



Dangers of fibre investment in the local loop

Telco financial failure *is* a potential outcome

April 2013

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Important note

This paper is a discussion document only. The purpose is to provoke debate and action.

Any ideas expressed need not represent the views of Telzed Limited or any clients.

Document history

This report was original published in February 2012. This new 2013 version includes additional material on local/regional broadband initiatives that have their own specific risks

Fibre technology works – it is faster than copper

There is no doubt that fibre access network technology has matured and it is technically viable. Deployment in the “local loop” has moved beyond trials and many fibre access networks are in place. There are various alternatives. The main ones are:

- Point to point fibre (P2P). This gives one fibre per customer from a head end perhaps in the street or else more often in a remote central exchange site
- Passive optical networks (PON). One fibre pair is used to a street location. The shared fibre’s signals are then split over individual final fibre links to the customer’s premises
- Hybrid fibre-copper. The fibres only extend to the street and then the final connections are over copper wires.

There are relative advantages of each. P2P gives the greatest speed per household (100Mbit/s and much more) and individual fibres may be easily used by alternative service providers.

Shared fibres in a PON reduce costs, but it makes it is less easy for alternative service providers to make use of the fibres. Dark fibre is not really practical. They usually have to take some type of electronic bit stream service, as the optical signals in the shared-fibre are mixed up.

Using copper for the last drop reduces costs but it limits the maximum possible speed, perhaps to 20 or 30Mbit/s (or more with some new technologies). Re-using the existing copper has obvious advantages as the “final drop”¹ fibre-installation to each premise can be complicated and it is relatively expensive, even if the length is short.

So why not deploy fibre?

Whatever technology is used, deploying fibre to the premises requires very significant capital investment. This *may* be partly countered by lower operational costs². The business case is not clear - if it were, we would all have fibre by now.

The required investment depends on both the locality and distance: city areas and buildings with many customers require lower investment compared to sub-urban and rural areas. This follows from the economic sharing of the cable, duct and system costs. More sharing reduces the cost per premises. This is a probable factor behind the higher penetration of fibres per household seen in Japan, Korea or Hong Kong. Other factors are also likely to have an impact, such as: the competition levels; regulatory structures; consumer preferences; and the views taken on investment risk. The business case is certainly clear in some locations.

¹ The “final drop” links the street cables to the customer. It may be underground or over poles

² There is some evidence that fibre systems may have lower operational costs: less fibre failures compared to copper plus electronic equipment is configured and managed remotely. We note that some reductions may be due to moving the new fibre deployment underground, when the old copper was overhead (which has lower initial investment cost but is more fault prone)

The investment is large, even if deployed only in the more dense locations or to the customers with the greatest ability to pay. Both the risks and the required investment rise significantly if the rural areas are to be covered. Here, the business case is less clear.

In part, the costs are ameliorated using hybrid fibre-copper solutions in more expensive localities. The excessive costs to address some customers may lead to a “digital divide” where only a percentage of the population can benefit from fibre investment. Others must remain on legacy copper or else make use of wireless technologies³. Less developed economies tend to have little or no copper to build upon, so the options are more limited, plus they are further constrained by the lower incomes to pay for the new investments.

Investment decisions have to consider:

- The required investment per household
- How investments vary by location
- The transition costs (copper to fibre)
- The costs relative to copper
- The revenues.

The cost side of the equation is relatively easy to solve. There have been many fibre deployments and so a solid analysis of the cost can be made. These costs naturally rise as more customers are addressed. As more rural and remote customers are covered, then the cost per customer rises. The data is available and so a business *cost model* can be made.

This is all part of normal business case evaluations. “Added spice” to the equations comes from additional factors:

- Demand side risks. The take-up rate, what services are to be delivered and resulting revenues, are not certain
- Regulation. National Regulatory Authorities (NRAs) must intervene if there are competition issues and, as there can often only be one fibre to a street or premises⁴, the NRA will need to consider how competitive service-supply can be encouraged. Alternative providers may need to gain access to the fibre. What form will that access take? At what price?
- Regulatory risks and uncertainty. Current regulatory debates, especially in the EU suggest there are real risks that future NRA actions could be adverse or else may alter over time.

Arguably the biggest issue is with the revenues – if these are high enough and there is sufficient confidence, then all the other risks can be handled. Revenues are a function of:

³ We do not consider these options here. In principle new LTE wireless may give high speed access to customers at a relatively low cost per premises. However the costs will rise depending on the traffic and user-density, and the speeds are unlikely to match fibre

⁴ Access costs are high – so it is usually unrealistic to have more than one access cable competing in the same street, except in a few areas, as that would imply almost double the investment and half the net fibre utilisation

- What are the services delivered (fibre in the loop is only a technology – customers buy a *service*)?
- Price per service
- The *take up* of services – how many customers will buy the services and over what time? This is also affected by the lower prices for slower speed (copper based) broadband – how many will migrate to faster fibre services or prefer to pay less for less performance?

If fibre costs are well understood, then why are fibres not being deployed in almost all areas?

The simple answer is that the other factors in the business plan do not make a robust business case – there is no certainty that the investment will be recovered except in the better locations. There are too many unknowns and variables in the demand and revenue side. Prudent businesses must cover the risks and make a return that is commensurate with the risk.

Is it time for Europe to meet the Digital Agenda or other goals?

The EC has set a Digital Agenda – all customers to have access to >30Mbit/s services and 50% of customers to have access to >100Mbit/s by 2020. These are laudable aims. Other countries have their own visions and pressures to increase the access speeds. This creates political pressures and in some cases, political interference. This can result in investment aids (these should make the investment easier and reduce risk) or regulatory changes that may be positive or negative.

Consumers can certainly benefit from faster broadband access and from more multimedia service such as TV or video on demand. There are surely economic gains from such services. However these are mostly not new services – they exist now and so are “simply” improved versions. The incremental benefits are therefore, arguably, relatively low. In contrast the wider economic benefits of broadband compared to not having it are very clear – there are many studies that show economic gains from having broadband (from all of the business, educational and government services that can be delivered over broadband).

There is no clear evidence there are radically new *telco services* that will generate new revenues and new economic welfare gains for the wider economy. Building fibre on the basis of some unknown form of future “3D interactive video” is clearly a very risky approach. The Internet history *has* shown that new *internet services* and novel applications will arise – we can be certain of the emergence of new phenomena in the way Google and Facebook have impacted internet services. New e-businesses, services and trading methods will emerge and these will also benefit from more broadband access. Government and education services will develop and will benefit from more (faster) broadband. It is however much less certain that these will result in a value chain that will be able to pay for the telco’s fibre deployment. Consumer gains or national economy increases need not result in the telco recovering its

investment. The gains are at the two ends of the value chain and the telco is a “bit carrier” in the middle⁵.

There are many reasons why investors should be wary about making the investment. There is a risk of major financial failure. All telcos invest in new technology and services and some of these are fail to meet expectations, some are major successes. This is covered in normal risk and return business analysis. But, the fibre investment is much larger than seen in most other telco services.

These issues suggest that telcos should be very wary of meeting the Digital Agenda, if they are doing all of the investment themselves and will try to over the digital divide.

Telcos could fail because of access fibre investment

The business case is complicated. The risks are high and many factors are unknown. Pressures from the public, NRAs, ministries and governments are high. These can easily combine and, in the case of a large telco investment, this could give catastrophic results:

- The telecoms industry has a history of major failures - in some cases the business cases did not add up. Hindsight is of course always perfect, but some of the failures around the Y2000 period were foreseeable
- Managers are open to persuasion – political and public pressures could lead to incorrect business case evaluations⁶
- Risks are high if the business case is based on new services, when these are not yet defined and the value chain is currently uncertain. The telco becomes a low value “bit pipe” to the customer
- Some telcos may be panicked by the falling traditional service margins and gradual erosion of broadband markets by mobile, cable and other providers. This failure does not mean the fibre business case becomes better
- The demand (volumes and revenues) may not be there.

The last item is the key point. Fibre costs are high and only a small amount of the costs are avoided if a customer does not take a service:

- Even today, many customers only require a basic phone or else prefer using mobile (wireless services). They will not pay more for a fibre
- More consumers are moving to become all mobile. The fibre investment is then totally unused – increasing the unit cost for others
- Many customers can live with slow broadband and/or will not pay more for the higher performance – prices are effectively fixed by the current services⁷

⁵ Some telcos, sometimes with regulatory assistance, have tried to control the use of the Internet and so block new services to avoid the traditional revenue streams being eroded. The national/consumer economic implications and competition implications of this type of approach are very clear but are not in the scope of this paper

⁶ This is not helped by industry practices where decision makers may not be held responsible for the outcomes that may not be clear until several years later. A bonus may be for managing the investment – not making a profit from it

- Pay TV and video on demand are only of interest to some customers
- TV and video are rapidly moving to “over the top” services via the internet. OTT services give almost no direct revenue to the telco. However these may be the saviour for the telco. Consumers want the services and so need fast broadband. This is currently one of the main drivers for very fast broadband take-up: “TV saves the telco⁸.”

There is some evidence therefore that both the demand and willingness to pay *significant additional* amounts for the fibre, are limited. All customers may want 100Bbit/s, even if they rarely need it, but may not pay more for it. TV/video is currently the main demand driver, but there are questions over how much this will increase the price premium customers will pay. This lack of fibre uptake and limited revenue sources for the telco are *major* sources of potential failure. This demand-side of the business case has not been receiving the same level of analysis as has the costing and pricing side of services⁹- the unit cost depends on the demand and if this is 80% or 40% of premises, then the net cost almost doubles.

The demand and revenue side of the equations are as equally important as the cost analysis. The current revenue pillars of telecom are: voice calls (including line rental), broadband internet, TV and video on demand (VoD). Take up of each is very variable – it depends on the country, customer segment and availability of services, which in turn depends on the fibre deployment. It is easy to get the predictions wrong.

One history lesson is relevant to current debates on what price should regulators force on the incumbent (dominant) access network provider. An international carrier built transnational fibre and ducts. The expected revenues were missing. The spare dark fibres and empty ducts were then sold at close marginal cost, on the grounds that this is better than no revenues. This allowed competing services with low market entry costs – *adding* to the price erosion. This commercially-led business failure could be mirrored by regulatory influenced outcomes, if costs are not properly predicted and recovered in sustainable prices.

Regional and local telco initiatives face bankruptcy

Many areas are marginal and so are not being addressed by the main telcos. These customers are in the “digital divide” and are not economic or else only become economic to serve with additional financial assistance or over time as costs fall (new technology). Many countries have therefore seen local initiatives to deliver broadband in the under-served villages, towns or regions. Many types of funding can be used: private or local government and mixtures of both. Many technical solutions are used as well: fibre, wireless, microwave and mixtures of each. Copper can also be used for the last for the last link into premises.

⁷ A customer may have a few Mbit/s DSL service. It is hard to force them to pay more for the same performance (even when fibre *is* more expensive) especially if the increased performance may not be really needed – willingness to pay is critical

⁸ This logic leads to telcos *encouraging* OTT services and not restricting access or traffic flows. Concerns arise when the telco is also a supplier of the same OTT services or has similar downstream TV services. This is a clear competition issue if there are restrictions – something true whenever a telco restricts other broadband/internet services and it has its own competing service

⁹ See for example the EC NGA recommendations and 2011 NGA costing Questionnaire

http://ec.europa.eu/information_society/policy/ecomm/library/public_consult/cost_accounting/index_en.htm

These options combine to enable bespoke solutions that enable high speed broadband to be delivered without having to wait for the main telcos to build out fibre broadband to the locality. These initiatives should be encouraged. The locality benefits from getting the broadband and this can help the local economy. Consumers get the services they want and there can be indirect gains for example from house price increases or new businesses.

There are clear dangers for these initiatives, and some recent failures demonstrate that care must be taken. Since local investment approaches vary so much, it is hard to give guidance that applies to all situations. A number of key issues still need to be considered:

- The local initiative has to still be based on a sound business plan. Even if the investment is partly based on monies that do not have to be all paid back or else those contributing gain from the indirect benefits (say house price changes or new industry in the area), a plan still has to be viable
- The local telco is still a business and it has to be thought through. Even if it exists “simply” to invest in fibre and lease that back cheaply to main telco it *must have* a thought-through business plan¹⁰
- The consumer take up rates, prices, revenues and cost equations have still to be answered.

A number of profound problems must be considered:

- Local solutions tend to need bespoke initiatives. Mixing technologies and (say) sharing systems with neighbours or agreeing to power network systems at home to help make it work. Equipment can be selected from various vendors. This makes a solution that works. But larger telcos and ISPs will not want to re-use these systems or customer contracts that have “odd” sharing or equipment powering obligations. ISPs are generally set up to use the wholesale services deployed by the main telcos. Huge investments are made to make these interwork to give consumers a standard service and to reduce operational costs. Systems have to be automated, with minimal manual intervention. The local solution might not fit with any major telco’s own network IT or processes.
- Even just investing in basic fibre systems might not fit with the larger telcos or ISPs: are the systems compatible with the service providers own systems? Are there compatible records to locate the fibres for fault repairs? A local initiative to provide wholesale services for the major service suppliers to access the customers, needs to be properly planned
- Eventually the major telcos will probably address the local region¹¹. In this case the local investment may be almost completely undermined: the telco will probably not want to buy the non-standard systems, assets and customer service contracts – they do not fit with the business, unless built to telco standards (and this undermines the local-initiative options that were a bonus point of the venture in the first place)

¹⁰ Local plans do not have to be based on selling wholesale services to telcos or ISPs – the business can deliver its own retail services

¹¹ With national/regional aid or as costs of deployment fall

- The major telco cannot simply be held back by regulators from competing or investing in the local region – there are competition issues to consider and there will be some customers who did not join the local network business who need to be served
- The major telcos have *national* plans – it is then hard to expect them to have special solutions for each local village that has already created a local broadband solution.

The net effect is that many local initiatives must expect to be effectively bankrupted as the major telcos advance. This is not actually a “failure” in the normal sense:

- The local consumers gain from having the broadband now, and this could be many years ahead of the main telco’s eventual move into the area
- This eventuality should be planned for: make sure it is in the business plan
- *Some* of the assets may be sold to the main telcos – reducing the net impact.

Therefore bankruptcy could be considered the normal outcome. Local initiatives therefore probably need to have a shorter term plan and certainly need to have a termination option. How long the venture remains viable depends on the situation: the more remote and less attractive to the main telcos the region is, then the longer the solution is viable. This business termination outcome is not inherently bad – it is simply something that has to be considered. Given that local investments sometimes do not have normal business cash flow or investor-return obligations to meet (due to the indirect benefits and different financial sources), planning to write off much of the investment, is not necessarily a bad result.

Conclusions

This paper does not address the full issues of: fibre technology; cost analysis; pricing; investment risk; and fibre regulation. It simply highlights some of the main issues and risks. These combine to contribute to explain why fibre deployment is currently often only in limited areas and universal coverage is not happening. Risks are reduced by addressing lower cost areas and using fibre-copper hybrids (where copper already exists). Where the business case is easy, fibre deployment should be accelerated: fibre *is* the better technology.

There are many aspects of the business plan are uncertain – this increases risks. With the impact of failure being far more profound (company failure is a realistic outcome) than for most telco investment decisions, a prudent telco will *and should* hold back.

Regulatory and political factors contribute to the risks.

Getting these factors wrong can lead to company failure or investor losses.

Arguably the uncertain demand and the related revenues create the greatest area of uncertainty – there is often not enough solid data to show what percentage of households will take up services. Anecdotal evidence suggests the take-up could be low and/or else the take up is only at the legacy-service revenues – there is probably no new source of *telco* money even if more consumer spends are made with OTT service suppliers. This is supported by the UK market data (from Ofcom) published in 2012, see also the Telzed analysis report on this.

The implications of this are that telcos should hold back on investment in riskier areas and investors should be aware of the realistic possibility of financial problems in a few years’ time for those who get it wrong.

Regulators and governments need to be careful of the incentives and pressures they apply. How will they impact the risks, the prices and could they undermine the business case? A case in point is the prices for both access fibres *and* legacy copper that are opened to other operators. This impacts consumer take-up rates *and* revenues - the two most sensitive areas in the analysis.

Careful actions are needed by all parties – regulators, governments, investors and telco operators. Everyone wants fibre broadband at the right price. Failure and the possible “fire-sale” telcos¹² that will follow, need to be avoided.

Local/regional broadband initiatives have their own special risks and benefits. These ventures should be encouraged. They still need to have properly thought through business propositions and must also understand the costs and returns. They have additional issues to consider and may have to assume an effective bankruptcy as potentially the normal outcome. If the local venture plans to link to major telcos or ISPs then it must consider how (or if) the assets and systems can be used. Compatibility with the standards used by the main telcos and ISPs are significant issues. They cannot expect major businesses to accommodate local solutions even if they are optimised for the location, as the big players cannot afford to adapt to non-standard systems within their national business. The market is usually dominated by the incumbent telco’s wholesale supply and re-sale of these services to ISPs – try to comply with this or else deliver a complete bespoke end-to-end local solution. There are pros and cons of each approach.

For a local initiative, “bankruptcy” when the major telcos eventually move in, may be the expected outcome. Therefore this must be in the plan. This is not necessarily a bad outcome.

Possible actions

A number of areas should be addressed:

- Risk analysis – what are the probabilities of various outcomes? Can a telco risk the investment if there is only 50% chance of the required take up? Regulators must also look at this when setting prices
- Evaluate the prices and demand including the alternative providers – mobile/LTE and cable TV
- Look at the demand and impact of customers who only take legacy services and prices (basic telephony and low speed broadband)
- Optimise delivery using fibre-copper and copper vectoring technologies and step back from a fibre to every home

¹² A distressed telco can be sold off (in a “firesale”) or merged with others. Assets (and debt) are mostly written off and so the new company that emerges from the ashes has lower costs – but this gives a distorted view of the true long run economic costs and this impacts other telcos who cannot compete with the firesale telco

- Examine closely the pricing (and costs) of services over legacy copper – this impacts both the take-up and the prices of the fibre services. What is the optimum approach to maximise value?
- Resist political/external pressures to install fibre. Ensure decision makers are responsible for their own actions' outcomes
- Regulators need to give clarity to allow commercial decisions
- Regulatory or government intervention has a role – especially to reduce risks such as with assistance in the more expensive areas or to devise schemes that allow competing investors to combine and share risks and rewards
- Factor in regulatory effects – the prices set for wholesale copper and fibre have a huge effect. Where the outcomes are unclear, the risks are higher. Can you influence the outcomes?
- Telcos might *encourage* OTT services (TV, video) as this is the primary driver for high speed broadband take-up. Although this causes higher network-capacity-costs, it encourages high speed broad band take up and it may help with a small price premium. Restrictions to these services, especially if the telco also has similar downstream services that could be “cannibalised” by their growth should be examined from a competition view point and also from a business strategy view – it might be counter productive
- Identify how a local broadband initiative can sell its local services or assets to larger national ISPs and the major telcos, who are not geared to using a bespoke solution
- Local broadband businesses may have to have an unusual business plan with “failure” when the major telcos eventually move in, as the normal outcome: this can be still be positive overall, both for the consumers and the local economy
- Local initiatives must still have proper business plans and well thought through operations. The business case, technologies, risk factors and funding approaches may be different from the larger telco's broadband networks, but they still have to understand the commercial reality and risks. They are still ruled but the same fundamental laws of business economics.

Telcos large and small or local/regional broadband initiatives, must all keep in mind that “Reality must take precedence over public relations.” Forgetting this will have inevitable consequences.

Please contact Telzed for further advice and help.