are promptly corrected and to gain valuable product usage statistics.

If this M2M solution were extended to provide a front end accessible to end-users, such as a web site, the manufacturer could then gain direct access to the customer and have the opportunity to enhance its product offering.

The potential of M2M is almost unlimited: across any device, in any business sector, located anywhere in the world.
Legislation and regulatory compliance
Various governments and regulatory bodies around the world are enacting regulations that mandate functionality of the type enabled by cellular M2M.

For example, Sweden has decreed that all its utilities must read their electricity meters at least once a month, starting in 2009. Swedish utilities are using cellular connectivity as part of the Advanced Metering Infrastructure solution, and other Scandinavian countries are expected to follow suit.

Speed and flexibility
M2M solutions can be used to help restructure and improve business relationships, for example by replacing regular servicing with on-demand servicing.

Rather than removing equipment from service for scheduled monthly maintenance, built-in diagnostics can schedule minor servicing to be done on an ad hoc basis and major servicing only when it’s necessary. It can also record a full audit trail of defects, usage, maintenance activities and any external inputs.

Health and safety
Many industries are now using specialised M2M-enabled badges or more generic ‘man down’ solutions to ensure that employees away from the office are adequately protected.

Environmental stewardship
We need smart metering because climate change, population growth and the availability of primary fuels mean that how we satisfy our energy needs is changing and that delivering sustainable, affordable, secure energy requires action.

Some companies are leading the way in tackling energy wastage by using M2M technology to monitor their property assets. Information collected from light and heat sensors throughout buildings can be processed and monitored. Instructions can be transmitted back to individual devices to re-calibrate their settings, thereby reducing energy consumption and costs.
Key drivers and enablers continued

**Stronger service offering**
M2M can be used to strengthen and differentiate service offerings and add greater value to the end customer. Sensors built into a vehicle for example can be used to add new functionality such as ‘infotainment’ and navigation services and to enable the vehicle to self-diagnose and warn the driver of potential difficulties before a long journey is undertaken.

When built into an end-to-end logistics system, more advanced M2M solutions can be extended to provide additional benefits such as producing information for customs officers, or providing confirmation that a shipment has satisfied environmental constraints and has not been tampered with en route.

M2M solutions offer the ability to continuously monitor and assure compliance of remote assets regardless of location. The automation of quality monitoring can reduce administrative costs, improve visibility and deliver benefits beyond simple reductions in the cost of monitoring compliance.

By automatically collecting business mileage information, for example, a company can produce employee mileage claims and tax deduction confirmation without waiting for the employee to submit an expense form.

For those businesses involved in transport and logistics this easily extends to confirming compliance with drive time regulations, CO₂ emissions, working hours and corporate responsibility for occupational training.

**Key challenges and inhibitors**

An enterprise commissioning an M2M solution will face unique challenges compared with traditional IT projects.

**M2M lifetimes are longer**
While IT projects range widely in terms of the lifetime of the project from systems planning to retirement, M2M systems generally have lifetimes of ten years or more. The build phase alone can take a year or longer.

Once up and running, these systems need maintenance and upgrading so as to be able to incorporate the new technologies that may come along in the interim. Hard coded links and interfaces between components of the system may need to be broken and remade.

**M2M collection networks are complex**
The sources of the data collected may be diverse and widespread and the networks which deliver the data can cross country borders and jurisdictions. Unlike IT projects where data are largely collected from sources within the enterprise, M2M systems may necessitate using the public wireless network or the Internet to transmit the data. Data collection is close to real time and more like a constant trickle rather than being fed into back office systems in traditional batch mode.
The M2M market is not yet mature
M2M projects are not ‘plug and play’, there is no blueprint for M2M developments and standards are still under development. And every company will have its own challenges, requirements, interests and IT backend systems. Hence projects must be designed from scratch, and all stages – from scoping to procurement to deployment through testing – take longer than conventional IT projects.

Complexity
Global M2M deployment is not a trivial task, especially for companies whose core businesses are in non-technical areas. Business terms, device certification requirements and technical configurations can change from one country to the next.

Sourcing communications through a single global supplier can dramatically reduce the cost and complexity of global M2M deployment. Having a single global M2M solution provider will help to facilitate multinational deployments, ease negotiations and technology selection, and simplify ongoing management. By negotiating centrally, deployment cycles can be reduced and seamless cross-border coverage achieved.

Cost
The cost of cellular M2M solutions can be an inhibitor for some applications. However, the cost of connecting remote assets has fallen dramatically, which means that M2M can be considered not just for the most important production assets, but for almost every other physical asset an organisation owns or services it provides for its customers. Negotiating global price plans, precisely tailored to the needs of the business, can help to control the cost of M2M deployment.

Security
There are unique challenges in data management and security needs. An M2M system connects remote machines with systems and people within the enterprise. The number of interfaces linking the components (not to mention the M2M collection network itself) make it vulnerable to breaches. Hence it is important to ensure that the data have been transmitted safely and securely and no data have been lost. Tools and techniques used to monitor and troubleshoot network performance are just as necessary here as with all telecoms networks.

Data security is a major issue for applications that involve sensitive information such as healthcare records, financial transactions and types of commercially sensitive data.

Encryption, secure password authentication and low-cost, easily deployed firewall/anti-virus products can be deployed to prevent security breaches or hacking into remote devices. They also provide the central configuration and sophisticated management capabilities needed to make administration of them in larger numbers relatively simple.

The challenges involved in exploiting M2M are significant, but the potential benefits are even greater. For the enterprise there is the potential for greater efficiency, improved business processes, and innovative new business models. The net result is lower costs, faster response times, better service and most importantly higher revenue.
M2M communications present a unique challenge for the multinational business. There are many different solution providers and even more branded solutions to choose from. From the business model, to the supply chain and ongoing support for devices thousands of miles away, simply purchasing a data plan is not enough. You need the tools, technology and best practices to ensure profitability for your connected device initiatives.

M2M solutions are determined by the target application and the industry as well as the technologies used along the way. Designing the solution involves optimising all of these components and the way in which they interact. Some solutions are very specific, such as applications in telemedicine. Others such as the smart grid are long range and large scale and must interconnect with existing, non-M2M-specific systems.

Developers of M2M projects face a two-fold challenge: to address the technical issues for each part of the chain, and to ensure the whole functions properly. Partnering with an M2M solution provider that has proven M2M global deployment expertise will help to eliminate the challenges and complexity of a global M2M deployment and ensure that any solution implemented can scale globally and help to speed time to market.

Nearly all wireless M2M applications are mission-critical. In many cases, they support vital services such as power delivery, security, health care, and emergency response. Simply put, they cannot fail.

1. Select partner of choice
Global M2M solutions are highly specialised, so choosing the right partner, one that fully understands the different components involved and that is financially stable, is critical to successful deployment.

Sourcing M2M services through a single global service provider can dramatically reduce the cost and complexity of multinational deployment and ease negotiations and technology selection.

Working with a global solutions provider enables deployment cycles to be reduced and allows solutions to be tailored to precisely meet the individual requirements of the enterprise.

The key to a successful business partnership is mutual collaboration and strategic engagement. The cornerstones of the relationship must be open and honest with direct communications between all levels of the organisation at national, international and executive levels.
Whichever partner you choose, as a minimum they must be able to:

- Satisfy the enterprise of their financial and corporate stability.
- Demonstrate that they have highly extensive M2M knowledge, skilled people with good experience and a proven methodology.
- Provide a full range of M2M services and capabilities, including proof of concept or testing of M2M applications in a test or live network.
- Provide consistent services, support and account management on a local, regional and global scale.
- Have direct influence and control over the network design and functionality.
- Be of a stature that enables global influence with other operators if needed.
- Demonstrate how they will be able to remove cost and complexity from the enterprise’s operations.
- Guarantee Quality of Service for mission-critical applications.

2. Validate business requirement

In order to gain maximum return, a global, business-wide identification of potential M2M candidates and solutions should be undertaken.

This review should aim to identify system synergies across the enterprise; for example, it might be appropriate to integrate the results of a monitoring system with an engineer job despatch system.

Any business implementation should conform to defined business strategies and demonstrate that the proposal is fiscally sound.
3. Build the business case
When making the case for a global M2M deployment, it is essential to identify a realistic scope for any proposed solution, the investment needed together with a clear understanding of the returns that the investment will generate.

Many M2M deployments demonstrate an immediate Return On Investment (ROI) simply due to a reduction of time and paperwork.

In our experience, an ROI showing payback within a short term, for example 12 months, is more likely to justify and create successful adoption.

As well as the cost benefit and ROI calculations, it is important to consider the end user of the service. This means thinking about how customer-facing applications will be sold, and how they will work, be maintained, charged for and so on.

4. Design, build and test
Having identified that M2M is viable, it is vital to ensure that the solution has the flexibility and scalability to evolve to meet the changing needs of the business and maintain a consistent end-user experience when you expand internationally.

The embedded hardware, (the device that gives the remote asset mobile communication capability,) must work and continue to work, even in harsh environments with excessive heat, vibration or dirt. It is vital to fully understand how your devices behave on the network under many different scenarios. This information can be used to improve connectivity performance and optimise the total data consumption of your device.

The SIM card in the sensor must support the mobile network and spectrum band employed in the area the remote asset is located. It must also be fully functioning and working before final shipping. The network infrastructure used for communication must be secure, responsive, reliable and impervious to natural disasters and tampering.

The wireless technology chosen must be appropriate for the M2M application in terms of speed, bandwidth, cost and quality of service. There must be no coverage, roaming or interoperability challenges.

5. Rollout
Technical support, provisioning controls, billing, and reporting are just some of the operational issues you will need to consider when designing your solution. When that solution is a global one, you only want to go through the business process just once.

Leading M2M-focused service providers offer Internet-based software that provides insight into every aspect of device performance and gives you the ability to take immediate action.

6. Manage
Controlling how, when and where remote devices access the network will help to contain costs, particularly for applications where roaming is involved.

Enterprise data tariffs can provide price predictability and simplify the management and complexity of a global deployment. Access to real-time management information about every device, every activation, data usage and network performance is vital to ensure objectives continue to be achieved.
7. Review and maintain
It is vital to review, test and fine-tune your devices in the field. If possible, benchmark your M2M deployment elements against other organisations, industry best practice and industry trends.

To protect your business, it is worth ensuring that a target-based Service Level Agreement is in place covering ongoing performance levels.

M2M has the potential to deliver significant benefits for organisations that are prepared to embrace its unique challenges and opportunities.

Vodafone
In 2009 Vodafone launched its global M2M service platform designed for multinational corporations looking to deploy and manage large, wireless M2M projects.

We provide a single point of contact for our customers to manage the complex area of M2M connectivity, from early concept development to support for national and multinational deployments.

The Vodafone M2M Global Service Platform provides our corporate customers with managed connectivity for M2M smart service deployments. Designed and hosted by Vodafone, it contains a complete set of management tools that allow you to control all aspects of your M2M communications in real-time, including the ability to centrally activate, suspend and deactivate devices at the click of a button.

Vodafone has also put in place a global M2M team to develop services designed to match specific industry needs alongside flexible commercial models. The team will analyse and provide solutions for emerging M2M market requirements, such as smart metering for utilities and e-call (an alert system for cars involved in accidents) for the automotive industry.

Our report, entitled ‘Carbon Connections’ calculates that the greenhouse gas emissions savings from a range of M2M-enabled smart systems could be more than 90 million tonnes per year across 25 European Union countries by the year 2020.

The market for M2M smart services using intelligent devices may have taken off, but in order to deliver its true potential, our customers need the reliable, cost-effective and universal managed connectivity that only we can offer.
Conclusion

We are on the cusp of a transformation in the M2M marketplace. Over the next five years we will see a dramatic breakthrough in M2M applications as organisations recognise the unheralded potential it represents for reducing operating and maintenance costs, for revenue generation and for improved customer satisfaction.

Global M2M applications are highly specialised. Embedding connectivity into the next generation of devices, ensuring they are deployed profitably and that the business can expand across multiple countries, is a challenging task.

M2M projects are highly specific to a vertical industry, requiring expert knowledge of that sector as well as of general systems development issues. Hence suppliers/developers must comply with national/international/sector-specific standards and best practices. The long-term stability of a supplier is also important in an industry where mergers and acquisitions are rife and technologies evolve rapidly.

Large enterprises have large IT departments with the resources and business knowledge to develop in-house systems. However, they may still need specialist suppliers and partners for sourcing sensors, devices, hardware, wireless connectivity, and M2M software platforms. They might call in systems integrators to manage the partner chain if they do not do it themselves.

Once the project is under way, maintenance and upgrading are more challenging for all the above reasons. Changing systems once they become obsolete will involve breaking and remaking links. The original suppliers in such a fast-moving industry may no longer be around several years into the project.

Choosing the right partner, one that fully understands the different components involved and that is financially stable, is critical to successful deployment.

Working with an M2M solution provider that has a profound understanding of the complexities of large global deployments will simplify negotiations and technology selection, reduce deployment cycles and costs, and ensure that the solution delivered is tailored precisely to the needs of your organisation.
Vodafone has more than 20 years of proven experience in the M2M arena. We can bring together and manage all the elements of a global M2M deployment from consultancy through to user support and can provide global wireless connectivity, a single administrative interface and support channel, a single global contract supported by a single global Service Level Agreement.

Vodafone has the largest mobile telecommunications network in the world, giving us direct influence and control over design and functionality. Our significant investment into the development of GSM, 3G and LTE standards has positioned us as the undisputed market leader in mobile communications.

When you choose Vodafone as your global M2M Service Provider, we will build the strong foundations required to ensure the long-term success of your M2M deployment.

Unlike virtual M2M network providers, we have direct influence and control over our network design and functionality and have invested heavily in the development of GSM and 3G standards.

Our industry-specific research is designed to support the challenges specific to M2M implementations including:

- Standardising SIM card packaging to ensure that it is suitable for harsh environmental conditions
- Research into service provision best practices
- Input into network design (3GPP), and network and business intelligence security
- EU safety initiatives.

To learn more about how we can help you to cost-effectively and quickly develop, deploy and maintain a successful global M2M solution please contact your Account Manager.

This paper outlines our approach to M2M solutions for the global business. Further papers and information can be found at: m2m.vodafone.com

M2M is a rapidly growing technology solution that is providing:

- Improved customer service and customer loyalty, which in turn open doors to new revenue opportunities
- Personal safety through ubiquitous tracking and surveillance
- Business results through optimised asset utilisation
- Improved processes and productivity through direct communication between remote machines and central management systems
- Enhanced performance and reduced costs through the utilisation of real-time information.