



**NEW ZEALAND INSTITUTE FOR THE STUDY
OF COMPETITION AND REGULATION INC.**

STRUCTURAL SEPARATION MODELS AND THE PROVISION OF ‘DARK FIBRE’ NETWORKS: the case of CityLink

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OVERVIEW

Policy objective

- encouraging investment in fibre broadband networks

Regulatory tools

- access regulation, separation (structural/functional)
- ‘dark fibre’ separate from other network elements

Implications for sustainable business models

- investment incentives for embryonic networks
- addressing risks of asset stranding

Case Study – CityLink

- long-standing commercial ‘dark fibre’ provider

Lessons for policy, regulation



FIBRE BROADBAND NETWORKS

Superior transmission speeds

- presumed to become dominant fixed line access technology

Very high fixed, sunk costs

- natural monopoly cost structures???

How to regulate them?

Access regulation

- historic precedents
- but at some cost to core network investment incentives
- not clear how they will work with different technology



SEPARATED CORE INFRASTRUCTURES

A strategic **AND** regulatory remedy?

Regulatory remedy

- separate network ownership from retail operations
- addresses (price and nonprice) discrimination by vertically integrated network operator in downstream (retail) markets

Strategic ‘remedy’

- separate ‘dark fibre’ component from other ‘intelligent processing’ and retailing layers
- echoes computer-centric view of the internet as a ‘dumb core, intelligent fringe’ infrastructure
- unites regulatory, end-user interests



SOME NETWORK ECONOMICS

Network infrastructures

- long-lived investment
- very high fixed, sunk costs
- incurred long before services sold to garner return on investment

Scale economies

- average cost per connection decreases as connection numbers increase => market power
- substantial risk of asset stranding if insufficient connections sold at prevailing market price to recover costs



INVESTMENT IMPLICATIONS (I)

No competition

- market power => prices set to recover costs at any given demand
- historic model – regulated monopoly franchise excludes risk of asset stranding

With competition:

- e.g. monopolistic competition with differentiated infrastructures (cable, copper, fibre, wireless, satellite)
- some (but very limited) ability to set prices
- investment will occur (absent subsidies) only if
 - costs truly lower than competitors for substitutable services
 - pent-up customer demand exists for differentiated product qualities



INVESTMENT IMPLICATIONS (II)

Without such assurances, investment is withheld

Risk of asset stranding/investment 'hold-up' higher the higher are

- fixed and sunk costs
- future consumer demand uncertainties
- actual and/or expected competition from other network operators

Exactly what is facing prospective fibre investors



ENDOGENOUS 'RESOLUTION'

Challenge: reduce competitive threat from bypass infrastructures

Achieved by sharing risks/costs of asset stranding across the supply/demand divide

- contractually
 - 'locking customers in' long enough to recover fixed costs
- ownership instruments
 - customer internalises risks of asset stranding by making a 'credible commitment' by purchasing some or all of the infrastructure
 - 'credible commitment' by purchasing co-specialised asset
 - owning the entire infrastructure (e.g. consumer co-operative)



HISTORIC EXAMPLES

Electricity lines/generation

- co-specialised investments: lights, cooker, water heater

Early telephony networks (New Zealand)

- political petition for permission to pay Post Office to lay lines/exchanges (co-specialised, sunk investment)
- contractual commitment to purchase services indefinitely into future
- confiscation of customer-funded equipment if payment missed/connection terminated (customer bears sunk costs)



SEPARATION MILITATES AGAINST CONTRACTUAL, OWNERSHIP RESOLUTION

Prevents resolution by vertically integrated customer ownership

Current demand, technology uncertainty makes it highly unlikely separated retailers will engage in long-term contracts with network operator

- customers (retail and wholesale) can (and will) defect to new, cheaper, more highly-valued technologies infrastructure
- minimal costs of co-specialised asset stranding (modems, dongles, very low cost – often given away)



CONSEQUENCE

Suggests business case for separate 'dark fibre' networks is economically unsustainable

'Dumb core, intelligent edge' networks a technological possibility but a commercial impossibility



YET CITYLINK

Formed in 1995 in Wellington, New Zealand

- arose from City Council internal network service provision
- to provide a neutral “open access infrastructure available to service providers and users alike”

Core product is a citywide dark fibre network

- developed entirely from private capital
- has steadily expanded into other markets (e.g. Auckland)
- amongst the stiffest infrastructure competition in NZ
- serves some of NZ’s most information intensive industries
 - business, government, including Bank of New Zealand, Victoria University, TradeMe, Weta Workshops



CITYLINK'S BUSINESS MODEL

1. Fibre is laid only to locations where there is an end customer committed to becoming a 'partner'
2. 'Partners' make co-specialised investments
 - e.g. housing, electrical facilities, technology to turn dark fibre into useful products and services
 - the larger the investment, the greater the assurance to CityLink that the customer will not 'defect' before CityLink's investment is recovered
3. 'Partners' justify their own investments by using contractual lock-in to bind downstream customers
 - e.g. building owners 'bundle' information services with fixed term leases



‘DARK FIBRE’ BUT NOT ‘SEPARATE’ BUSINESS MODEL

Each arrangement is unique

‘Partnership’ reconstructs the effects of a vertically-integrated firm

Derives its origins from models of commercial information technology network provision

- proprietary (“private”) networks (in-house or within-alliance)
- partners’ locked in’ to using ‘internally-provided’ services
- demand uncertainty reduced by internal forecasting, demand aggregation and control over purchasing behaviour
- substantially decreases risks of asset stranding



IMPLICATIONS

CityLink's 'dark fibre' business model is not directly transferrable to a 'public access' network infrastructure

- as envisaged by policy-makers, regulators more familiar with telecommunications business models

'Dark fibre' financially viable only under conditions that enable substantive (contractual or ownership-based) replication of vertically integrated provision of customised services

- diametrically opposite to provision of services on 'open access', 'structurally or functionally separate' networks



CONCLUSION

Policy-makers must rethink mandating access regulation, structural and/or functional separation of nascent fibre networks if they wish their deployment to be substantially funded by the private sector

