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M2M Connectivity Helps Telcos Offset Declining Traditional Services

by Michele Pelino
for Vendor Strategy Professionals



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M2M Connectivity Helps Telcos Offset Declining Traditional Services

But They Are Poorly Positioned For The Larger Value-Added Service Opportunity

by **Michele Pelino**

with Christopher Mines, Jamie Warner, and Sarah Musto

EXECUTIVE SUMMARY

Telcos face increasing pressure on traditional voice revenues and seek new revenues from services leveraging existing assets. Machine-to-machine (M2M) technologies, including radio frequency identification (RFID) tags, ZigBee sensors, and actuators, have been available for more than a decade. Lower device costs, IP network deployment, and opportunities to improve business operations in many vertical markets are driving telecom service provider investment in M2M technologies to capture new revenues from M2M service deployments. In 2016, Forrester forecasts approximately 450 million connected M2M devices globally will generate nearly \$17 billion in connectivity revenues, growing at a 34% compound annual growth rate (CAGR) between 2010 and 2016. To capture these M2M revenues, telecom providers must sharpen their vertical market focus; make changes in their strategic, billing, and operational activities; and expand partnerships. However, connectivity revenues alone will not fill the gap left by declining revenues from legacy telecom services. Long-term success requires telcos to capture value-added service revenues beyond M2M connectivity.

TABLE OF CONTENTS

- 2 **Telecom Carriers Face Declining Traditional Markets**
- 3 **Changing Market Dynamics Catalyze Demand For M2M Services**
- 4 **M2M Encompasses A Wide Range Of Devices**
- 8 **Emerging M2M Connectivity Revenues Appeal To Telcos**
- 13 **Telcos Must Make Strategic And Operational Shifts To Capture M2M Revenues**
- 17 **Telcos Will Capture M2M Connectivity But Likely Miss The Bigger Opportunity**

RECOMMENDATIONS

- 21 **Telcos Must Continue To Make Strategic Changes For M2M Market Success**
- 22 **Supplemental Material**

NOTES & RESOURCES

Forrester interviewed 21 vendor and user companies, including AT&T, HP, IBM, Orange Business Services, Sprint, Telenor, Verizon Wireless, and Vodafone.

Related Research Documents

["Forrsights: Mobility Dominates Enterprise Telecom Trends In 2011"](#)

July 22, 2011

["The M2M Market Is A Blossoming Opportunity"](#)

March 16, 2010

["Smart Computing Drives The New Era Of IT Growth"](#)

December 4, 2009

TELECOM CARRIERS FACE DECLINING TRADITIONAL MARKETS

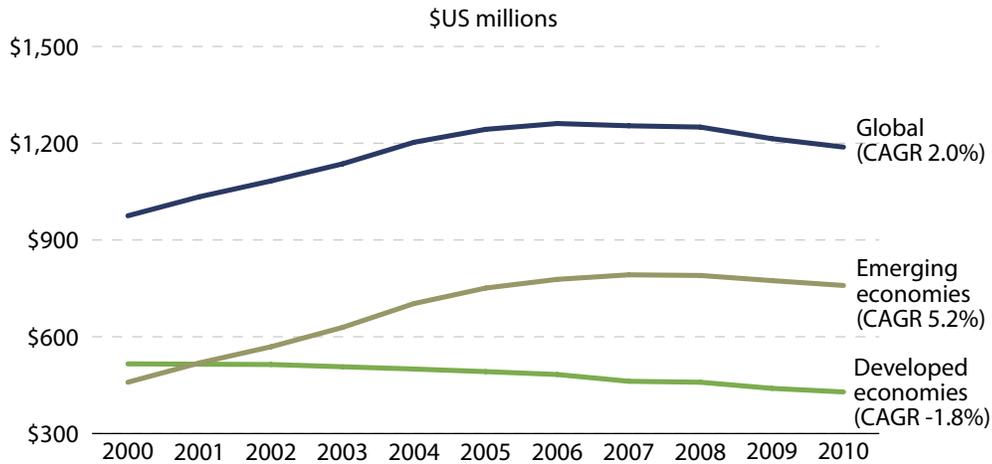
Telecom carriers are facing increased pressure on their wireline and wireless subscriber bases and revenue streams. The negative trends for telcos are unmistakable:

- **Fixed-line subscriptions are in irreversible decline.** Telecom operators are facing intense pressure on their traditional fixed telephone line subscriptions. According to our analysis of the number of global fixed line subscriptions between 2000 and 2010, fixed line subscriptions have declined at a 2% CAGR during this 10-year timeline (see Figure 1).
- **Mobile subscriber growth is flattening.** In addition, growth of mobile cellular telephone subscriptions is flattening, especially in developed economies. Between 2000 and 2010, mobile cellular telephone subscriptions in mature markets grew at a CAGR of 8.4%, which is significantly less than the 31.2% CAGR in emerging markets, indicating mobile subscriber saturation is occurring in developed markets.
- **Fixed line cord-cutting puts further pressure on traditional revenues.** Wireless substitution, AKA fixed line cord-cutting, is gaining momentum in the US as more cell phone users are using wireless as their primary means of communication and are cancelling their landline telephone service. In the US, cord-cutting households now represent 30% of the total, up from 25% at year-end 2009.¹ In addition, the combination of wireless-only households and wireless-mostly households — those that have both landlines and wireless phones yet receive all or almost all calls on wireless phones — ranges from 25% to 53% of households, depending on the state.
- **New revenue opportunities are captured by over-the-top (OTT) service providers.** Telecom carriers face additional pressure from OTT application and service vendors including Google (YouTube), Facebook, Microsoft (Skype), and Apple (iTunes). Applications provided by OTT vendors are transported over the top of fixed and mobile networks, and the service user pays no additional network-usage fees. For example, the Google Voice application provides users with calling features including blocking calls, screening calls, personalized greetings, and supporting number porting and conference calling. Telecom operators benefit from additional network usage and revenues; however, these incremental revenues from OTT services do not make up for the additional investments the telecom operators make to support these services.²

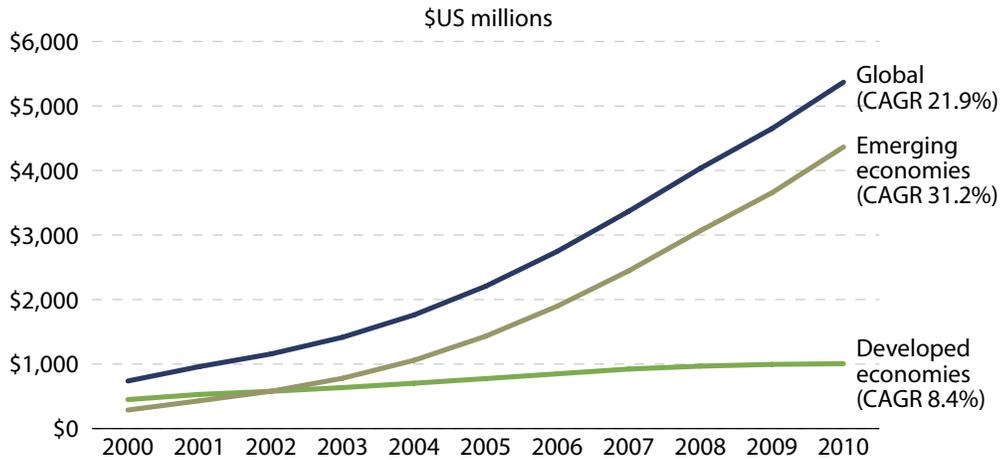
To address these challenges of saturating markets for traditional services and strong competitors in new service markets, many carriers are counting on the emergence of M2M communication services (sometimes called the “Internet of Things”). This report builds on our previous analyses of M2M opportunities, concluding that M2M services will become a meaningful increment to telcos’ revenue streams over the next five years, but not big enough to entirely fill the gap left by declines in traditional service revenues.³

Figure 1 Subscriber Growth Rates For Fixed And Mobile Telephone Services Are Under Pressure

1-1 Fixed telephone line subscriptions continue to decline



1-2 Mobile cellular telephone subscription growth is flattening out



Source: "World Telecommunication/ICT Indicators Database 2010," International Telecommunication Union (<http://www.itu.int/ITU-D/ict/publications/world/world.html>)

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Source: Forrester Research, Inc.

CHANGING MARKET DYNAMICS CATALYZE DEMAND FOR M2M SERVICES

M2M solutions have been in existence for more than a decade. Why are telecom operators and their customers focusing on M2M solutions now? Pricing, availability, and demand are aligning to spark the M2M market, which will offer telcos new opportunities to connect more devices to their networks and generate more transport revenues.

- **Declining communication service and device costs.** Connectivity prices vary based on the type of network, devices, and bandwidth used. However, many wireless operators are dramatically reducing their M2M connectivity fees. For example, during the past few years, the connectivity price for smart meters installed by gas and electric utility companies has declined by at least half. In addition, M2M device prices have also declined dramatically. For example, the cost of a standard fleet monitoring device that plugs into on-board diagnostic units in cars is about \$100 today and has declined by about at least half in the past few years. These falling prices improve the economics and affordability of M2M solution deployment and drive broader interest among enterprises in a variety of vertical markets.
- **Wide deployment of IP-capable networks.** M2M solutions transfer data across many different networks, including wireline, cellular, licensed radio networks, and satellite. Third-generation (3G) wireless networks are ubiquitous in most mature markets, and many telcos are deploying 4G/long-term evolution (LTE) networks to support bandwidth and high data speeds for smartphone users. Wireless local area network (WLAN) and ZigBee solutions are suited for supply chain applications, while wide area wireless networks (e.g., cellular and satellite) are ideal for real-time fleet management and asset monitoring of shipping containers or railroad cars. Many of today's M2M apps are adequately supported by lower speed 2G networks. However, upgraded 3G and 4G networks provide new options to support M2M services requiring high quality video content, which is particularly relevant to healthcare and video surveillance applications. Each telco must identify and communicate a timeline for supporting 2G networks, as well as determine a road map for when and how to transition 2G M2M traffic onto 3G or 4G networks.
- **Increased focus on incorporating green practices into corporate operations.** Many companies are looking for ways to improve asset management and efficiency, while simultaneously anticipating regulatory and policy initiatives to improve energy efficiency, manage carbon emissions, and improve healthcare system efficiency. All of these efforts will drive M2M solution adoption. For example, the UK government's Committee on Climate Change requires smart meters to be installed in each residence (approximately 50 million meters) by 2020.⁴ This smart meter implementation supports the overall goal to reduce the UK's greenhouse gas emissions by 34% by 2020 when compared with 1990 levels. Brazil's Contran 245 resolution requires all vehicles to be fitted with an antitheft tracking device by January 15, 2013. The law is intended to reduce car thefts and lower vehicle insurance rates.

M2M ENCOMPASSES A WIDE RANGE OF DEVICES

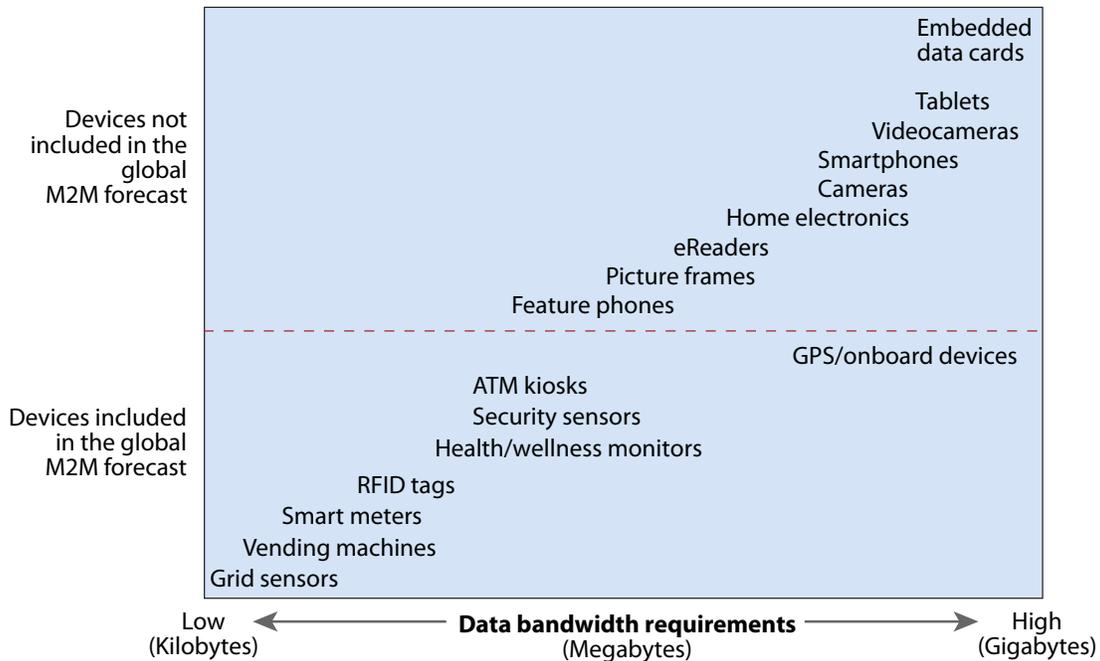
M2M is a broadly applied, and therefore malleable, term; it is also referred to as the "Internet of Things," the "Extended Internet," or "connected devices." Forrester defines M2M simply as:

Technologies that collect and transfer information on the condition of physical assets or people.

Examples of M2M devices include RFID tags, sensors, video cameras, global positioning system (GPS) chips, smart meters, and smart cards, all of which are used to capture data on the identity, status, condition, and/or location of physical assets. As broad as the M2M definition is, it fits within two other concepts:

- **M2M systems form the awareness component of Smart Computing solutions.** Smart Computing solutions blend hardware, software, and network technologies to help companies optimize their business processes. Smart Computing combines five functions of intelligence (awareness, analysis, alternatives, actions, and auditability) and will drive the next big growth cycle in IT investment.⁵ M2M technologies such as RFID, sensors, and GPS chips serve to monitor corporations' physical assets, providing data on the identity, status, condition, and/or location of those assets to help optimize their operation in business processes. The information captured by M2M devices enables businesses to improve their decision-making processes and enhance operational efficiencies.
- **M2M devices are a subset of telcos' connected devices revenue category.** Some telecom operators, such as AT&T, Orange Business Services, and Verizon Wireless, publicly report the number of connected devices supported on their networks. Each telecom operator includes different categories of devices, for example, eReaders, embedded data cards, and tablets are considered connected devices by some operators, but not by all. In making our M2M market forecasts, we included purpose-built devices that support enterprise and consumer M2M applications in areas that present the most significant revenue-generating opportunities for vendors and service providers over the next five years (see Figure 2).

Figure 2 The Connected Devices Included In Our M2M Forecast



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Source: Forrester Research, Inc.

M2M Solutions Are Evolving To Meet Specific Vertical Market Requirements

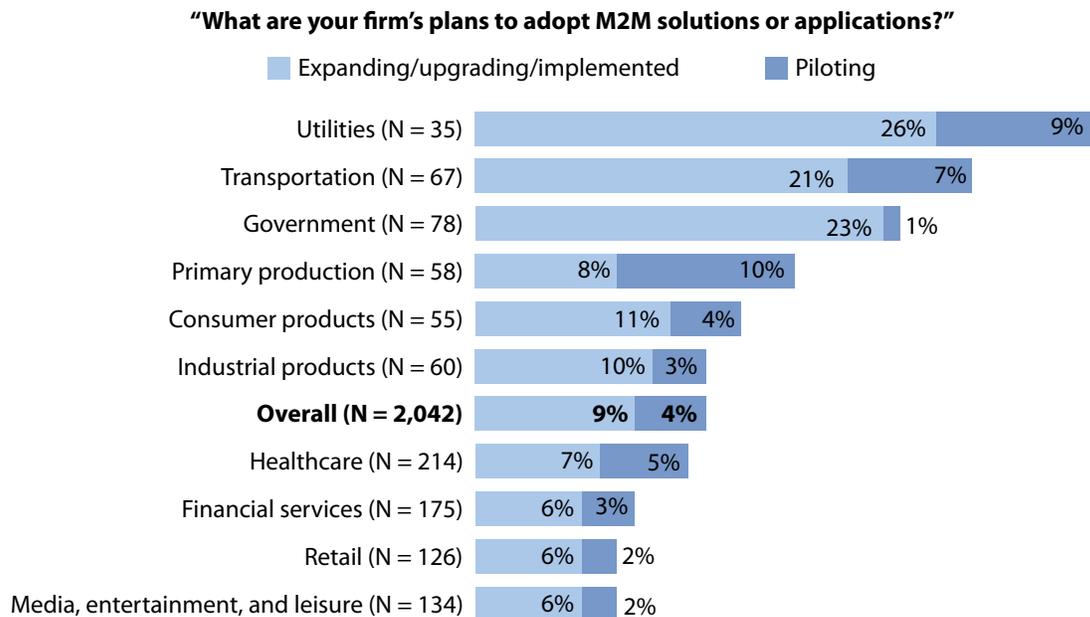
Overall, M2M solution deployment is in its early stages. In early 2011, 9% of enterprises in North America and Europe had implemented or were expanding implementation of M2M solutions or applications, and another 4% of firms were piloting M2M solutions (see Figure 3).⁶ During this early adoption phase, M2M solutions are evolving to:

- **Improve business processes in specific vertical industries.** Each industry has unique regulatory requirements, technology standards, and interconnection requirements, which require M2M solutions to be tailored to address unique verticals. Industries with significant focus on M2M solution implementation include utilities, transportation, and government. Firms in these industries were among the earliest to adopt M2M solutions and are at least two times more likely to be in the implemented, upgrading, or expanding implementation stages of M2M solution deployment compared with organizations in all industries. In the transportation industry, Navman Wireless provides GPS fleet tracking services for vehicles, buses, and trucks. Jaris Transportation uses Navman Wireless solutions to monitor start and stop times of 35 vans covering 150 miles, which reduced payroll costs by \$4,000 per week fleet wide and reduced use of vehicles during off hours, resulting in fuel savings of \$7,000 per month.

• **Offer solutions more suited to M2M applications than traditional mobile data services.**

The requirements of M2M services are dramatically different from those of traditional mobile data services (see Figure 4). The scale of M2M solutions is larger, encompassing hundreds of millions of connected devices; however, the average revenue per device for M2M devices is very low, perhaps US\$1 to \$5 per-month per-device, compared with \$40 to \$50 per month for smartphones. In addition, the life cycle for M2M devices may be 10 years or more, while the replacement cycle for smartphones is often 12 to 18 months.

Figure 3 Emerging Demand For M2M Solutions Is Evident In Particular Vertical Markets



Base: North American and European networks and telecommunications decision-makers

Note: This figure shows data for 10 industries out of 20 total.

Source: Forrsights Networks And Telecommunications Survey, Q1 2011

Figure 4 The M2M Service Profile Is Significantly Different From Mobile Data Services

Characteristic	M2M services	Traditional mobile data services
Devices	<ul style="list-style-type: none"> • Temperature sensors • Smart meters • GPS chips • Active and passive RFID tags 	<ul style="list-style-type: none"> • Smartphones • Laptops • Tablets
Device connections	Hundreds of millions of connected devices	Millions of connected devices
Device certification	Thousands of devices	Fewer than 100 devices
Average revenue per user (ARPU)	<ul style="list-style-type: none"> • \$3 per device per month average • Many ARPUs (e.g., smart grid, RFID asset tracking) may be less than \$1 per device per month 	\$40 to \$50 per month per device
Solutions	<ul style="list-style-type: none"> • Custom developed • Vertically focused • Solutions are tightly integrated into core business processes 	<ul style="list-style-type: none"> • Standards-based devices • Horizontal focus • Address the needs of a broad range of users
Device replacement cycle	Extremely long device replacement cycle (five to 10 years or more)	<ul style="list-style-type: none"> • 12- to 18-month replacement cycle for smartphones • Three years for laptops
Purchasing decision-makers	Multiple decision-makers across many roles in the organizations (e.g., CIO, field service, supply chain, fleet manager, product development, etc.)	<ul style="list-style-type: none"> • Telecom executive • IT executives • Line-of-business workers • Consumers

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Source: Forrester Research, Inc.

EMERGING M2M CONNECTIVITY REVENUES APPEAL TO TELCOS

M2M solutions are often customized to address the requirements of a specific industry sector or business process (e.g., smart meters for utilities or home patient monitors in healthcare). Other M2M solutions improve the efficiency of processes used across multiple industry sectors, such as fleet tracking and telematics services, which can be applied to the industrial transportation, consumer automotive, and insurance industry. However, as we look out to the next three to five years, we expect demand for consumer-focused M2M solutions to gain momentum, particularly home energy management solutions, personal health monitoring, and residential security services.

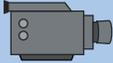
M2M Service Revenues Will Grow Fastest In Seven Industry Applications

The seven categories of M2M services that will generate the vast majority of M2M revenues during the next five years are transportation and fleet management, retail and finance kiosk applications, manufacturing and asset management services, utilities and energy demand management, healthcare and health monitoring, security and video surveillance applications, and consumer services and appliance control (see Figure 5).

Brief case examples of M2M solutions implemented in a few of these key industry/application categories include the following:

- **Fleet tracking solutions improve vehicle monitoring capabilities.** Fleet tracking and navigation services are often deployed in government, construction, and service industry vehicles. For example, Eagle Medical Services, a private ambulance company, installed NexTraq's fleet management vehicle tracking system in 22 vehicles to ensure on-time pick up and drop off of non-emergency calls. These fleet tracking services track fuel usage, vehicle maintenance status, and vehicle speed and provide benefits including reducing fuel costs and insurance rates. Additional benefits included faster servicing and the ability to reroute vehicles in real time, which increased productivity for the company. Operations have improved significantly, as the company has gone from supporting 14 calls in a month to supporting more than 1,300 calls a month, while also winning repeat business due to providing on-time responses.
- **Telematics solutions are often included in fleet tracking services.** Many car manufacturers including GM, Ford, Mercedes-Benz, and BMW are incorporating telematics services into new vehicles as competitive differentiators and high-value options. Examples of telematics services include insurance tracking, emergency services, concierge services with a live operator, predictive maintenance reports, and infotainment applications. In Europe, Accenture is collaborating with Fiat and Telecom Italia to offer telematics services for specific Fiat vehicles. Telecom Italia and Accenture developed the Infomobility Platform to deliver these M2M services, and Fiat equips its vehicles with a specially designed on-board unit (OBU), which was developed by Magneti Marelli to enable these telematics services.
- **Remote monitoring of ATM kiosks is gaining momentum among financial institutions.** Diebold, a manufacturer of ATMs, works with financial institutions, including Bank of America, which uses Diebold to manage more than 17,000 ATMs. Diebold uses Axeda's platform to provide remote servicing for ATMs including intelligent monitoring components that track status, support self recovery, and capture data that enables money to be optimized in each machine. Diebold is able to securely and remotely diagnose and fix problems and reduce the number of on-site repair visits, which otherwise cost hundreds of dollars per visit.

Figure 5 M2M Solutions Focus On Seven Specific Categories

Categories	M2M applications	Vendor examples
Transportation/fleet management 	<ul style="list-style-type: none"> • Fleet management services combine GPS, vehicle diagnostics, and fuel monitoring information to track driver performance in real time. • Telematics systems transmit information about a vehicle to external parties, including air bag deployment, concierge services, turn-by-turn navigation, and accident assistance. 	NexTraq TeleNav TomTom Garmin OnStar BMW Mercedes-Benz
Retail and finance/kiosk applications 	<ul style="list-style-type: none"> • Retail stores use point-of-sale solutions to enable card payments, check account balances, and complete transactions. • Vending solutions provide real-time stock information, monitor machine activities, and monitor cash collection. • Banks can use to evaluate cash assets, ensure printer paper availability, and remotely diagnose and repair issues. 	VeriFone Systems Diebold Hypercom USA Technologies
Manufacturing/asset management 	Remote monitoring solutions are used in many verticals, including utilities, logistics, transportation, public infrastructure, and facility management. These solutions are often custom developed. Examples include asset, container, and cargo tracking .	OnAsset Intelligence Omnilink Systems ILS Technology
Utilities/energy demand management 	<ul style="list-style-type: none"> • Smart meters measure energy and fuel consumption and send this information to third parties. These meters send and receive and act on commands to adjust the operations of equipment or appliances. • Smart grid networks import and export electricity generated via micro generation, monitor the load in real time, and exert control at all levels of utility production and transmission infrastructure. 	General Electric Echelon Elster Landis+Gyr Silver Spring Networks
Healthcare/health monitoring 	<ul style="list-style-type: none"> • Healthcare solutions include EKG body sensors, which communicate with a smartphone. The smartphone picks up signals measuring brain activity, muscle activity, and cardiac performance. • Diabetes monitoring is enabled when a patient's blood sample is obtained using a handheld device that displays the sugar level on the LCD screen. The device sends the blood sugar measurements to the hospital's central server. 	CardioNet Vitality Ideal Life Reflection Solutions
Security/video surveillance 	<ul style="list-style-type: none"> • Alarm system monitoring services focus primarily on business customers in verticals, including banking, retail, and industrial buildings. • Video surveillance capabilities enhance these security features and provide real-time monitoring capabilities. 	Alarm.com Securitas Direct Johnson Controls
Consumer services/appliance control 	<ul style="list-style-type: none"> • Residential and personal security monitoring services include intrusion detection, as well as well as fire, flood and emergency service alarms. • Smart appliances measure and control energy use and communicate with homeowners and utilities. A refrigerator can be programmed to defrost at night, or a clothes dryer can reduce power consumption during the hours of peak demand. 	ADT Security Services Lok8u Electrolux Samsung LG Electronics Whirlpool

Global M2M Connectivity Revenues Will Reach Nearly \$17 Billion In 2016

Forrester's forecast of M2M connectivity service revenues predicts M2M services will generate nearly \$17 billion in worldwide connectivity revenues in 2016, with a CAGR of about 34% over the next five years (see Figure 6).

- **Fleet management services will be the largest M2M services opportunity.** The fleet management market (including telematics) is the most mature M2M market. Many of today's new fleet management customer opportunities are focused on fleets with between 10 and 30 vehicles. Currently, fleet management and telematics services represent the largest segment of M2M revenues, 65% of the total. This submarket will grow at a 33% CAGR from \$2.7 billion in 2011 to nearly \$10 billion in 2016. New car sales will drive demand for consumer-focused telematics services. Most auto manufacturers, including BMW, GM, Mercedes-Benz, and many others, are incorporating these telematics solutions into their new vehicles.
- **Other categories grow faster from smaller bases.** As we look to 2016, M2M revenues will be more diversified. M2M service categories with the highest CAGRs through 2016 are healthcare (95%), utilities (71%), and security (59%). Consumer-focused services, including home security monitoring and smart appliances adoption, have the lowest forecast growth through 2016 at 28% per year. Nevertheless, consumer services represent the second-largest category of M2M transport revenues.
- **Average revenues per device vary significantly by service category.** Average revenue per device per month is driven by bandwidth demand and the type of network infrastructure used. For example, a smart meter device using a 2G network and sending small bursts of data to the utility company throughout the day may generate connectivity revenues of \$0.50 per device per month; compare that with revenues from fleet management services enabled by on-board units, which may generate revenues of \$10 per unit per month (see Figure 7). Devices that support telemedicine and industrial security or surveillance services that incorporate video content generate connectivity revenues that can be at least three times higher than those without video content.

Figure 6 Forecast: Global M2M Connectivity Service Revenues 2010 To 2016

 A spreadsheet detailing this forecast is available online.

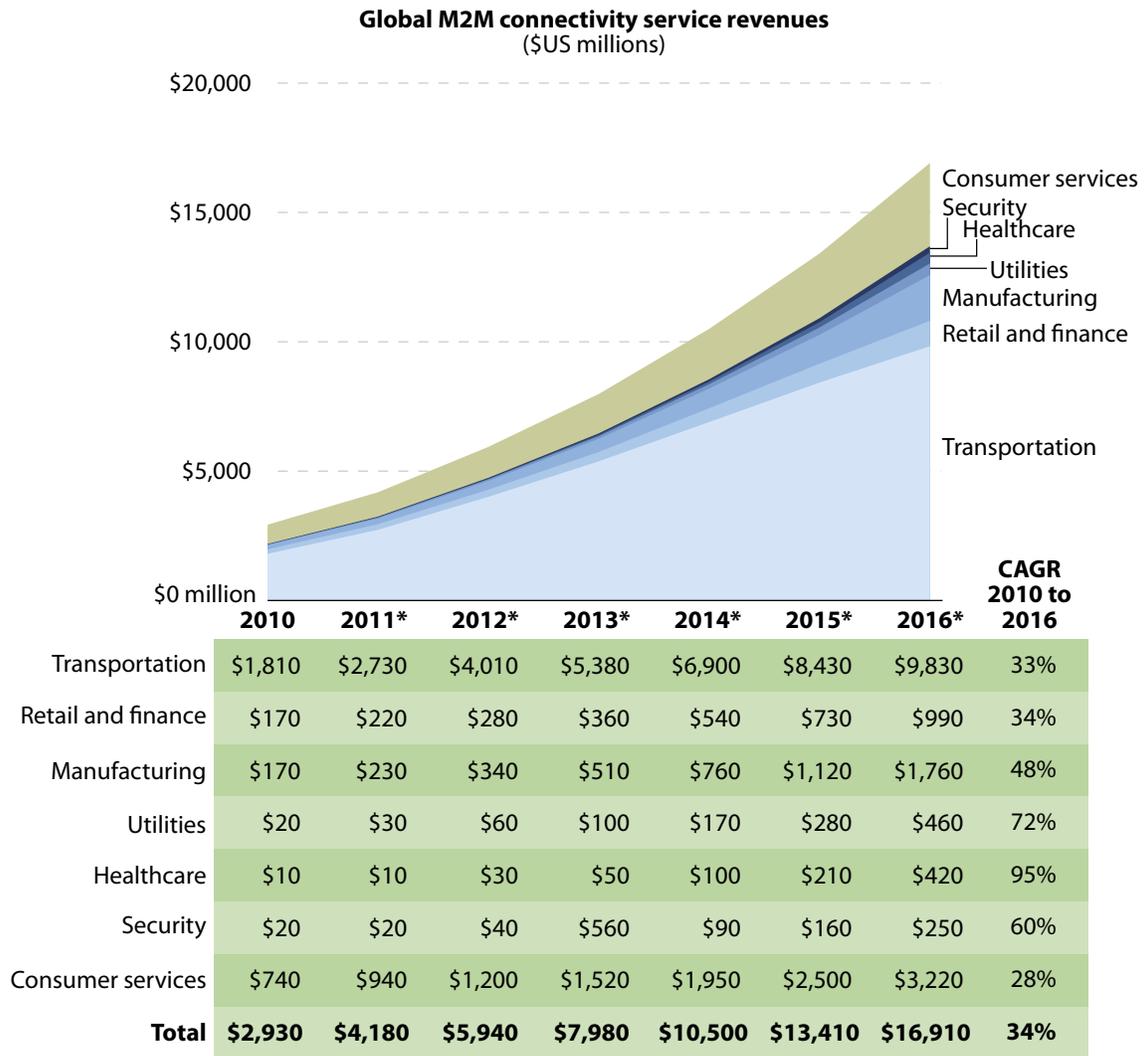
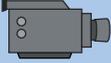


Figure 7 Average Monthly Revenues Per Device Vary By M2M Category

Categories	Average monthly connectivity revenue per device
 Transportation/fleet management	\$3.00-\$10.00
 Retail and finance/kiosk applications	\$1.00-\$6.00
 Manufacturing/asset management	\$4.00-\$7.00
 Utilities/energy demand management	\$0.50-\$1.00
 Healthcare/health monitoring	\$5.00-\$8.00
 Security/video surveillance	\$5.00-\$11.00
 Consumer services/appliance control	\$0.50-\$2.00

Source: Forrester Research, based on vendor briefings, public statements, and guidance from some vendors

56893

Source: Forrester Research, Inc.

TELCOS MUST MAKE STRATEGIC AND OPERATIONAL SHIFTS TO CAPTURE M2M REVENUES

Eyeing the fast-growing opportunities in the context of flattening traditional revenues, many tier one telcos are focused on expanding their support of M2M services and connected devices. To succeed in the M2M arena, telecom operators are making strategic changes that affect a wide range of business dimensions, including organizational structures, customer service processes, billing initiatives, partner ecosystems, and marketing and sales activities (see Figure 8). Telcos are starting to make significant changes in their:

- **Organizational structure.** Many telcos have formed separate organizational business divisions to focus on M2M opportunities. For example, Telenor Connexion, a wholly owned M2M-focused subsidiary of Norway-based Telenor, has a strong regional presence in the Nordic countries, Europe, and Asia. AT&T established two units: The Emerging Devices Organization focuses on consumer M2M opportunities, and the Advanced Mobility Solutions group handles enterprise M2M services. Verizon established its Global Strategy Organization with a key focus on M2M initiatives, and Orange Business Services established an International M2M Center based at its Belgian subsidiary, Mobistar. We expect more telcos to enter the M2M arena by establishing separate business units with dedicated personnel to focus on the unique characteristics of M2M solutions, including partnerships, alliances, customer care, billing and rating plans, and device certification processes.
- **Billing systems and pricing structures.** M2M services are often characterized by a small number of customers with a very high number of connections (e.g., hundreds of thousands or millions). Therefore, telco billing systems must be scalable to support the massive number of micro transactions typical of M2M services. For example, AT&T provides utility companies with SmartSynch's suite of smart grid products in addition to AT&T's wireless data services on a single bill. Utilities can purchase smart meters from AT&T and can pre-pay up to 10 years of M2M data usage on those meters to get assurance around data costs. Telecom billing and operational support systems — and third-party vendors such as Amdocs, Comverse, and Convergy's, which assist telcos in this area — will support more flexible charging models beyond traditional subscriber connectivity and megabytes of data. We expect to see increased demand for billing systems that can charge based on bytes of data, tiered data usage, flexible pricing models, data transmission types, time of day, per session, or per application. M2M billing systems will also be able to process both real-time and batch transactions to address data accessibility requirements for various types of M2M services.
- **Marketing and sales approaches.** A traditional mobile device sales approach that focuses on strong brand recognition, uses retail stores as a distribution channel, and includes device subsidies to encourage customers to make purchases will not succeed in the M2M market. M2M purchasing decision-makers are typically CIOs, CEOs, product development, R&D, sales, marketing, field service, and service management teams. Account managers from telecom service providers must also expand their relationships with executives in a wider range of business units, beyond telecom and IT executives. Expect telcos to ramp up the consultative sales training for account executives targeting M2M customers to help them identify and reach potential M2M service decision-makers across various groups in the organization. From a marketing perspective, M2M service contracts are likely to be much longer term (e.g., five to more than 10 years) compared with traditional telecom contracts; therefore, telecom providers will not need to offer device subsidies to retain existing customers or encourage customers to churn from competitors.

- **Application and solutions innovation.** Many telcos have established innovation centers that bring together application developers, device manufacturers, partners, customers, and telco expertise in project management, service integration, and network technology to develop new applications and services that leverage the telco's network. Some innovation centers, such as the Sprint M2M Collaboration Center, are dedicated to M2M solution and application initiatives. Other innovation centers have a broader remit to support a range of new technology initiatives such as 4G/LTE and video solutions.⁷ As telcos expand their focus on addressing the M2M solution requirements of a range of vertical markets, these innovation centers will play a critical role in bringing together the device, application, and service components to show customers how M2M solutions and applications will address their unique requirements.
- **Multinational roaming agreements.** A key differentiator among telecom operators is the ability to support the M2M requirements of multinational organizations that want to deploy M2M solutions across regional networks. Vodafone, Verizon, and Qualcomm participate in nPhase, a partnership that facilitates cost-efficient global connectivity in the US and Europe including enabling enterprises to manage, activate, deactivate, monitor, and analyze data related to connected devices. In Europe, TeliaSonera signed a cooperation agreement with France Telecom Orange and Deutsche Telekom to increase the quality of service and interoperability for M2M communications. This multiparty agreement provides roaming services with enhanced service quality across the participating countries.

Figure 8 Telcos Make Wide Ranging Business Changes To Serve M2M Markets

Telco business dimensions	M2M services	Traditional mobile data services
Marketing/distribution	<ul style="list-style-type: none"> Vertical industry expertise is required. Consultative sales approach Complex solutions No retail distribution channel No device subsidies 	<ul style="list-style-type: none"> Product-focused Retail distribution channel is critical. Device- or product-specific knowledge Device subsidies are commonly used.
Brand relevance	<ul style="list-style-type: none"> Connectivity may be embedded into the device. Customers may not know which telco provides M2M connectivity (e.g., telematics solutions are tied to the automotive brand, with network connectivity hidden). 	<ul style="list-style-type: none"> Customer selects which telecom operator supports wireless data requirements. Brand relevance and network coverage are key differentiators.
Customer service	<ul style="list-style-type: none"> Automated customer service Self-service portal access to information 	<ul style="list-style-type: none"> High-touch customer service approach Multiple channels (e.g., customer service personnel, online, portal, etc.)
Billing requirements	<ul style="list-style-type: none"> Bytes per transaction Flexible billing Bill based on transmission rate, device type, data transmitted, per session, per application 	<ul style="list-style-type: none"> Megabytes or gigabytes of bandwidth per month Unlimited plans Data pools
Partner ecosystem	<ul style="list-style-type: none"> Highly competitive Many different types of partners, some of them not well known (e.g., niche vertical application developers, thousands of device manufacturers) Vertically focused partners 	<ul style="list-style-type: none"> Partnerships primarily focused on a few device manufacturers Mobile application developers (e.g., expense management, time sheet management, sales force automation, etc.)
Network infrastructure	<ul style="list-style-type: none"> 2G networks are sufficient for many M2M applications. 3G and 4G/LTE networks may open doors to value-added applications and video services, but M2M device costs also increase. 	<ul style="list-style-type: none"> 3G is necessary for many applications. 4G/LTE networks are a key differentiator and will drive future application deployment.

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Source: Forrester Research, Inc.

Partner Ecosystems Will Be A Prerequisite For Telcos To Push M2M Into New Industries

Telecom operators are focused on playing an integral role in end-to-end M2M service deployment across many different industry segments. To establish credibility in these industry sectors, beyond providing basic network connectivity, telecom carriers will form M2M alliances and partnerships with other vendors focused in vertical niches.

- **T-Mobile’s Raco Wireless partnership shows the way forward.** T-Mobile USA established a partnership with Raco Wireless, a separate company, which operates as a mobile virtual

network enabler (MVNE) to support T-Mobile's new M2M customers. Many executives and account managers from T-Mobile's M2M team joined Racó to provide expertise and continuity between the two partner organizations. As part of the relationship, Racó enables T-Mobile's M2M partners to efficiently build new M2M rate plans and get devices authorized on the T-Mobile network. Racó has the option of working with other operators in addition to T-Mobile, but expanding T-Mobile's M2M business is the primary focus of the organization.

- **Vertically focused partnerships will be necessary for expertise in new markets.** Telecom operators are not experts in addressing vertical market requirements, so many are establishing partnerships and alliances that cut across various device, application, and industry sectors. For example, O2 in the UK and G4S, a smart metering firm, are working together to deploy a remote management and monitoring system for the national smart meter network. This deal includes 200,000 subscriber identity module (SIM) cards to connect smart meters in the UK with the G4S data center. In the fleet management arena, Telefónica and Masternaut are jointly marketing fleet management products. Masternaut provides fleet management applications, services, and technical support while Telefónica contributes network infrastructure, sales support, and customer care services. In the healthcare arena, AT&T provides wireless connectivity for the BlueLibris personal health monitoring device, enabling real-time transmission of health information, sensing and user location, and connecting healthcare organizations with their members.

TELCOS WILL CAPTURE M2M CONNECTIVITY BUT LIKELY MISS THE BIGGER OPPORTUNITY

Today we are in the early stages of M2M solution deployment, and most telcos are focused on generating revenues from network connectivity and roaming services. And while we project M2M connectivity service revenues to grow smartly, they will not be enough to make up for the dampening effects on telcos' revenues from declining wireline service revenues and flattening mobile service revenues (see Figure 9). For example, between 2010 and 2016, global fixed line revenues will decline by \$116 billion. However, global connectivity revenues generated from M2M services will only account for about \$17 billion — or less than one-fifth of the fixed decline — in 2016.

So that will leave telcos looking for additional services they can build on top of M2M connectivity. M2M solutions will evolve to address many types of business processes, consumer services, and vertical market solutions, which will open the door to additional M2M revenue streams from services like data mining, systems integration, and managed services (see Figure 10). We expect such solutions and services to generate at least three times the revenues that we forecast for M2M network connectivity. However, for the most part, telcos will be poorly positioned to capture these new revenue streams. They do not currently have extensive expertise in these areas and will need to partner with other vendors to provide these services. In addition, telecom service providers will likely face intense competition from systems integrators, business analytics vendors, and other vendors providing M2M services like:

- **Management consoles to provision and monitor M2M devices.** Many telcos offer M2M monitoring consoles that enable firms to monitor, provision, and track deployment of M2M devices. For example, AT&T Control Center is a management console powered by its partner platform provider, Jasper Wireless. Jasper Wireless' platform provides service management such as provisioning, billing, and operations support for connected devices on the AT&T cellular network, while AT&T focuses on providing network connectivity and service support packages. Sprint's Command Center and Verizon's M2M Management Center, powered by nPhase, are additional examples of management consoles. It will be difficult for telcos to generate significant value-added revenues from these management consoles because they are becoming a de facto requirement to monitor and manage M2M devices. In addition, telcos that cede development and deployment of M2M management consoles to a partner will find it difficult to subsequently generate significant revenues from this service.
- **Systems integration services to deploy complex M2M solutions.** Implementing complex M2M solutions to address vertical industry processes typically requires integration services to interface with back-end systems. Systems integrators (e.g., IBM and HP/EDS) and professional services firms (e.g., Accenture, Deloitte, and Logica) are focused on capturing revenues from integration services. IBM has been very proactive in leveraging its hardware, software, and service capabilities to address M2M service opportunities in vertical markets like the public sector, healthcare, utilities, and manufacturing.

Most telecom operators are not proficient at providing M2M systems integration services. An exception is Orange Business Services (OBS), which established M2M professional services by acquiring Silicomp, a consulting firm specializing in M2M, and Data & Mobiles International, a fleet management and telemetry solution vendor. OBS offers clients business service and back-office systems integration services to support fleet management, smart grid, telemetry, and other bespoke offerings. Most telcos will not use acquisitions to fill in systems integration expertise due to the expense and organizational challenges of melding an acquired firm into the organization, along with the cost of educating sales personnel and customers about new combined solutions.

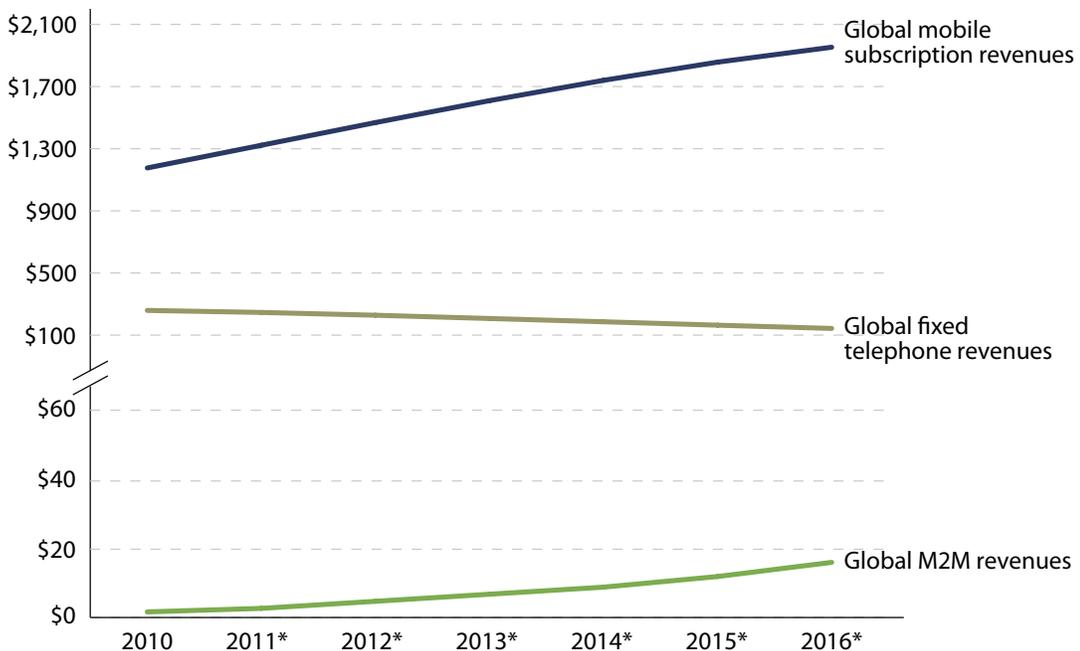
- **Data mining and business intelligence services.** Business intelligence (BI), data mining, and predictive analytics software are value-added services that analyze information captured from M2M solutions and use pattern recognition algorithms to determine whether the company should act on or ignore the identified pattern. Business intelligence and data mining services are not a core competency of telcos, which are well versed in network services but not in these IT services. Therefore, we expect most telcos to fill the BI gap through partnerships with large vendors, including IBM (which owns Cognos and SPSS), SAP (BusinessObjects), and Oracle, or smaller vendors like MicroStrategy and Actuate, which have business intelligence expertise.

- Vertical-specific services from dozens of niche players.** In some industries (e.g., healthcare, utilities), telcos will be up against an ecosystem of vendors specialized in addressing the unique requirements for that industry. For example, in the utilities industry, there are smart meter vendors like Elster, Itron, and Landis+Gyr and software vendors including SAP, Oracle, and Silver Spring Networks that focus on this industry. GE and Siemens provide power generation equipment and medical technology in the utilities and healthcare industry and have incorporated sensors and tracking software to monitor and track the condition of these assets. Partnerships will remain the dominant approach telcos use to fill vertical M2M application and solution expertise requirements. These partnerships enable each participant to bring to the table a core M2M competency that contributes to creating a more complete M2M solution to offer to customers in each vertical industry. The challenge with these partnerships is to develop win-win revenue arrangements to ensure each partner captures a share of the M2M revenues.

Figure 9 M2M Connectivity Revenues Will Not Offset Fixed And Mobile Revenue Declines

 The spreadsheet detailing this forecast is available online.

Global M2M, fixed, and mobile revenues 2010 to 2016
(\$US billions)



Source: "World Telecommunication/ICT Indicators Database 2010," International Telecommunication Union (<http://www.itu.int/ITU-D/ict/publications/world/world.html>)
*Forrester forecast

Figure 10 Capturing Value-Added M2M Service Revenues Requires Additional Expertise

Value-added services	Service description	Average telecom competence	Telecom leader examples
Systems integration	Provide system integration services to integrate M2M services for key vertical applications		Orange Business Services developed its M2M service delivery platform using expertise from IT&Labs (formerly Silicomp, an acquired IT service company). Orange offers M2M services to European businesses with a dedicated organization, internally developed delivery platform, and integration services.
M2M management consoles	Provide M2M provisioning and monitoring tools to customers through a portal site including automated provisioning, custom alerts, real-time diagnostics, analytics reports, service plan identification		<ul style="list-style-type: none"> Telenor Connexion M2M service platform was acquired and is sold by Ericsson as the Device Connection Platform to other telecom providers. Telenor promotes the platform in other sectors including automotive, energy, utilities, healthcare, and transportation/logistics. Telenor Connexion is a strong regional M2M provider in the Nordics and other countries in Europe and Asia. AT&T, KPN, and Telefónica use Jasper Wireless to power their service delivery platform to connect and manage embedded mobile devices.
Managed/hosted services	Provide managed and/or hosted M2M services through data centers		Verizon Wireless and Axeda established an alliance that combines Verizon's wireless network with Axeda's cloud-based application development platform, which simplifies the process of developing M2M applications that can scale to millions of devices.
Data mining and business intelligence	Vertically focused data mining and business analytics services to provide insights into industry-specific business processes		No specific telco M2M examples to note
Partnership ecosystem management	Bring together M2M partners who provide devices, applications, and services in particular industries		<ul style="list-style-type: none"> O2 in the UK established a deal with smart metering and security firm G4S to deploy a remote management and monitoring system for a national smart meter network. The multimillion pound deal over three years will provide M2M technology to connect smart meters across the UK to G4S' data center. Telefónica and Masternaut are jointly marketing fleet management products. Masternaut provides fleet management services, applications, platform and technical support, and Telefónica contributes network infrastructure, sales support, and customer care.



RECOMMENDATIONS

TELCOS MUST CONTINUE TO MAKE STRATEGIC CHANGES FOR M2M MARKET SUCCESS

Supporting M2M services is a significant opportunity for telcos to expand their revenue streams and diversify their service portfolios. Many telcos are stepping up to the challenge of supporting M2M connectivity services by making strategic, operational, and organizational changes. Beyond M2M connectivity revenues, however, is a broader opportunity to offer value-added services such as systems integration, managed or hosted M2M services, and data mining and business intelligence capabilities for specific industries. To capture value-added service revenues, telcos must make even more changes and prepare for intense competition from vendors, including systems integrators, aggregators, and niche players for these M2M value-added service revenues. There are several key activities that will help telcos capture the M2M market opportunity:

- **Build an M2M ecosystem beyond connectivity service.** Network service revenues make up the core building block telcos can use to expand their M2M solution support. To become an integral part of the end-to-end M2M implementation life cycle, telcos must offer additional value-added M2M services through an ecosystem of partnerships and alliances with systems integrators and professional services firms (e.g., IBM, Accenture, and Logica), as well as with business analytics and intelligence vendors (e.g., Oracle, SAP, or MicroStrategy) to capture a share of this value-added service market. Providing these value-added services will also enable telcos to differentiate their M2M service offerings beyond providing network connectivity services.
- **Evaluate regulatory issues on a country by country basis.** A single standard to interconnect M2M devices, applications, and solutions in each vertical industry is not currently available. Regulations in each country or in specific vertical markets (e.g., healthcare, utilities, financial services, and retail) are often complex and drive differences in privacy and data requirements. Operators must be aware of these regulations and the political and cultural differences that affect the rollout of M2M services in each geographic region and vertical market.
- **Expand corporate relationships beyond communication decision-makers.** CTOs and CIOs are often the key decision-makers driving M2M solution deployment, but other business unit stakeholders, including field service, product development, and deployment executives may be involved in the process. Building these relationships requires teaching the account team to use a consultative sales process, as well as hiring experts who can speak and understand the nuances of processes in each vertical industry and that have contacts across firms in each industry sector (e.g., professionals with medial experience in the healthcare industry). Innovation centers should also be used to show corporate decision-makers examples of how M2M solution partners can develop applications and services that address the unique requirements in their industry.

- **Clearly define the ROI of M2M solution investments.** The promise of how M2M solutions can dramatically improve efficiencies in specific industries is not new; however, proving the benefits of these solutions remains a challenge. Many suppliers have been deterred from joining in the supply chain effort due to the cost and complexity of implementing these solutions. Vendors in the M2M ecosystem must keep this challenge in mind and develop return on investment (ROI) analysis, as well as identify what's in it for customers to justify M2M solution investments.
- **Focus on developing strong partner ecosystems.** Telcos should use a partnership approach as the primary method of filling in gaps in their M2M solution capabilities. This approach enables each partner to bring to the table their core competencies in the M2M area. Acquisitions are not recommended for the most part because using an acquisition strategy is expensive and the acquiring organization must invest in integrating the personnel, organizational processes, and technology of the acquired organization into the M2M solution, as well as in the marketing and education process required to inform the internal sales team and external customers of the combined solution.

SUPPLEMENTAL MATERIAL

Companies Interviewed For This Document

Accenture	NexTraq
AT&T	Numerex
Axeda	Orange Business Services
Convergys	Raco Wireless
Diebold	SAP
Eagle Medical Services	Sprint
Gerber Technology (a Gerber Scientific company)	Telecom Italia
HP	Telenor
IBM	Varian Medical Systems
Logica	Verizon Wireless
	Vodafone

ENDNOTES

- ¹ State-level data from the Centers for Disease Control and Prevention (CDC) in the United States show that there is a range in the number of wireless-only households based on individual states. The number of wireless-only households in the US range from 13% in Rhode Island and New Jersey to 35% in Arkansas and Mississippi.
- ² The traditional one-size-fits-all business model used in the communications industry is breaking down. Telcos must determine how to break out of the unsustainable status quo and must consider the impact of four operating business models which are emerging: 1) vertically integrated; 2) partnership-based; 3) horizontal; and 4) disaggregated models. Vendor strategists must piece together a strategy to take the telco forward and choose which of the four best suits their company. For additional details describing each of these business models as well as the ten actions to help telcos address this challenge, see the April 24, 2009, "[New Business Models Emerge For Telcos](#)" report.
- ³ For an initial analysis of the overall M2M market drivers, vertical industry examples of M2M applications and services which present opportunities for the complex array of vendors and service providers participating in the M2M ecosystem, see the March 16, 2010, "[The M2M Market Is A Blossoming Opportunity](#)" report. For detailed insight into the proactive strategy Orange Business Services is taking to capture M2M opportunities, see the March 23, 2010, "[Case Study: How Orange Business Services Is Building A New Machine-To-Machine Market](#)" report.
- ⁴ The UK government's Committee on Climate Change identified targets to reduce the UK's greenhouse gas emissions by increasing renewable energy, home insulation, and electric and hybrid cars and vans. By 2020, green energy would produce 30% of the UK's electricity, and 40% of new cars would be low emission.
- ⁵ The five stages of Smart Computing activities are: 1) Awareness, technologies such as RFID, sensors, video cameras, GPS chips, smart cards, and other tools will capture the identity, status condition, and/or location of people and physical assets. This is the step where M2M devices play a critical role; 2) analysis, business intelligence and specialized analytical software such as data mining and predictive analytics, video image analysis, pattern recognition, and artificial intelligence algorithms will determine whether businesses or governments should act on or ignore a pattern or anomaly; 3) alternatives, rules engines and workflow are the existing technologies for deciding which alternative courses to pursue, either automatically through the application of a rule that says "if this happens, do this," or through human review based on workflow engines that route the anomaly and alternative courses to the right person to make a decision; 4) actions, the action may be as simple as quoting a different price, placing a new order, making a new offer to a customer, or initiating a customer service contact; and 5) auditability, tracking all steps in the process to aid in regulatory compliance with company policies and goals and improvement opportunities. For additional details about each of these activities, see the December 4, 2009, "[Smart Computing Drives The New Era Of IT Growth](#)" report.
- ⁶ Forrester's Enterprise And SMB Networks And Telecommunications Survey, North America And Europe, Q1 2010, was fielded to 2,247 IT executives and technology decision-makers located in Canada, France, Germany, the UK, and the US from SMB and enterprise companies with two or more employees. This

survey was fielded from March 2010 to April 2010. LinkedIn Research Network fielded this survey online on behalf of Forrester. Survey respondent incentives included gift certificates and research summaries.

- ⁷ Orange Business Services (OBS) is successfully developing and addressing M2M opportunities. Vendor strategists in the M2M arena can learn six lessons from OBS's early success: 1) M2M requires a strategic call now; 2) add value and innovate; 3) specialize in industry verticals; 4) focus on the ecosystem; 5) dare to be different in your strategy; and 6) opt for open standards. For insight into the strategy OBS is taking to capture M2M opportunities, see the March 23, 2010, "[Case Study: How Orange Business Services Is Building A New Machine-To-Machine Market](#)" report.

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Headquarters

Forrester Research, Inc.
60 Acorn Park Drive
Cambridge, MA 02140 USA
Tel: +1 617.613.6000
Fax: +1 617.613.5000
Email: forrester@forrester.com
Nasdaq symbol: FORR
www.forrester.com

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