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by Richard Feasey

Is the Internet a success?

And if it is, who pays for it?

At first sight, the internet appears to be an enormous success. The people involved in the internet tend, by nature, to be enthusiasts and there is much to be enthusiastic about. More than a quarter of the world's population is online today and levels of usage continue to grow strongly around the world. Most of today's growth is being extended by mobile devices into parts of the world where fixed infrastructure is less developed. Usage is being driven by richer services, better devices, and the continuous migration of tasks and activities from the physical to the digital world.

In Europe, the internet already accounts for about a third of our total media consumption and is growing by about 20% a year. But revenue is growing by only about 8% a year. The internet might take more of our attention but it captures less of our wallet.

The relationship between these two numbers is something we will need return to.

Everyone agrees that the internet has generated an enormous amount of what economists call 'consumer surplus' around the world. In laymans terms this means we are able to do new things which we value and to consume a lot more of the older things at much lower costs than before. The costs of obtaining news, music, video or other content through legitimate channels are all much lower on the internet than via pre-internet channels. Much of this content can be obtained illegally for free. Many people now argue that the internet is now a 'critical public infrastructure' – like the electricity grid or the roads network it underpins a wide a range of other critical activities like supply chain management, banking, healthcare and education delivery. And we all know it provides a tremendous platform for innovation and collaboration.

But unlike the critical public infrastructures of the past, all of which were built and financed by taxpayers, the internet has been built using private funds. Although the US Government, in particular, played an important role in the very early days of the internet and although its non-profit origins still influence what we might call the culture of the internet, the vast global infrastructure which supports the internet has been funded by private investors.

In recent years we have seen various Government initiatives to use public funds to upgrade some of the local access infrastructure for the internet, generally through the subsidy of various fibre networks. But I think we can safely assume that the vast majority of the investment required to sustain the internet will need to come from private funds in future.

This matters because whilst the internet has clearly produced massive gains for consumers, it's financing requirements mean it also needs to generate what economists call producer surplus – profits for firms. It is here that the internet has been less obviously successful over the past 30 years or so.

The dotcom crash of the late 1990s was the first time it became obvious to most that the economics of many internet businesses were very uncertain and some were simply bonkers. It became clear that firms had been able to raise capital without working out how to monetise the services which they offered for free. Other firms who did try to charge for services, such as the core infrastructure providers like MCI Worldcom (for whom I worked at the time), created markets with large fixed costs, massive oversupply and very low marginal costs – a potent cocktail which drove a collapse in pricing which proved great for consumers but terrible for investors.

A lot has changed since then, but the economics of the internet remain no less challenging. In the intervening years a lot of excess capacity has been available to soak up the growth in internet traffic without requiring large additional investments. But at some point significant new investments in capacity in both the core and access networks will need to be financed in order to support the internet's continued growth.

Internet economics

Just how uncertain the internet's economics are has also been obscured by the cross-subsidies that have flowed between the offline and the online worlds. This makes good sense when the internet is complementary to a core offline business, but it is becoming more difficult to sustain when the online business cannibalises its offline parent. The classic example of this is traditional media such as newspapers and music distribution. Newspaper industry revenues in the US and Europe are falling by almost 7% a year. But online revenues have been negligible and have remained flat at the same time. This is why everyone is watching Rupert Murdoch's experiment with online paywalls at the Times newspaper.

Scott Wallsten has made the same point recently when he pointed out that a lot of internet activity does not create new economic output- it simply shifts it from the offline to the online world[1].

I should add that there are parts of the internet where investors have made very healthy returns over the past decade. The value of some of the world's leading software and internet service companies have increased 5 fold in the past 5 years. These firms tend to operate in parts of the internet value chain with low capex requirements and strong network effects where one firm can dominate the market – operating systems, smart phones and search are all obvious examples. The aggregate market value of leading content and infrastructure providers has, in contrast, fallen over the same period.

Overall I believe it has been consumers not other internet companies that have been the clear winners. Yes, there has been a significant transfer of value amongst players within the internet. But I suspect this is nothing like as big as the transfer of value from producers as a whole to consumers as whole over the same period. The question is: 'can this continue?'

(Mis)pricing the internet

The short answer has to be 'no'.

The core and access networks – the pipes, routers and wireless connections – together require global capital expenditure of about $215 bn a year[2].

That's 75% of all the capex spent on the internet.

Yet infrastructure and internet access providers earn only about 15% of the revenues generated by the internet.

And this misalignment looks like it could get worse rather than better.

This is because the internet services which are driving the demands for new network investment are often not generating any revenues for anyone. In 2008 about 75% of the total internet traffic generated by consumers was video streaming and file sharing. These services

1 http://www.techpolicyinstitute.org/files/the%20future%20of%20digital%20communications%20research%20and%20policy.pdf

2 All figures taken from AT Kearney's study of the Internet, available at http://www.vodafone.com/etc/medialib/public_policy_series.Par.21246.File.dat/public_policy_series_11.pdf

accounted for only 8% of the revenues generated in that year.

What is to be done?

We all know that revenues and costs get misaligned when prices send the wrong signals to users about the economic consequences of their behaviour. 24 hour YouTube at 2Mb/s for €10 a month is not a sensible pricing signal. It's not the fault of users – they rationally respond to the signals they are given.

It is not easy to generalise about what's wrong with the pricing on the internet because it facilitates a huge range of pricing models. Some of these are very simple – network operators selling undifferentiated internet access to one set of customers or simple peering relationships between backbone providers. Others are extremely complex, with very precise price discrimination between customers on many different sides of the market, as we see with search engines.

But it is at least clear [with the benefit of hindsight] that many of the internet access pricing models offered by network operators create poor incentives on both sides of the market:

users sold 'unlimited' internet access behave as if the marginal cost of providing internet access was zero and swamp the network with their usage

content creators and service providers obtain access to their retail customers through transit and peering agreements in which the cost of access is again effectively zero, giving them no reason to manage or even consider the demands which their services place on the network infrastructure

I am told that some protocols send duplicate packets across the network if they detect congestion – something which only makes sense if you regard congestion as costless

It is equally clear that fixing these problems and developing the right pricing signals for the internet requires new pricing models, new industry structures or more likely a combination of both. This is becoming urgent because, after years where demand often lagged supply, the industry – particularly mobile operators - is now facing the challenge of managing scarcity for the first time.

What does the solution look like? We do not yet know what form these new pricing models or new industry structures might take – and the twin constraints of commercial confidentiality and competition law prevents me from saying too much on this topic. But some things can be said and were recently said by Vittorio Colao at Nokia World[3].

It is already clear, for example, that 'unlimited' undifferentiated internet access is not sustainable and that it will have to be replaced by more differentiated propositions which, in the case of mobile networks, are optimised for the use of particular services or particular users. This means some users get a greater share of the available capacity in a given cell in return for a higher price. Vodafone is already doing this in Spain and the UK.

We can also better align prices to cost – as with the introduction of 'out of bundle' charges announced by AT&T in the US and by several European operators.

And we can limit particular applications at particular times if the user is not willing to meet the costs that they impose on the network – as with P2P filesharing.

No doubt there will be much more innovation and more sophisticated forms of retail pricing in future. This will be enabled by network management tools.

Less certain is whether and how network access and other infrastructure providers might introduce prices to generate revenues from the providers whose services or traffic they carry. There are several suggestions here, with network management again being a key enabler:

- some talk about offering prioritised access for applications like time critical medical applications, rich voice telephony services, high definition video services and high performance multi-player gaming, or cloud services, all of which may require something better than best efforts access in future and all of which might generate sufficient revenues to support wholesale charges. There are few real world examples of this today, but the CDN market demonstrates that some wholesale customers are already willing and able to pay for better performance over the internet infrastructure and this model would simply extend this all the way to the user device at the edge of the network.
- others talk about offering additional functionality, such as operator billing or access to

3 http://uk.news.yahoo.com/16/20100914/ttc-nokia-world-data-caps-here-to-stay-6315470.html

location information, which would allow the internet service developer to monetise a service in a way which they could not otherwise do, or do as easily. The Wholesale Applications Community, of which Vodafone is a leader, is a mobile industry initiative expressly to address this kind of opportunity.

» others talk of imposing 'data termination charges' for internet traffic which they deliver over their access networks, presumably replacing peering. It is not clear whether these charges would be applied unilaterally or whether they would require some form of intervention by the regulators to set multilateral charges. No regulator has yet made such a proposal.

Which of these new models will work and whether they will allow us to address the investment challenge of the internet is simply unknowable at this stage.

Change is only a problem if you think the status quo is perfect. Although it is the firms and their investors who face the most significant challenges, I want to make a few comments for regulators and policymakers.

Policymakers have not had to engage much with the internet in the past. To the extent that public policy and regulation applied itself to the internet over the past decade it has been in the relatively obscure but important areas of how the technical governance and management of the internet is undertaken through ICANN, and in the areas of child protection and copyright law. The copyright issue addresses some aspects of the commercial challenges of the internet which I have been describing, although in my view tackling piracy will prove a lot easier than finding a model for consuming lawful content over the internet which earns adequate returns.

More recently, we have seen the emergence of a debate about 'net neutrality' which to many people is a question about consumer rights and freedoms when large corporate or Governmental interests might have reason to try to block or restrict access to various things on the internet.

Although there are many people who are genuinely and understandably concerned with these issues, it is also important to recognise that the 'net neutrality' debate is turning into an equally profound debate about which commercial models can play out in future. The questions involve whether operators can offer differentiated retail tariffs such as I have described and whether and when they can charge wholesale customers.

On this, I think it is obvious that the best response from policymakers is to accept that nobody, least of all regulators, is in a position to formulate rules that will answer these questions today.

Does this leave nothing for policymakers to do? No. The first thing they should do is to understand how the internet works and some of the economic challenges it faces today. Having been largely unregulated to date, the internet is often misunderstood by regulators. More data would help the debate.

We must also treat the internet as a normal economic market and not as something imbued with special powers. Some of those involved in the internet used to argue that the new internet economy meant that conventional economic and anti trust assumptions could be suspended. As we have seen, the competition in the internet works as imperfectly or well as most other markets.

Internet regulation should also be consistent with the way that we go around regulating most other markets. We do not require every firm to offer the same product in other markets, so it makes no sense to require network operators to offer the same standardised internet access either. Good regulation should always be about expanding choice, not restricting it.

Above all, we can expect more debate and more complaints to regulators as the internet strains to accommodate these new commercial models and economics plays out. Some people may end up paying more for things than they would wish or than they have been accustomed to in the past. Quality may not always improve. This does not mean anything bad is happening - unless you believe that where we are today is perfect. I have tried to explain why, for many people, it might not be.

Richard Feasey is Director of Public Policy at Vodafone Group. This viewpoint is based on comments presented to the IIC Annual Conference 2010 in Barcelona, Spain. See http://www.iicom.org for details.