

FACILITATING INNOVATION

We shouldn't be complacent that the regulatory approaches of today will be enough to support innovators in the era of the internet of things, says **JEREMY GODFREY**

Back in the year 2000, I was interviewing prospective telecoms strategy consultants. I asked them what they thought 3G would be used for. Some said video calling. Some talked about watching TV and movies on handsets. Some said purchasing music or checking email on the move. Nobody mentioned anything like WhatsApp, Twitter, Facebook or Snapchat. Nobody mentioned anything like Pokémon Go. Nobody mentioned anything like Google Maps.

This was four years before Apple even began work on the iPhone. So it's understandable that none of the candidates predicted applications that depended on smartphones with touchscreens, cameras and GPS. But once the smartphone was invented, millions of innovative applications were developed, and some of them have made much impact on people's lives.

What has enabled this innovation to happen? First, there is a huge market opportunity – there are more than 5 billion end users with connected devices. And second, there are very low barriers for innovators to bring new applications to market – the open internet provides a ready-made global distribution platform. Innovations that create value can rapidly become highly successful and the rewards for successful innovators are high. So, many of the world's most creative people are motivated to work hard and to take entrepreneurial risks.

GOOD REGULATION HAS BEEN CRUCIAL

Well-regulated telecoms markets have been critical in creating this environment. Competition has created incentives to upgrade network technology. And spectrum assignments have provided an essential input to enable investment in high-speed mobile networks.

In addition, a variety of regulatory tools have been used to ensure competition and choice for end users, and to create and uphold user rights. Operators of access networks have been constrained from raising prices to monopolistic levels; nor have they been able to control which applications their end users are able to use. The result has been substantial improvements in the quality of the world's connectivity, enabling exponential growth in the use of innovative applications and hence in the volume of data carried. All this has been achieved without a significant increase in the

amount charged for the underlying connectivity.

Between 2008 and 2013, telecoms expenditure in the OECD grew by less than 0.2% a year. Over the same period Facebook grew its revenues more than tenfold, and its user numbers eightfold. This reflects the fact that enhanced connectivity would be of little value if it were not for the innovative applications that make use of it.

But will the innovation model of a small startup developing an application, getting it hosted in the cloud, and using the internet as a delivery platform still be applicable in the era of the internet of things (IoT)? And will today's regulatory approaches suffice to enable IoT-based innovation?

Just as it was difficult in 2000 to predict the applications and the business models of 2010, it's difficult today to imagine the IoT applications of ten years from now. Commentators write about a small number of examples, such as smart thermostats and autonomous vehicles. But in all probability some of the most significant IoT applications of ten

years' time will be beyond what most of us can currently imagine. But we can perhaps imagine the tools that innovators will need.

Let's imagine Thingamabob, an

IoT-based start-up five or ten years from now. The idea and the business model that the founders have in mind could have some or all of the following characteristics:

- Thingamabob has designed a thing called a Gizmo
- Some Gizmos will be used at fixed locations, others will be used on the move, including when the user travels across international borders
- In order to work, Gizmos will need to communicate with one another and with Thingamabob. Some of these communications will need to be guaranteed to have very low latency
- Users will typically buy a dozen or more Gizmos, and subscribe to a service run by Thingamabob
- The user experience is kept very simple, with no configuration needed by the end user or in the supply chain. Once the user has registered their Gizmos, they just work
- The end user doesn't have to arrange connectivity.



It's difficult today to imagine the IoT applications of ten years from now.





The cost of wide-area connectivity is included in the subscription to Thingamabob's service. But if the user wishes, Gizmos at fixed locations can be connected to a user-supplied wireless connection (such as WiFi) with a discount on the subscription.

What would be necessary for the founders of Thingamabob to have an easy route to market, so that their Gizmos and the associated service can compete with other innovations?

Of course, Thingamabob will need there to be low-latency wireless networks such as 5G operating in all the countries where Gizmos are to be used. There is a lot of spectrum management work needed to bring this about, but the nature of the work is well understood. The world's regulatory community knows how to go about setting standards, harmonising band allocations and assigning spectrum rights of use. There will be important decisions to be made about matters such as shared use of spectrum, coverage obligations and the timing and design of spectrum assignment processes. Difficult though some of these decisions are, it seems likely that spectrum will get assigned for the 5G networks that Thingamabob's service will require.

5G SPECTRUM MAY NOT BE ENOUGH

But the mere existence of 5G networks may not be enough to ensure the company can deploy its service cost-effectively. Here are some of the things it may need:

- Access to computing resources that are located within the 5G network. The need for reliable low latency connections between Gizmos and the Thingamabob service means that the company may not be able to use data centres located far away from the places where Gizmos are being used. Instead it may need to run parts of its application within the 5G network – maybe at cell sites, or at aggregation nodes or at switching centres.
- An ability to easily remotely reconfigure Gizmos to work with different 5G networks. Without this, Thingamabob could not deliver the simple customer experience that it desires, find it difficult to switch its fleet of Gizmos from one 5G operator to another which would limit price competition among network suppliers, and could find itself stung with exploitative roaming charges when Gizmos move across national borders.
- Non-discriminatory commercial deals for 5G connectivity that reflect costs. If 5G operators are

Current ideas about IoT applications may not be useful when predicting what is to come

able to impose an excessive toll on Gizmos, or favour a Gizmo competitor for some reason, then Thingamabob's founders might not be able to sell Gizmos profitably at a low enough price to build the scale they need to be successful.

- An ability to work with a global supplier instead of cutting deals with national 5G operators – If Thingamabob had to cut deals with 5G operators in every national market, it could incur heavy costs in travel, legal fees and in employing commercial staff. The process would also significantly delay its time to market. And if the result was a multiplicity of commercial deals struck on different terms, it might also have to adapt its application to work differently in different markets, increasing costs and damaging the customer experience.

The barriers to Thingamabob's innovation would be substantially lowered if it could deal with a global service provider that could provide it with virtual computing resources, and low-latency 5G connectivity between Gizmos and those services. Such a service provider would be a combination of a cloud computing provider and a multi-country MVNO. Will such providers emerge as a result of competition, or will regulatory action be needed?

Spectrum constraints mean that today there are no more than a handful of 4G operators in each national market. But the nature of today's internet means that mobile network oligopolies have not so far been an inhibitor of innovation. In future, however, companies like Thingamabob may need more intimate access to 5G networks. Regulators will need to assess whether innovation by IoT providers is at risk of being inhibited by the market structure. And if regulatory intervention is needed, it will probably require greater international collaboration so that companies like Thingamabob can operate on a global scale.

We are still several years away from needing to make decisions. But it is not too early to have a debate about the role of regulation in enabling IoT innovation. When regulatory frameworks are being reviewed – as the EU framework is at the moment – it would be a pity if all the debate about 5G was related to spectrum management issues. It could well turn out that the main focus should be on regulatory reform that facilitates IoT innovation.

***JEREMY GODFREY** is the chair of ComReg, the Irish communications regulator. The opinions expressed in this article are his own.*