

Wanted: Smart market-makers for the “Internet of Things”

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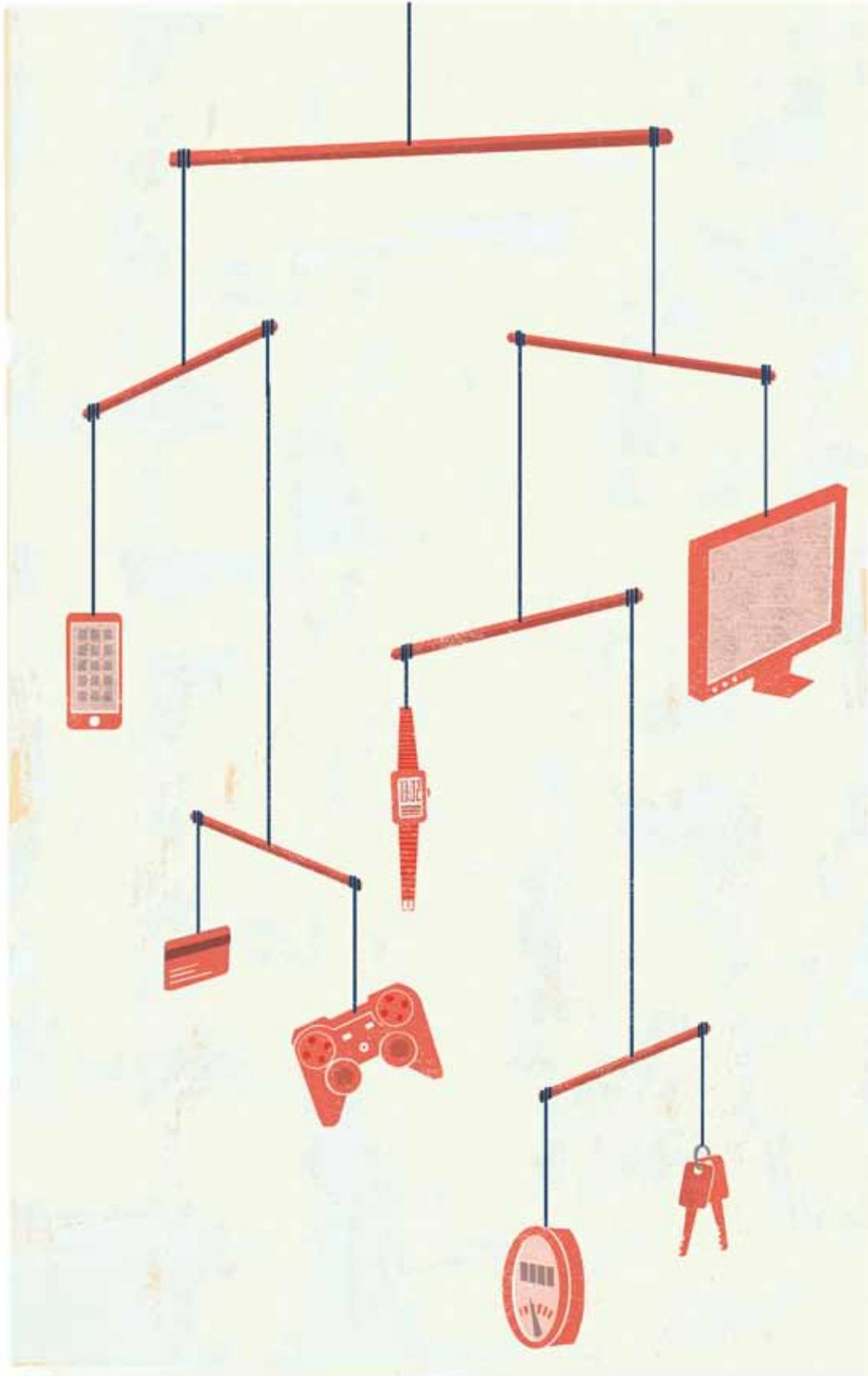
The “Internet of Things” is among the hottest topics currently being debated, with the projected potential in turnover whetting the appetite of industry experts around the globe. However, solution providers are still searching for sustainable business models for this new field and offering their solutions in a trial-and-error mode. In this article the authors explore alternative ways in which various types of players can create value in this budding market.

The “Internet of Things” is one of the hottest topics being debated today across industries worldwide. The most diverse products – home appliances, medical equipment, cars and power meters, to name but a few – are getting connected to the Internet. When products can thus communicate with the outside world, they are said to become connected devices and smart objects: one can interact with them remotely, query how they are doing and change their state as required. For example, a smart vital sign-monitoring device can connect a person who has a chronic illness to a physician’s office, enabling telemedicine. The combination of a smart object and the service exploiting its capabilities is called a smart solution.

Industry experts are outbidding each other when estimating the number of smart objects in homes, offices, factories, vehicles and elsewhere. The estimates range from 22 billion (IMS) to 50 billion (Cisco and Ericsson) by 2020, up from six billion today. Beecham Research predicts that global revenue from these objects will grow from \$15 billion in 2011 to more than \$30 billion in 2014. Driving this growth is customer demand, technological standardization and, in some cases, regulation. Examples of the latter are smart meters in Italy and stolen vehicle-tracking in Brazil.

As smart objects become omnipresent, lack of imagination may seem to be the only constraint to developing a myriad of wonderful services related to these objects. Today’s reality, however, is that the market for such services is immature. Solution providers are still searching for sustainable business models and they offer most solutions in a trial-and-error mode.

Likewise, the competitive landscape is still very heterogeneous. It includes telco players (such as Deutsche Telekom, Orange, Telefonica and Vodafone), product manufacturers (such as BMW in cars and LG in home appliances), utilities (such as EDF), hardware and system integrators (such as Ericsson, Siemens and IBM) and so-called over-the-top

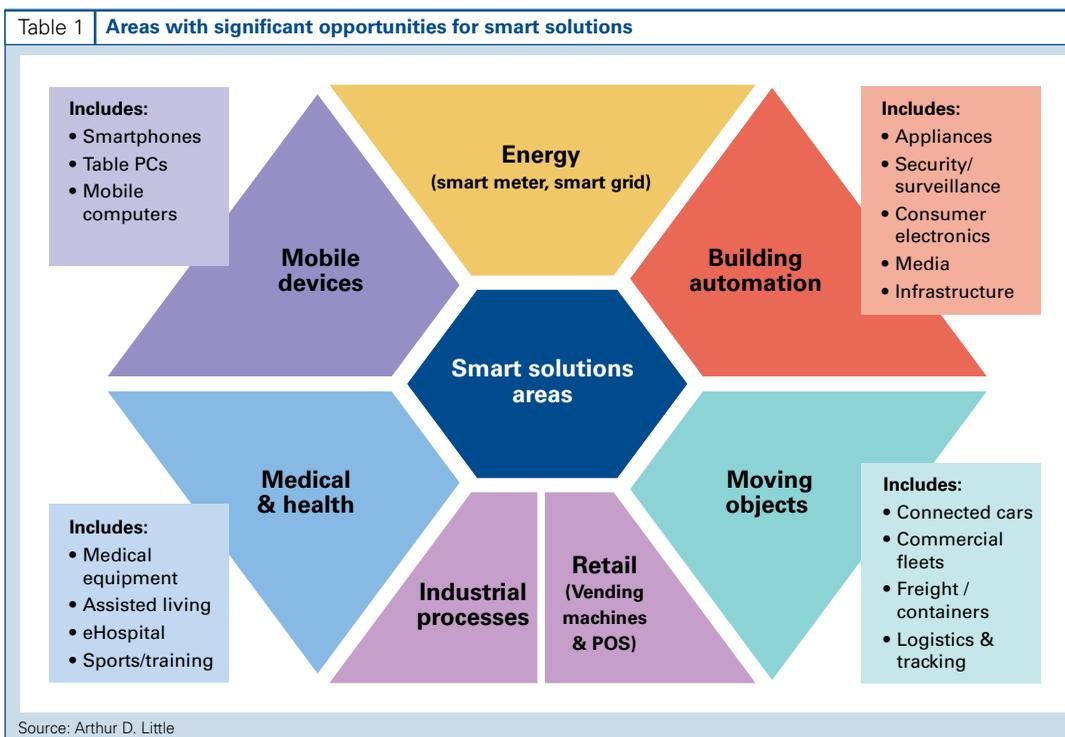


players (such as Google and Microsoft). But none of these has in any way yet managed to take the lead.

In this article, we will explore alternative ways in which the various types of players can create value in this budding Internet of Things market. In particular, we will sketch ways in which the telecommunications network operators – which traditionally have owned the customer – may develop in this area, and how other players in the value chain could benefit from this development through partnerships.

The user benefits of smart objects

In a way there is nothing new about smart objects. Telecommunication sets and consumer electronics devices are inherently smart objects, as they are fundamentally designed for connectedness to a network such as the Internet. Indeed most of the roughly six billion smart objects in use today are personal computers and smartphones, while tablet computers such as Apple’s iPad are quickly gaining momentum. Likewise, demand for Internet-enabled TV as



the fourth screen next to the PC, smartphone and tablet computer is increasing.

The real interest, however, is in the vast number of other, as yet unconnected products. These fall into seven areas, as shown in Table 1.

Smart objects enable consumers, businesses and communities (such as cities) to optimize and extend their functioning by exchanging information across the network. Successful smart solutions could provide a variety of benefits such as:

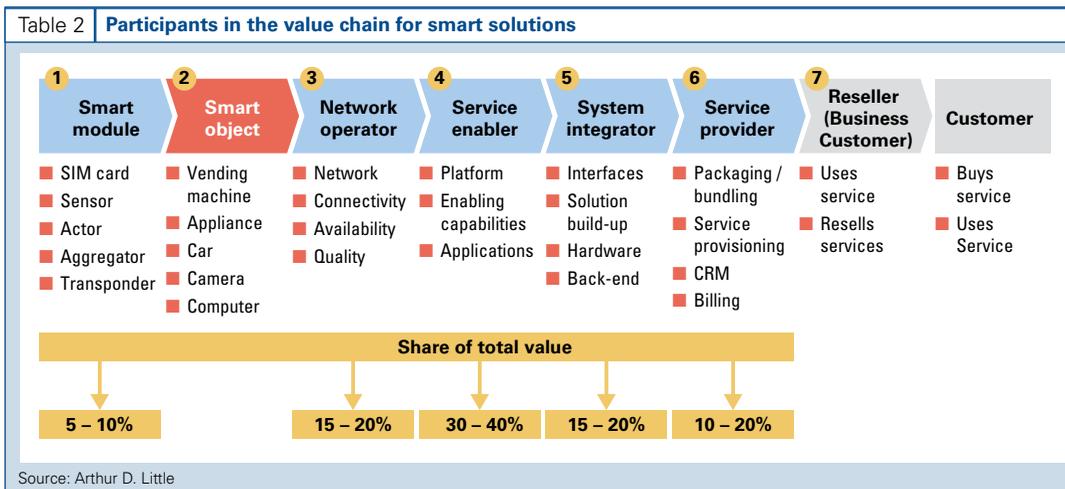
- Product lifetime extension. Continuous monitoring of a machine allows pre-emptive maintenance, which increases machine lifecycle and productivity, for example by reducing downtime.
- Energy use optimization. By being used as a function of external circumstances, devices can be made to consume less energy and/or run at a lower cost. For example, at sudden moments of peak demand or supply shortage, a refrigerator could be switched off temporarily without risking its contents.
- Greater user convenience. Remote access to a product can improve its ease of use, such as in the case of patient care at home or remote power management.
- Provision of value-added services. The value of a product can be enhanced by tacking services onto it. For example, adding smart features to a car allows it to be tracked and recovered in case of theft.

Clearly, only smart solutions that create sizable benefits for both consumers and businesses – and allow providers across the value chain to make money – will prevail.

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The value chain for smart solutions

Bringing smart solutions to life requires bringing together several physical components – such as the smart object – and services. As a consequence, the value chain is quite scattered and complex (see Table 2). Let’s have a closer look at each of its constituent parts.



1. Smart module

Smart module is the generic name for modems, wireless modules, gateways and other components that connect the smart object to a network and make it do the things it should do. In other words, the smart module contains sensors, actors and the communication interface with the Internet or other networks. It is the territory of players such as Cinterion, Sierra Wireless and Telit.

This sector is witnessing the entry by Asian heavyweights such as Huawei and ZTE, strong price pressure and consolidation (e.g. the acquisitions by Sierra Wireless of Wavecom Wireless in 2009, by Gemalto of Cinterion in 2010, and by Telit of Motorola M2M in 2011). In addition, hardware represents only 5 to 10 % of the overall smart solution value. As a consequence, the product portfolio of these players will evolve from hardware towards services related to device management and application platform provisioning, which takes them into classical network operator territory.

2. Smart object

The smart object is the product – a refrigerator, a vending machine, a car, etc. – that its manufacturer has designed to be able to connect to others via its smart module and a network. Most players that are introducing smart objects are currently part of the automotive sector (for telemetry and infotainment services), the utility sector (for smart metering) or facility management (for home and office automation and security). Appliance manufacturers are also starting to make their products smart. For example LG has recently launched its THINQ™ technology, enabling customers to monitor and control their appliances remotely.

In this context the notion of a vertical market is used, as the solutions related to the smart object vary strongly with the nature of the product. A smart car, for example, needs functionalities, such as services, workflows, security level and connectivity technology, that are much broader and partly different from those for a smart vending machine. In any case, short-term market success depends on the availability of use-cases for the customer and acceptable price levels.

3. Network operator

The network operator enables and manages the fixed or wireless communication with the smart object. Through this connectivity, it is possible to inform other parties in the network of the condition of the smart object. Numerous technologies are available: home automation traditionally relies on near-field-communication standards such as Zigbee, Z-Wave and WLAN, whereas mobile or out-of-home objects are equipped with classical mobile technologies such as GPRS and HSPA.

The value share of connectivity within the overall smart solution is relatively low (15-20 %). In addition, tariffs for wireless communication between smart objects (known as machine-to-machine communication or M2M) are under the same pressure as in traditional mobile communications. As a consequence, network operators are trying to offer services that go beyond pure connectivity provisioning. For example, some are getting into so-called home

management platforms, which aggregate connectivity for diverse solutions in areas such as home security, energy management and home healthcare. This field also harbours some pure-play solution providers, such as iControl.

4. Service enabler

The service enabler offers the platform that provides the intelligence to the smart objects and distributes information (e.g. the location of a car) correctly to the relevant parties. It also manages the multitude of partners that offer third-party applications that run on the platform (e.g. for vehicle tracking), in a way that is similar to how an app store is managed.

The service enabler occupies by far the most critical and complex position in the value chain. With a 30-40 % share of total value, it is also the most attractive position.

Current service enablers are relatively small players. For example, MiX Telematics is one of the market leaders in fleet management solutions, yet its revenues are barely above \$120 million. Most players are cash-strapped and lack global scale. Therefore, much larger players such as Nokia Siemens Networks, Alcatel-Lucent and IBM are moving into this territory with their own platforms, as are network operators such as Vodafone and Telefonica.

5. System integrator

The system integrator ensures the seamless operation of the smart object with the platform and workflows. This takes place at two levels. First, the smart module containing the communications technology (e.g. a SIM card) has to be integrated into the smart object (e.g. a car). This is usually done in a partnership between the smart object manufacturer, the smart module supplier and a network operator.

Second, the smart object has to be integrated with the platform and its relevant applications, as provided by the service enabler. In most cases today, this integration is cloud-based, meaning that a chosen application platform will support the integration through standardized applica-

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tion programming interfaces (APIs). As a consequence, all large system integrators, such as Ericsson and IBM, are entering this territory, which used to be dominated by smaller regional players, such as Axeda or Aeris in the US or Telenor's Connexion in Europe.

Since system integration generates only approximately 20 % of the overall smart solution value, system integrators are also trying to position themselves as service enablers and/or service providers.

6. Service provider

The service provider takes care of bundling the solutions, setting the tariffs, billing and customer care. It brings together the hardware, the connectivity and the platform to provide end-to-end solutions to its (business) customers. It usually also carries out the customer data and lifecycle management, as most business customers (e.g. car manufacturers) traditionally do not have end-user contact and therefore do not have the competency to manage mass-data billing and customer relationship management.

As a consequence, service integration should be natural network operator territory. So far they have not made significant inroads into this service. But in recent months players such as Deutsche Telekom, AT&T, Sprint and Verizon Wireless have announced plans to move into smart solutions and/or launch M2M competence centres. There are also some specialists, such as WirelessCar or Hughes Telematics, that are one-stop-shop service providers to the automotive industry.

While the overall value share of service provisioning is comparatively low (10-20 %), it is a critical part of the value chain, as the lack of attractive pricing models and customer relationship management often leads to low customer uptake.

7. Reseller

The reseller markets both the smart object and the related smart services. In many cases, such as cars, appliances and electrical power, the manufacturer of the smart object

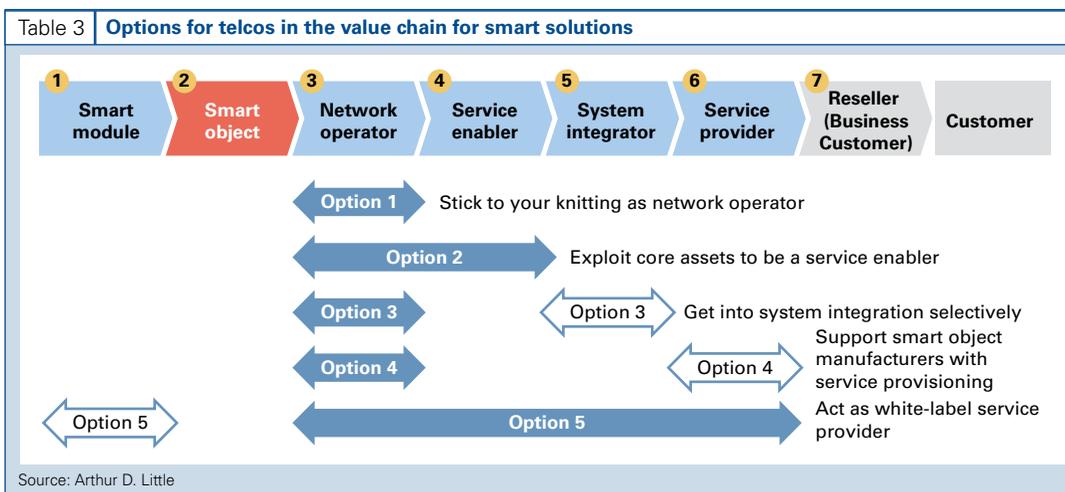
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also acts as reseller. In other cases, the network operator or system integrator acts as reseller to the end-customer. Mobilkom Austria, for example, sells m-health devices as well as selling smartphones.

Smart moves that telcos may make

From the above description, it is clear that the value chain for smart solutions is complex and that the positions of the various players are shifting. Of primary interest to all players should be the moves that the telecommunications network operators may take, as they are powerful and traditionally have owned the customer. Once other players have appreciated potential moves by telcos, they will better understand their own options and constraints in creating value.

There is one major reason why telcos are tempted to expand from their current stronghold position as network operators into other parts of the value chain for smart solutions: growing competition and price pressure in voice and data services is reducing their margins dramatically. Services beyond connectivity are reckoned to be a great opportunity to secure additional revenues and take a larger share of the overall value created. We expect telcos to target five out of the seven value chain steps in the mid-term (see Table 3). Let’s look at each of these mutually non-exclusive options.



Option 1: Stick to your knitting as network operator

Operating a network is the core capability of a telco. Operating one for smart solutions has thus become commonplace for virtually all of them, also in view of the specific machine-to-machine (M2M) tariffs that have been established. While this primary focus is understandable, the pure bit-pipe model does not create any sustainable differentiation in the mid to long term. First, connectivity is becoming a commodity and price pressure is likely to increase further. Second, embedded SIMs will make their way into smart objects, doing away with the need for replacing the SIM card when swapping operators, and thus lowering the barrier for doing so. Telcos therefore must rethink their approach to serve the smart objects market, both in terms of service offerings and differentiation strategy.

Option 2: Exploit core assets to be a service enabler

Numerous international telcos such as Verizon (via nPhase, a joint venture with Qualcomm), Telefonica and Deutsche Telekom are starting to position themselves as service enablers. They can build on various assets to do so successfully.

First, telcos are generally well placed to manage applications over the network with dedicated quality-of-service levels. This is especially important for high-security or mission-critical applications such as remote patient monitoring. As network management is one of the core assets of a telco, they have an advantage over over-the-top players, such as Google and Microsoft, in these critical business segments.

Second, telcos, as well as offering connectivity, are also well placed to develop their own application and workflow platforms. By doing so they can offer managed services from one place, which simplifies the development of smart solutions.

Third, most smart object manufacturers (such as car and appliance makers) are not familiar with establishing partnerships with third-party application developers and integrating applications into a compelling smart solution. Telcos can fill this space.

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Most mass-market solutions fail due to inadequate provisioning processes. For example, current “connected car” offers focus on infotainment services that rely fully on the consumer’s smartphone and its use of the telco’s provisioning processes.

Option 3: Get into system integration selectively

Company size is likely to determine whether it makes sense for a telco to be active in the physical integration of a smart module into a smart object, including the certification of the hardware. Large telcos such as Orange, BT and Deutsche Telekom can use the capabilities present in their ICT divisions. Small telcos without real ICT capabilities will instead look for specialized partners.

Telcos in any case will consider the integration of the smart object with the platform and its applications. Telcos could provide application programming interfaces (APIs) that allow developers to use common programming languages, such as Java, to build solutions, in a way similar to an app store in the smartphone environment.

Option 4: Support smart object manufacturers with service provisioning

Most mass-market solutions fail due to inadequate provisioning processes. For example, current “connected car” offers focus on infotainment services that rely fully on the consumer’s smartphone and its use of the telco’s provisioning processes. Services developed and provided by the car manufacturer often lack the capabilities to offer flexible tariffs, on-demand services and attractive customer lifecycle management (such as special offers). Telcos therefore can support smart object manufacturers with core competencies such as service provisioning, billing and customer lifecycle management.

Option 5: Act as white-label service provider

It is unlikely that telcos will get involved directly in the sale of smart objects such as smart meters (or, for that matter, energy) or home appliances. They lack the industry insights to do so successfully.

Telcos will instead aim to become service providers for smart object manufacturers, i.e. manage the connectivity, the enabling, the integration and the service provisioning. They can act as white-label providers, offering their solutions to more than just one customer in a given industry.

In other words, most smart solutions will be sold through and in the name of the smart object manufacturer, and the underlying service provisioning will not be sold separately. To be successful at this, telcos will have to abandon their classical project-driven approach in favor of a service-oriented sales approach toward the smart object manufacturer.

Telcos could create value in one other way. They can leverage their buying power to exert price pressure on manufacturers of smart modules (such as modems). By offering standardized and cheap modules for different vertical markets, they can stimulate the take-off of smart solutions.

Making the market for smart objects

In order to ensure market acceptance of smart objects and stimulate their widespread application, the cost and complexity of smart solutions must be reduced. This in turn will require the emergence of market-makers that can provide direction to the scattered industry and realize scale benefits.

Telcos in principle are well equipped to be market-makers for smart objects. Yet so far no telco has been able to generate significant revenues from smart solutions, let alone become a dominant force. At the same time, smart object manufacturers in vertical industries (such as car manufacturing and utilities) are developing services solely for their own customers and thus are not destined to fill the role of market-maker either.

As a consequence, telcos and players from vertical industries will need to find new ways of partnering rather than try to compete with each other. Together they should increase the size of the pie. This will require work in two dimensions.

First, they will need to find economies of scope. While each end-user market (e.g. passenger cars vs. commercial vehicles) has different requirements for smart solutions, they have many functionalities and services in common, such as localization, messaging and customer identity management. These could be developed once and offered over one identical platform instead of multiple industry-specific or even player-specific platforms that undermine the pos-

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sibility of leveraging scale and scope. Telcos could position themselves as the platform provider for many vertical solutions, utilizing common functions and allowing vertical industry players to offer industry-specific services on top.

Second, telcos must have the courage to look differently at their core asset, i.e. the network. As we have mentioned before, the switch to embedded SIM cards for machine-to-machine communication ends the dependence of manufacturers of smart objects on one specific network operator. The telcos are thus in danger of becoming one of several bit-pipe players with very limited margins. Therefore, we advise telcos to develop into network enablers, treating different applications with specific priority and quality levels. This would stimulate the emergence of mission-critical applications that currently cannot be offered due to a lack of service differentiation on the network. In addition, telcos must evolve from network providers to connectivity providers, managing different networks (and operators) and services (own and third-party) from the one place.

Insights for the executive

The Internet of Things is a growing market. The revenue potential from services related to monitoring, managing and steering smart objects is very significant. To users of smart objects – such as connected cars, appliances and medical devices – it holds the promise of greater convenience and higher efficiency.

Unfortunately the industry is scattered today. Diverse types of hardware, software and service players are populating a fragmented value chain for smart solutions. For the market to really take off, innovative and influential players need to stand up and take the lead. Only their actions will enable the spread of easy-to-use and affordable smart solutions, just as Apple’s iPhone revolutionized and built the smartphone market.

Telcos in theory could take that leadership role because they need new sources of revenues, because they know and can play the hardware game, because they have mass data management and platforms as their core service, and ultimately, because they are familiar with the required networks.

What holds them back in practice is their lack of knowledge of the industries to which they should offer smart solutions, industries such as transport, power supply and healthcare provision. The only way out is for telcos and industry players to decide together which strengths to use in the value chain, where to cooperate and where to compete. Ultimately all parties, including consumers, will lose out from unproductive competition in this field because no player will reach critical mass. All forecasts of the number of connected smart objects and concomitant revenue streams will then turn out to be illusory.

If telcos do not take this development seriously and move fast, they will be overtaken by players such as Google, Apple and Blackberry, who in the past have already demonstrated very successfully how to bypass operators.

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