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Executive Briefing

MONETISING IOT: FOUR STEPS FOR SUCCESS

A framework for telcos to move up the IoT value chain

Preface

The document has been prepared and commissioned by independent research firm STL Partners. It is based on STL Partners' continuous research programme into the future telecoms operator and how to get there.

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Executive Summary

Most telcos have now accepted that they need to offer more than connectivity if they want to move up the IoT value chain. There are three popular theories about how they can do this, but in our opinion only one will help telcos start moving up the IoT value chain today – developing advanced IoT services and solutions focused around core verticals.

The other two theoretical opportunities are:

1. Providing the horizontal IoT platform

2. Monetising IoT data and insights

The first option, providing the horizontal IoT platform, is very difficult for telcos to do successfully because there are already hundreds of IoT platforms and this is a very competitive market. It is unlikely that any telco will be able to develop an IoT platform that has technical capabilities to rival the likes of specialists such as Jasper, AWS and Microsoft Azure. Where telcos could differentiate their platforms would be by building an ecosystem of partners and orchestrating new services for the end-user by bringing together capabilities from their different partners. However, in order to do this effectively telcos would need to take a vertical focus.

The second option, monetising IoT data and insights, will be feasible for some telcos but it will take some time before this delivers significant ROI. As we described in our report, Big data analytics – Time to up the ante, just being a data seller (i.e. not analysing the IoT data, just selling it to a third party) is not a particularly valuable role for telcos. They can create more value by developing data analytics capabilities and services – either on their own or through partnerships – but this would need to be done in parallel with their IoT development.

Although developing advanced IoT services and solutions focused around core verticals is the most feasible way for telcos to move up the IoT value chain, even the largest telcos won't be able to develop capabilities in every single vertical. This will result in additional horizontal opportunities, such as providing IoT connectivity, outside their areas of expertise that they don't want to miss out on.

We have therefore developed a four-step process that results in a hybrid, T-shaped IoT business model for telcos, which allows them to rise up the value chain in certain verticals and develop sufficient horizontal capabilities so they don't miss out on incremental opportunities in non-core verticals. The four steps are:

1. **Look beyond connected device forecasts** – these are a red herring and will not help operators monetise IoT

2. **Map out your IoT strategy by:**

    2.1. **Choosing your core verticals**, by considering your individual telco's capabilities, culture and market opportunities.

2.2. **Deciding which roles you want to play in targeted verticals and how you will achieve this**, out of four possible options: wholesaler, solution provider, ecosystem component supplier or ecosystem orchestrator.

3. **Be brave and commit.** Many telcos, regardless of their size and capabilities, are still hesitant to commit to a vertical approach. If they don't do this now they will lose out to their competitors and be doomed to providing just commoditised IoT services such as connectivity and technical IoT platforms. Of course they will need to bring their shareholders and other stakeholders along with them to achieve this.

4. **Develop horizontal capabilities to serve your non-core verticals.** No telco will be able to create focused solutions for every vertical, and there may be opportunities to provide horizontal services in non-core verticals that operators won't want to miss. However, just focusing on horizontal capabilities is a low-value position though, so should complement your core verticals, not be developed as an alternative to focusing on verticals.

This report is the first in our series on telco IoT monetisation, and presents a high-level overview of the four-step process. Over the next 12 months we will publish several deep-dive reports focusing on specific challenges that telcos are facing in IoT, including:

- IoT verticals: How to choose?

- Monetising IoT: Which data strategies work?

- Primers on specific IoT verticals, including smart cities and healthcare

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Introduction

The internet of things (IoT) will revolutionise all industries, not just TMT. In addition to the benefits of connecting previously unconnected objects to monitor and control them, the data that IoT will make available could play a pivotal role in other major technological developments, such as big data analytics and autonomous vehicles.

It seems logical that, because IoT relies on connectivity, this will be a new growth opportunity for telcos. And indeed, as anyone who has attended MWC in the last few years can testify, most if not all major telcos are providing some kind of IoT service.

But IoT is not a quick win for telcos. The value of IoT connectivity is only a small portion of the total estimated value of the IoT ecosystem, and therefore telcos seeking to grow greater value in this area are actively moving into other layers, such as platforms and vertical end solutions.

Figure 1: Telcos are moving beyond IoT connectivity
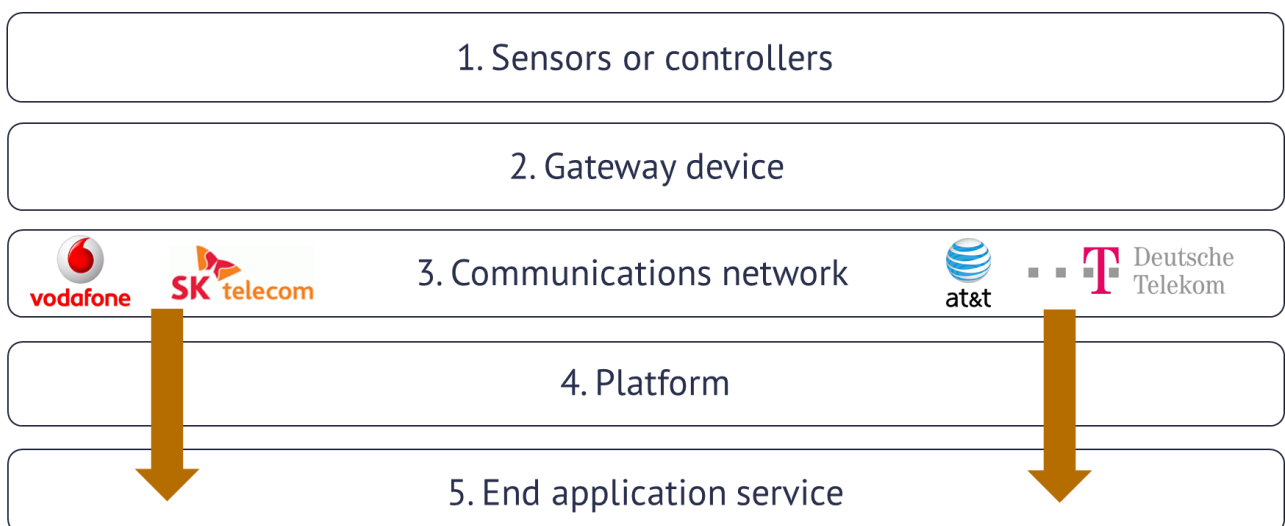
Source: STL Partners

Although telco IoT strategies have evolved significantly over the past five years, this is a complicated and competitive area that people are still figuring out how to monetise. To help our clients overcome this challenge we are publishing a series of reports and best practice case studies over the next 12 months designed to help individual operators define their approach to IoT according to their size, market position, geographic footprint and other key characteristics such as appetite for innovation.

This report is the first in this series. The findings it presents are based upon primary and secondary research conducted between May and September 2017 which included:

- A series of anonymous interviews with operators, vendors and other key players in the IoT ecosystem

- A brainstorming session held with senior members from telco strategy teams at our European event in June 2017

- An online survey about telcos' role in IoT, which ran from May to June 2017

This report also leverages insight from other research reports by STL Partners, including:

- The IoT ecosystem and four leading operators' strategies

- The IoT money problem: 3 options

- Consumer IoT: How telcos can create new value

- Big data analytics – Time to up the ante

- TELUS Health: Innovation leader case study

- Which operator growth strategies will remain viable in 2017 and beyond?

A four-step process to monetise IoT

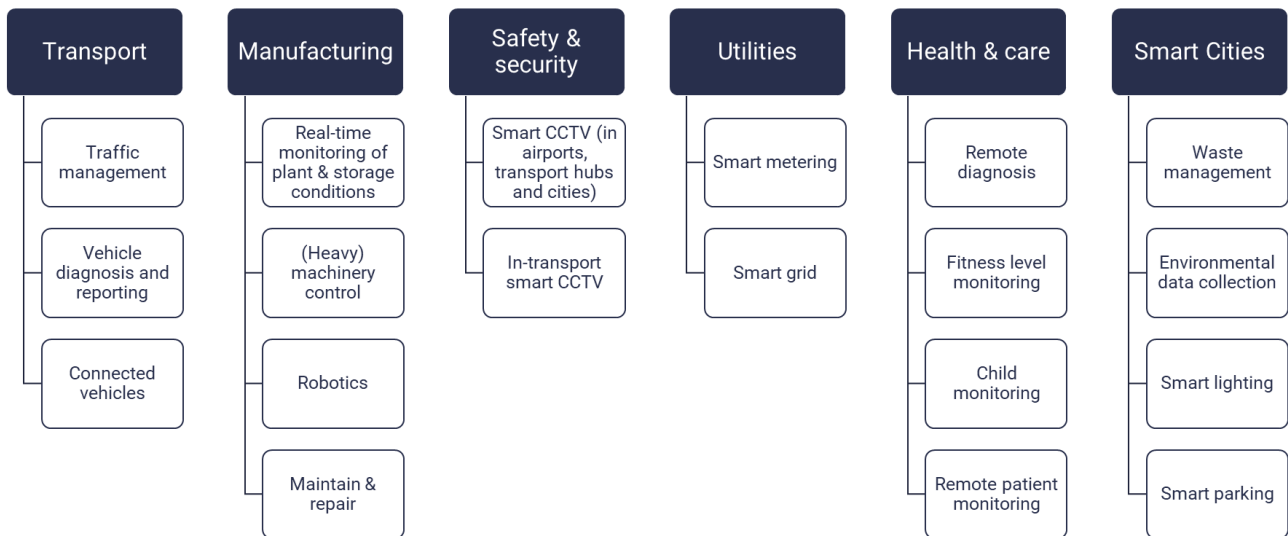## Step 1: Look beyond connected device forecasts

Billions of devices are forecast to be connected by 2020, and that number will continue to grow. However, we think that these forecasts are a red herring that telcos should pay little attention to when defining their IoT strategy:

- Firstly, these numbers cover a multitude of different connectivity types – mobile cellular, fixed line, LPWAN, and short-range technologies such as Wi-Fi, Bluetooth and ZigBee. The number of new, dedicated cellular connections that IoT will create will only be a small proportion of the overall number of connected IoT devices.

- Secondly, in most cases end-users won't pay for IoT services as a connectivity subscription in the way that they do for mobile, fixed line or broadband connectivity. In many cases end-users – be they consumers, enterprises, or government entities – will pay for the IoT service outcome, not its constituent parts. For example, a city will pay for a traffic system that decreases pollution and improves safety but it will not pay separately for the connectivity, devices, sensors and software that makes this system possible.

- And thirdly, even if you have customers paying for IoT services on a "price per device" basis, as we have seen already with mobile voice ARPU, the amount that customers are willing to pay for connectivity decreases over time, so this is not an attractive long-term strategy.

Step 2: Map out your IoT strategy by:

2.1: Choosing your core verticals

Not even the largest telcos can develop capabilities in every single IoT vertical. To decide which verticals to focus on, you need to consider your individual telco's capabilities, culture, and market opportunities. In our report The IoT money problem: 3 options, we identified 12 different IoT verticals which comprise a combined total of 40 different use-cases. Figure 2 shows a selection of six of these verticals that we can use to illustrate how telcos can assess which verticals to focus on.

Figure 2: IoT verticals and use-cases

Transport	Manufacturing	Safety & security	Utilities	Health & care	Smart Cities
Traffic management	Real-time monitoring of plant & storage conditions	Smart CCTV (in airports, transport hubs and cities)	Smart metering	Remote diagnosis	Waste management
Vehicle diagnosis and reporting	(Heavy) machinery control	In-transport smart CCTV	Smart grid	Fitness level monitoring	Environmental data collection
Connected vehicles	Robotics			Child monitoring	Smart lighting
	Maintain & repair			Remote patient monitoring	Smart parking

<div align="right">Source: STL Partners</div>

The key questions that telcos need to answer when considering IoT verticals are:

1. Does this vertical have high value potential?

2. Do we currently have capabilities in this vertical?

3. If not, would we be willing to develop new capabilities in this vertical, either through acquisition or organic growth?

Answering these questions will help telcos assess which role they should play in it, out of wholesaler, solution provider, ecosystem component supplier and ecosystem orchestrator. These four roles are described in detail below.

2.2 Deciding which roles you want to play in targeted verticals and how you will achieve this

To define their IoT strategy, telcos need to decide which role they want to play and are capable of. There are four different roles that telcos can play within IoT projects. These are not mutually exclusive: telcos could choose to play different roles in different verticals, or even several different roles in the same vertical if they have the resources to develop capabilities in all four roles. The four roles are:

1. **Wholesaler:** As a wholesaler telcos would provide connectivity and basic technical platform services but would not add extra value with a specific vertical focus. The telco would not lead the IoT project but work with systems integrators, and therefore the amount of long-term value that this role will deliver is limited. Traditional M2M plays where telcos provide SIMs would fall into this category.

2. **Solution provider:** In this role operators offer a complete turnkey solution, such as a smart parking service where the connectivity, platform and end application are all controlled by one

provider. This is only possible for certain use-cases, typically limited in size. It would be very difficult for any organisation to offer a complete turnkey solution for an advanced IoT proposition such as a smart city, unless the city had very strong top-down governance. As this role is limited to certain use-cases only, there is a limit to how much value telcos will gain by playing this role. Another key barrier preventing telcos from playing this role is the need to establish credibility as a solution provider in a specific vertical or sub-sector. Why would a city go to a telco for its parking solution, rather than a specialised parking solutions provider? If telcos want to provide turnkey solutions they need to build their credibility in the target vertical, which will require investment in people and possibly M&A, such as Vodafone's acquisition of Cobra.
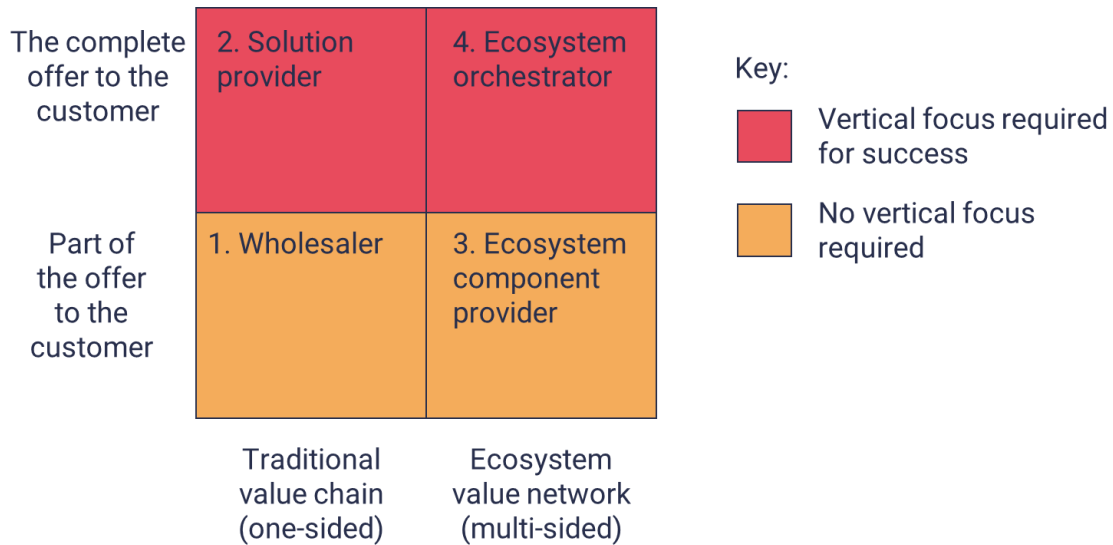
3. **Ecosystem component supplier:** In this role telcos would be the trusted provider of a key component of the ecosystem, and, if taking a purely horizontal approach, will need to differentiate themselves by providing advanced technical capabilities. At the moment, most IoT providers trying to play this role are focused on the platform layer, but in the future telcos could use edge computing and network slicing as key technical differentiators.

    Despite not being an example from the IoT sector, PayPal is a great example of a successful ecosystem component supplier. PayPal is used globally as a payment platform for online transactions, making it an essential part of many e-commerce marketplaces. Many players in the IoT ecosystem – especially those that are focusing on technical platforms – want to establish themselves in this role, and the competition is already fierce.

    Although it's possible to create an ecosystem component with no vertical focus, like a technical IoT platform, telcos will struggle to differentiate themselves here because the competition is tough and they do not have as much experience in creating ICT solutions as the likes of AWS, Microsoft Azure, Jasper and other organisations looking to compete in this area. To be successful as a horizontal component provider telcos would need to adopt software-centric business practices, such as highly automated rapid release cycles to keep their software constantly up-to-date and cutting edge. This is a huge leap from where many telcos are today, but we know of some operators who are already working towards this.
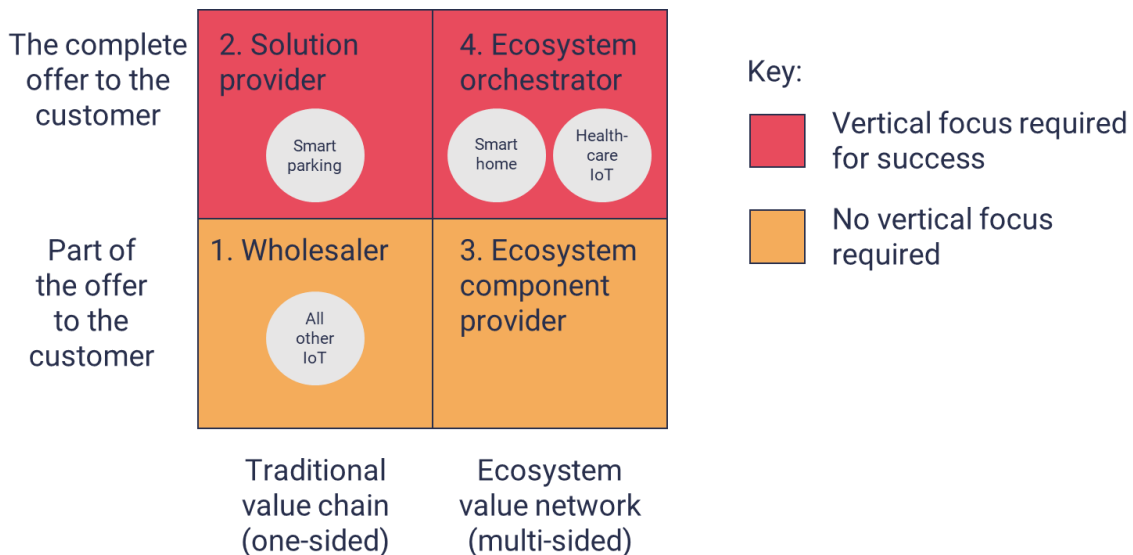
    An alternative to this horizontal approach would be to create a vertically-focused platform, meeting specific needs of vertical customers. So, although taking a vertical approach is not necessarily *required* to be successful as an IoT component provider, understanding the needs of specific verticals and providing some vertical-specific components could help telcos differentiate themselves in the very competitive platform market.

4. **Ecosystem orchestrator:** Telcos playing this role would adopt a B2B2X business model and need to offer professional services as well as technical capabilities to their B2B customers. It is not possible to play this role for the entire IoT ecosystem, so telcos adopting this strategy would need to focus on one or two key verticals to establish themselves in.

Figure 3: Four possible roles within the IoT ecosystem

	Traditional value chain (one-sided)	Ecosystem value network (multi-sided)
The complete offer to the customer	2. Solution provider	4. Ecosystem orchestrator
Part of the offer to the customer	1. Wholesaler	3. Ecosystem component provider

Key:

■ Vertical focus required for success

■ No vertical focus required

These roles are not mutually exclusive, so telcos can choose to play different roles in different verticals. Indeed, even the largest telcos will not be able to develop the necessary skills and expertise to act as either a solution provider or an ecosystem orchestrator in every IoT vertical. Therefore, telcos need to decide which verticals they are going to place bets on, and be content to provide horizontal services for the others, as shown in Figure 4.

Figure 4: Telcos can play different roles in different verticals

	Traditional value chain (one-sided)	Ecosystem value network (multi-sided)
The complete offer to the customer	2. Solution provider — Smart parking	4. Ecosystem orchestrator — Smart home, Health-care IoT
Part of the offer to the customer	1. Wholesaler — All other IoT	3. Ecosystem component provider

Key:

■ Vertical focus required for success

■ No vertical focus required

Step 3: Be brave and commit

There is a myth that only large, multinational or regional telcos can successfully focus on IoT verticals. This is not true. Naturally, there will be some verticals where having a broad geographic reach is important, for example international logistics and transportation. However, there will also be some verticals where telcos with a strong national position – which could be local players as well as multinationals – will be in a better position because of their market knowledge, relationships, and, in some cases, regulation. For example, the healthcare market is heavily influenced by national government policies and regulation, so could be a more feasible opportunity for telcos that have a strong national presence in a specific market, rather than a multinational which hasn't worked there before.

Also, some large telcos struggle to take the leap of faith needed to commit to a vertical approach. During the anonymous research conducted for this report we spoke to several people who talked about their telco's reluctance to place big bets on verticals, preferring to take a "client-led" incremental approach. This may feel like a safer strategy now, but it is risky in the long run, as IoT is such a competitive area. Each vertical has its own unique set of challenges, opportunities, drivers and stakeholders, and in many cases your potential clients will be looking for an experienced partner that can help them navigate their IoT transformation. Telcos that do not commit to focusing on at least one vertical will struggle to move beyond offering easy-to-commoditise services such as connectivity and technical platforms.

Taking a vertical approach does not mean that telcos need to try and provide every component of the IoT solution (e.g. connectivity, platform, end solution, device etc.), it means that they need to tailor the components that they provide to that specific vertical.

For example, Deutsche Telekom has taken a vertical approach to developing its Qivicon smart home platform. This example is particularly interesting because it has developed into a sophisticated commercial platform, rather than just a technical IoT platform, and Deutsche Telekom is creating new experiences for consumers by combining the capabilities of the different smart home devices it connects. For instance, it has integrated its home security application with Sonos smart speakers (one of its ecosystem partners) so users can choose a setting through their Qivicon app that uses the smart speaker to imitate household noises, such as a dog barking, to make it seem as if people are at home and deter intruders.

It would be virtually impossible to create such value-adding experiences without a vertical focus. Therefore, once telcos have decided which IoT verticals they are going to focus on, they need to:

1. **Build brand credibility in your chosen verticals** – to play the higher value roles of turnkey solution provider or ecosystem orchestrator telcos need to develop brand recognition and credibility in their chosen verticals. This requires serious investment, not just in M&A but also in people. In addition to the acquisitions Telstra made as part of its healthcare strategy, the telco also made several key senior hires from the healthcare sector, rather than relying on moving executives across from the telco side of the business. For example, Managing Director Shane Solomon was formerly head of the Hong Kong Hospital Authority, was Group CEO of a leading

Australian hospital and aged care provider group, and has also been a civil servant as Under-Secretary of Health in Australia's Victorian Department of Human Services.

2. **Identify who the customer is** – for example, in smart cities your customer could be the city government, a specific city department or a services contractor. You need to identify who will benefit the most from your solution and who will be willing to pay for it. In some cases, you may need to court a number of different parties.

3. **If you are focusing on consumer IoT, such as smart home or connected car verticals, build a network of partners with which to develop B2B2C services.** You need to add value to remain relevant, so you need to develop integrated services such as Qivicon's integration of Sonos smart speakers with its home security application.

4. **Seek to understand what your customer will pay for** – for example, home security systems are the highest-selling smart home solutions, but often a few months after having purchased a smart home security solution consumers will add further IoT devices. One vendor that we interviewed for this research claimed that safety and security are the most critical use-cases for smart cities, so they deliberately sell "safe city" solutions, with the aim of using the infrastructure to add further smart city solutions at a later date. Understanding which use-cases will sell best in your chosen vertical is critical to success.

5. **Be patient and persistent** – IoT services will not deliver significant ROI overnight, but they have the potential to become as ubiquitous as the mobile phone. Providing connectivity alone will not deliver high value, so telcos need to move now to develop more compelling IoT services.

As part of our suite of IoT reports, we will produce several deep-dive reports on specific IoT verticals such as smart cities and healthcare IoT, defining what telcos need to do to succeed in these specific verticals.

Step 4: Develop horizontal capabilities to serve your non-core verticals

Naturally there will still be opportunities for telcos outside their core verticals that they won't want to miss. For example, some telcos will not want to specialise in the smart city vertical, but will be happy to partner with systems integrators such as IBM and Cisco to provide connectivity for smart city projects.

Therefore, all telcos need to develop at least some horizontal capabilities in addition to their core verticals. Specifically, they need to decide what they are going to do about connectivity and platforms.

IoT connectivity

When it comes to connectivity, there are lots of different options out there, which broadly fit into four types:

Figure 5: IoT connectivity can be simplified into four broad categories

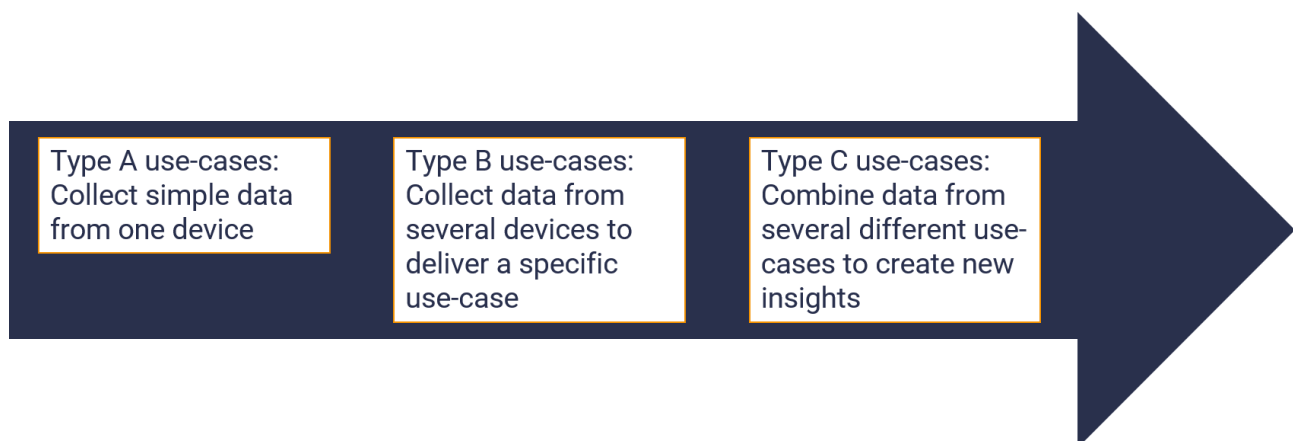| Cellular	Fixed-line	Low-power wide area network (LPWAN)	Wireless personal area network/Wireless local area network (WPAN/WLAN)
3G	Ethernet	Weightless	RFID low frequency (LF)
4G LTE	PLC / Powerline	LoRaWAN	RFID high-frequency (HF)
LTE-MTC		SigFox	RFID ultra-high frequency (UHF) RFID
EC-GSM-IoT		RPMA (Ingenu)	EnOcean
GPRS			NFC
2G			Bluetooth
NB-IoT			Wi-Fi
			ANT+ (Owned by Garmin)
			802.15.4
			Z-Wave
			Zigbee

Source: STL Partners

These four broad categories can be further sub-divided by range, speed and whether they are licensed or unlicensed, and some of the "cellular" connectivity types could be classified as LPWAN. For the purposes of this report we will only discuss what telcos need to do about IoT connectivity at a high level as part of their overall strategy.

To be able to provide horizontal capabilities in their non-core verticals, telcos need to offer some type of LPWA, cellular and fixed connectivity, either by developing their own connectivity solutions or by partnering with others. Interviewees for this report agreed that there will be far more LPWAN connections than any other, and we are seeing a number of telcos building out LPWAN in addition to developing capabilities in core verticals. For example, SK Telecom has completed a nationwide rollout of LoRa and has identified the connected car and smart home as its core verticals. There will undoubtedly be opportunities for the operator in other verticals, such as smart manufacturing, that the operator will be able to provide connectivity for without making manufacturing a core vertical. For more analysis of the LPWAN field, please see our up-coming report in the Network Futures research stream.

As the IoT field matures, use-cases are becoming increasingly complicated, connecting devices and aggregating data using multiple types of connectivity. If you take smart cities as an example, data about different aspects of city life – such as traffic, air pollution, energy use, and people movement – is being gathered from multiple sources which require different types of connectivity. Therefore, if telcos want to be the connectivity provider of choice for their non-core verticals, they are going to have to develop a comprehensive portfolio of connectivity types.

Figure 6: As the IoT field matures, use-cases become more complex

Type A use-cases: Collect simple data from one device

Type B use-cases: Collect data from several devices to deliver a specific use-case

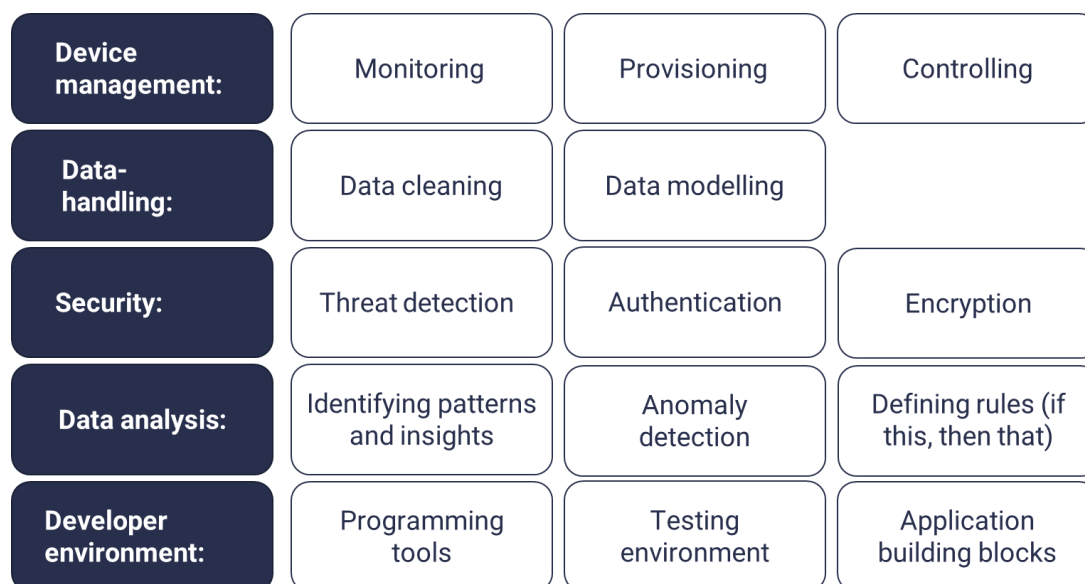Type C use-cases: Combine data from several different use-cases to create new insights

Source: STL Partners

IoT platforms

The word 'platform' covers a multitude of sins. When some people talk about IoT platforms they are referring purely to the technical capabilities depicted below:

Figure 7: The technical components of an IoT platform

Device management:	Monitoring	Provisioning	Controlling
Data-handling:	Data cleaning	Data modelling	
Security:	Threat detection	Authentication	Encryption
Data analysis:	Identifying patterns and insights	Anomaly detection	Defining rules (if this, then that)
Developer environment:	Programming tools	Testing environment	Application building blocks

Source: STL Partners

However, the IoT platform market is crowded and we doubt that telcos will be able to differentiate themselves on technical capabilities alone. Also, as the IoT field matures, there is increasing demand for IoT platforms to be connectivity agnostic, so the idea that if you control the platform you can insist on providing the connectivity as well will not work long-term, and we therefore to see telcos move away from this idea in the future. We think that the technical platform market will be dominated by specialist providers such as Jasper, Microsoft Azure and AWS, among others, which telcos will need to partner with. The recent announcement about Apple partnering with GE Predix may mean that GE Predix becomes one of the most widely used platforms; however, as this partnership was only announced a few weeks before this report was published it is far too early to tell.

Although we doubt that a purely technical platform play will work for operators, there are three additional areas where they can add more value, each of which requires a vertical focus in order to be successful. These result in a commercial platform offering, rather than a purely technical one:

1. **Provide a route to market for OEMs through their trusted brand.** For example, in the smart home segment white goods manufacturers will not have the expertise or appetite to manage the connected services themselves, such as predictive maintenance and remote control, so will need an experienced partner to help them provide connected appliances.

2. **Create new, value-adding experiences for end-users that would not be possible using individual connected products and apps.** For example, Deutsche Telekom's smart home platform Qivicon creates new features by combining the capabilities of different products on its

platform, such as using a connected music speaker to imitate household noises to deter intruders when the house is empty.

3. **Help other companies on their IoT transformation journey.** Change is hard. IoT will revolutionise many industries including energy, automotive, government, manufacturing and healthcare. The individuals leading IoT transformation in these industries want to work with a trusted advisor that has done this before and can help them through the process.

Result: The T-shaped IoT business model

The result of this four-step process is a hybrid, 'T-shaped' IoT business model – telcos can't ignore the essential horizontal parts of IoT services, but if they just focus on these they will face commoditisation. Therefore, they need to pick certain core verticals to provide advanced solutions and services in, and thus rise up the IoT value chain.

Figure 8: The T-shaped IoT business model
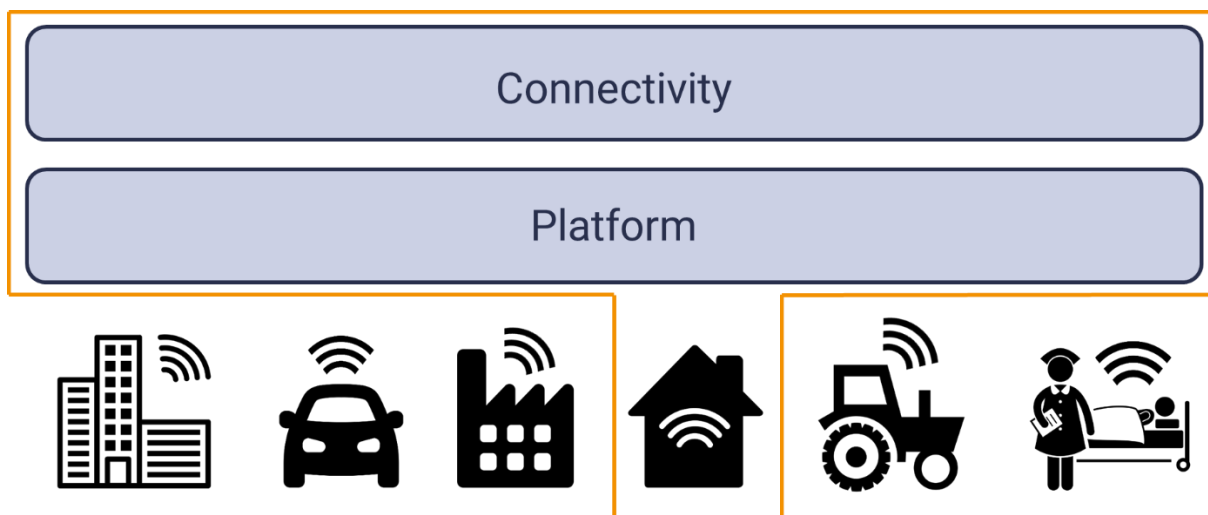
Source: STL Partners

IoT data is a secondary opportunity

As well as moving up the value chain into the platform and end-services layers, some telcos are hoping to create secondary value from IoT data.

IoT systems make it possible to collect large volumes of data, in some cases from previously unobtainable sources. There is a lot of industry excitement and speculation about the value of this data and the new insights it will make possible. At the moment, when questioned about how they will monetise IoT, many organisations (including telcos, vendors, internet players, city authorities and other entities involved in the IoT ecosystem) reply that they will monetise the data. For telcos that decide they want to play in the field of data insights, there are three options:

1. Sell raw data collected from IoT devices to a third party to analyse.

2. Develop your own data analytics capabilities in-house, create insights from IoT data and sell to others.

3. Develop data analytics services yourself and base new services on the new insights you create from IoT data.

As we described in our recent report, Big data analytics – Time to up the ante, developing big data analytics capabilities – which would be needed to derive meaningful insights from large-scale IoT implementations – is not a simple task. Therefore, although developing new IoT services based on the insights created through in-house data analytics is theoretically the highest value option, it is just not a practical approach yet for some telcos.

Of course, if you are in the lucky position of being able to develop big data analytics capabilities yourself, then IoT data can be used as an input. Big data, as the name suggests, is very much a volume game, so the more data that can be brought together from different sources and combined and analysed, the more likely you are to find new insights. Which of these can be monetised is the next question.

Although IoT data will definitely play a role in providing new insights through big data analysis, it would be naïve to think that telcos will be able to monetise all their IoT data – especially as in some cases they will not actually own it. Therefore, we think that telcos should develop a T-shaped business model where they focus on a select number of core verticals and provide horizontal services in others. Telcos that have the capability – and appetite – to invest in big data analytics should do so in parallel with their IoT developments. It will most likely be some time before any telcos see significant ROI from big data analytics projects, so they should not define their IoT strategy on the assumption that they will be able to monetise the data. As part of our series of reports on IoT monetisation we will publish a study of data monetisation strategies in the next 12 months.

Conclusion

- If telcos don't focus on IoT verticals by developing strong technical and commercial capabilities and building market credibility they will fail to rise up the value chain and be doomed to just providing commoditised services that will decrease in value over time.

- Focusing on IoT verticals does not mean that telcos need to provide an end-to-end solution, controlling every component. For example, they could add value through a vertically focused commercial platform, orchestrating relationships with multiple partners in a B2B2X business model. To find the best role for your telco, you need to assess your current capabilities, company culture and aptitude for innovation.

- The idea that only large telcos can succeed in IoT verticals is not true – in fact, in many cases large telcos are reluctant to take the leap of faith required to commit to a vertical approach. There are even some verticals that will be more suited to local and national players, such as healthcare, because of existing relationships and understanding of the local market and regulations. Being brave is more important than being big in IoT.

- However, because no telco can focus on every possible vertical, you need to make strategic choices, but also develop horizontal capabilities to avoid missing lower value – but still relevant – IoT opportunities. Adopting a T-shaped strategy will help you do this.

- In the future there will be opportunities to monetise IoT data, and it could play an important role in big data analytics. Just selling IoT data to others to analyse will not create value for telcos, so they need to either develop their own analytics capabilities or broker partnerships in this field to monetise IoT data; however, this should not be their primary monetisation strategy for IoT.

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