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Beyond Surface Similarities: Telecommunications Industry Structure Evolution in Finland and New Zealand[1]

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Abstract *Finland and New Zealand share many geographic, demographic and economic similarities. Their telecommunications markets also demonstrate many similarities; but behind these superficial similarities lie important structural differences that influence market performance. By tracing the evolutionary path of each market from the nineteenth century, this paper identifies how ownership and control structures in the very early stages of market development have influenced the shape of each market today. The paper concludes that an appreciation of the different economic histories and cultures in each country's telecommunications market is helpful for understanding subsequent industry responses to changes in regulatory processes and government policies.*

Keywords: telecommunications market, Finland, New Zealand, institutions, economic history, cultures and norms

To a casual observer, Finland and New Zealand share many geographic, demographic and economic similarities. Both are countries on the periphery of their local geographic region. They are also both characterised by specific geographic features (lakes in Finland; mountains in New Zealand) that pose challenges to the development of key infrastructures such as telecommunications, electricity reticulation and transport. Further adding to these challenges, both countries are sparsely populated. They also have similar patterns of urbanisation: both are dominated by a single large city of international scale (Helsinki in Finland; Auckland in New Zealand), but have several smaller regional centres and many local villages.

In the telecommunications market, Finland and New Zealand share a tradition as avid and early adopters of electronic technologies, a factor that may be attributable to their relative isolation (communication being an effective means of lessening their distance from the wider world).[2] Telegraphy featured prominently in both countries in the nineteenth century, with Finland's first telegraph office being opened in Helsinki in 1855 and New Zealand's in Christchurch in 1862.[3]

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Telephones, first successfully deployed for voice transmission in the United States in 1876, were in operation in Helsinki and Christchurch just a year later. Both countries also deployed leading-edge telecommunication networks relatively early: mobile telephony in the 1980s, fully digital networks in the mid-1990s, and DSL technology in the late-1990s.[4] New telecommunications methods were widely available across the countries at an early stage, despite the challenging terrain. By 2005, uptake of both fixed and mobile telephony in the two countries was practically identical: New Zealand had 43.6 fixed lines per 100 inhabitants and 101.9 mobile lines per 100 inhabitants, and Finland 43.4 and 102.7, respectively.[5]

Mirroring this quick technological uptake, both countries were also quick to undergo regulatory developments during the worldwide wave of telecommunication market liberalisation beginning in the 1980s.[6] Initially each country adopted a unique, country-specific approach, but both have subsequently developed regulatory structures and obligations more consistent with the currently prevailing European regulatory orthodoxy.[7]

Defining Differences

However, the extensive superficial similarities between Finland and New Zealand mask crucial underlying differences. These differences have led to a notable divergence in services and uptake in the two countries, particularly in:

- *Broadband use*—Finland has a much higher number of broadband accounts per capita. Despite the fact that New Zealand has lower broadband connection prices and higher quality connections than Finland, more New Zealand customers use inferior dial-up Internet services;[8]
- *Mobile calling*—Finland has much lower mobile telephone calling charges and much higher call minutes per connection than New Zealand;[9]
- *Mobile technology*—although Finland licensed 3G operators before New Zealand (and indeed was the first country to do so in Europe), New Zealand has a significantly higher uptake of 3G mobile technology;[10]
- *Fixed line calling*—while New Zealand's number of fixed line connections remained relatively stable as mobile uptake increased, Finland's fell sharply. Although fixed line calling volume per connection fell in both countries as customers shifted to the mobile market, this fall was far sharper in Finland (decreasing by 39.3%) than New Zealand (12.7%). Fixed line calling volume is now approximately five times higher in New Zealand than Finland.

Such differences beg the question: how, despite the very large number of outwardly similar characteristics, did these two countries end up with telecommunications markets exhibiting so many deeper differences?

To address this question, this paper draws from an understanding (following Melody's framework)[11] that market evolution occurs as a consequence of complex interactions between a number of factors: the technologies underpinning the market, policies governing interaction, and the actions of participants in the market. Participants' actions can be further understood by analysing Koppenjan and Groenewegen's application of Williamson's four 'levels' of formal and informal structures: individual actors, institutions, laws and regulations, and cultures, norms, values and attitudes.[12] Inter-temporal analysis is also important: 'current' interactions are dependent upon previous actions and interactions.[13] Thus, different

outcomes in two markets in the twenty-first century likely have their genesis in historical market interactions and factors.

The following sections of this paper first examine the historical development of the telecommunications markets in New Zealand and Finland, identifying key market factors and interactions. The paper then applies the analytical framework outlined above to draw insights on the two countries' current differences in industry structure and performance. A key revelation is that, although Finland and New Zealand have used nearly identical technologies, their actors, institutional arrangements, legal rules, and cultures, norms, values and attitudes have differed markedly over time. Thus, each country has inevitably developed different policies and market structures, which in turn have resulted in performance differences.

Divergent 'Evolutionary Paths'

Historical analysis shows that New Zealand and Finland's evolutionary paths were diametrically opposed. As in much of the rest of the world, New Zealand's industry was largely controlled by the central government (deriving from the country's colonial heritage and postal legislation imported from England). In sharp contrast, Finland's industry was predominantly decentralised, with the government's active participation subordinated to strong local interests both geographically and with respect to market segments.

New Zealand: A Full-circle Return to Government Control?

The evolution of New Zealand's telecommunications market, illustrated in Figure 1, has followed a broad pattern of government control, followed eventually by deregulation, and—more recently—increased regulatory intervention.

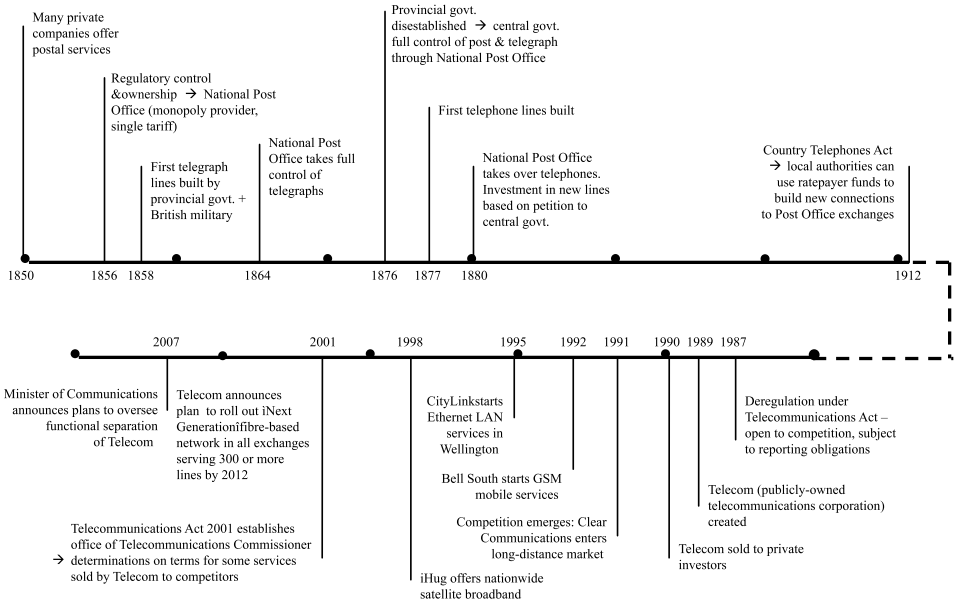

Figure 1. Selected events in the evolution of the New Zealand telecommunications market.

Origins in Post and Telegraphs The industry's genesis can be traced back to its nineteenth century colonial origins—particularly in post and telegraphic services. Originally, a plethora of private companies offered postal services, all charging different rates; but one of the first acts of the first colonial parliament was to establish a national Post Office to take control and ownership of the postal sector.[14] Following the very popular British 'penny post' model, the government established a single, nationwide letter tariff. Legislative protection of the Post Office as a monopoly letter carriage service persisted until deregulation in the 1980s.

Telegraphy in New Zealand was initially undertaken by a mixture of provincial government (Canterbury) and British military (Auckland and Waikato) interests. From 1863, subsequent lines were deployed in conjunction with burgeoning provincial government railways. Post Office officials were quick to recognise the competition that telegraphy posed for their mail services, and in 1864 succeeded in securing legislation to ensure their full regulatory control of telegraphs. Consistent with the approach taken with postal services, one of the first regulatory actions the Post Office took was to mandate a single consistent national tariff schedule binding all operators.[15] In 1866, following the defeat of the Waikato Kingite movement, the Auckland–Waikato military telegraph was sold to central government. When provincial government was disestablished in 1876, all provincial railway and telegraph assets reverted to central government control under Post Office operation.

The Introduction of Telephony and Government Control Following the patenting of the telephone by Alexander Graham Bell in 1876, New Zealand's first telephone connection was laid in 1877. A year later, the first privately owned, commercial telephone service began. However, the government soon intervened to preclude further private sector operations: it passed an amendment to the Electric Telegraphs Act was in 1880, conferring an effective government monopoly in both the connection and calling markets.[16]

From 1880 until deregulation in 1987, the Post Office controlled all telephony investment and industry strategy. Initially, the government considered telephony to be a luxury item, and prioritised investment for administrative and commercial purposes. As a result, new networks were concentrated in central business districts and government-intensive locations. Such investment was of little benefit to the majority of the population, which at that time was predominantly rural, and derived its income from primary industries.

Rural residents had to 'petition' the Governor in Council for permission to install and operate local lines, equipment and exchanges.[17] The petition process was essentially under political control. The government required local residents to pay all capital and operating costs, but allowed only the Post Office to supply, install and operate all equipment. Strict covenants ensured that the resident-funded infrastructure reverted to Post Office ownership if the petitioners defaulted on any operational charges. Local government was precluded from assisting residents in preparing petitions or funding infrastructure until the passing of the Country Telephones Act of 1912, which permitted local authorities to use ratepayer funds to supply wires and connect residents to Post Office-operated exchanges. By 1920 most connections and exchanges installed with private and local funding had effectively reverted to government ownership.[18]

The Post Office also controlled price-setting. It initially determined line rental charges on the basis of a complex set of factors, but in 1883 moved to a single tariff. From 1880, charging for calls between subscribers to the same exchange was

eschewed because it was too 'complex and onerous for exchange staff', thus establishing a practice of 'free local calling'. This practice proved too politically difficult for the government-owned provider to alter at any later stage.[19] 'Free local calling' areas increased in line with the growing exchange catchments as technological capability improved. Once exchange-based transaction costs ceased to be important, the Post Office set local calling area boundaries in line with political considerations, and used revenues from long distance and international calls to 'cross-subsidise' local calls in the ever-growing local call areas.

The patterns of government ownership, investment and tariff setting prevailed largely unchanged through most of the twentieth century. New Zealand's small size and overriding political imperatives resulted in an episodic investment pattern that typically saw the entire network upgraded as a consequence of a single political decision (rather than incremental changes across time as a consequence of changes in the financial, commercial and technical environment). This investment pattern resulted in substantial technological standardisation, but was also characterised by political influence over the distribution of investment and activities.[20] For example, following the 1930s depression the Post Office (along with other government services such as Railways and Public Works) increasingly became a means for distributing welfare benefits. These benefits included discounted line rental charges for specific groups (for example, the elderly), and more apprenticeships and full-time jobs than the organisation needed (as an alternative to paying unemployment benefits). Customers, with no commercial power to alter industry outcomes, were restricted to political lobbying to achieve change.

Market Liberalisation and Privatisation The market began to change in 1984 when the newly elected government embarked upon 'one of the most notable episodes of liberalization that history has to offer'.[21] The government enacted economy-wide reforms based on stabilising macroeconomic policies and a pro-competitive microeconomic policy that minimised scope for regulatory intervention.

As part of the reform process, the Post Office postal, banking and telecommunications services were separated into independent operational units. Telecommunications policy was separated from operational functions. Given the small size of the New Zealand economy, and the high costs of industry-specific regulation, the government favoured generic competition law (in the form of the 1986 Commerce Act in particular) as the main restraint upon firms with a dominant position. The Telecommunications Act 1987 took the reforms further by removing all statutory protections from competition, but created a range of reporting, disclosure and other regulatory obligations for all firms. The New Zealand approach came to be known as 'light-handed' industry-specific regulation.

Following the opening of the market to competition, in 1989 the government corporatised its telecommunications services, creating the Telecommunications Corporation of New Zealand (Telecom). Soon after (1990), the government sold Telecom to private interests. A key condition of the sale was the 'Kiwi Share' agreement, which bound the private owners to cap residential line rental charges, ensure that rural residential line rentals would not exceed urban rentals, and continue to offer free local calls for residential customers.

Within a decade of the 1987–90 reforms, industry performance showed admirable signs of improvement: substantial fringe entry had occurred, real prices for fixed line rentals, long-distance and international calls were demonstrably lower than both 1990 New Zealand and other contemporaneous OECD counterfactuals,

and the ISP market was highly competitive, with some of the highest uptake and lowest prices in the OECD.[22] Telecom remained the dominant fixed line provider (with over 95% of market share in 2003), but struggled to gain a share greater than 50% in the dial-up ISP market, and lost its initial dominance in mobile services to Vodafone in 2003.[23]

Nevertheless, Telecom's ongoing position as a leading market participant led to concerns that its dominance was constraining the sector. Claims that Telecom was behaving in an anti-competitive and predatory way escalated into legal disputes that became subject to lengthy and confrontational court processes. The two most prominent were the dispute between Clear and Telecom over the price of local interconnection, which spanned three years and three court hearings, and the Commerce Commission's 1999 case alleging that Telecom's charging for residential dial-up Internet calls was anti-competitive, which was finally adjudicated in 2008. Both disputes resulted in widespread public belief that Telecom was behaving in an anti-competitive manner, despite findings in both cases that, given the circumstances, Telecom had been acting as any competitive firm would.[24]

Re-regulation and Government Control The perception that Telecom was behaving anti-competitively led to substantial political petitioning, which forced 'light-handed' regulation in general, and Telecom's activities in particular, into the headlines in New Zealand's 1999 election campaign. Upon election, the new government launched a Ministerial Inquiry in 2000 that recommended industry-specific regulation be introduced.

The Telecommunications Act 2001 established the office of the Telecommunications Commissioner within the Commerce Commission, and gave the Commissioner the right to make determinations on price and non-price terms for a range of designated services sold by Telecom to competitors. The arrangements were intended to facilitate agreements only where parties were unable to agree, and thus to remain at the 'light-handed' end of the regulatory spectrum. In practice, however, an adversarial approach (presuming Telecom to be exerting dominance) persisted. Rather than being, as originally intended, an arbitrator in respect of only a handful of disputed contracts, the Commission rapidly became the default forum for brokering every agreement between Telecom and its competitors.[25]

Political petitioning has ultimately proved more decisive for the shape of the New Zealand industry than remonstrations to the Commission, for both regulated (or potentially regulated) firms and their competitors. Upon re-election in 2005, the government immediately instituted a 'stock take' of the telecommunications sector, undertaken not by the politically independent Commission, but by the Ministry of Economic Development (a policy agency with limited industry-specific expertise). The Ministry's analysis resulted in amendments to the Telecommunications Act mandating full local loop unbundling and functional separation of Telecom's network provision facilities from its other operations.[26]

By 2007, resumption of full political control of sector strategy appeared to be complete. Despite the Commissioner twice recommending regulatory oversight of mobile termination rates, the Ministers of Communications and Economic Development instead directly brokered a set of undertakings with the firms concerned. The Minister of Communications also announced that he, and not the Commissioner, would oversee the functional separation of Telecom. Thus, whilst currently the vast majority of sector investment is privately held, it appears that New Zealand's industry direction is once again in political hands.

Finland: From Multiple, Small, Self-regulated Providers to a Few Large Firms[27]

In contrast to New Zealand's centrally- and government-controlled telecommunications market, Finland's market evolution has been characterised by decentralised, local co-operative ownership and a federal model of industry-led self-governance (Figure 2). The Finnish government has confined itself to a role as a single service provider operating amongst many other industry participants. The outcome is a less adversarial industry (compared to New Zealand's), where commercial considerations prevail over political interventions.

State-owned Monopoly Dominance in Long-distance Communication As in New Zealand, Finland's telecommunications market has its origins in the nineteenth century telegraph industry. Historically, the Telegraph Office of Finland (begun in 1855) was controlled by Russian officials. When the first telephone service was installed in 1877, it was unclear who would take responsibility for administering the new service. The Finnish Senate seized the opportunity to assert its independence by taking the fledgling industry under its jurisdiction, and granting itself the right to issue licences to prospective operators, via the Telephone Declaration in 1886. Tsar Alexander III endorsed the decision, and the modern Finnish telecommunications market was born.

The consequence of the Senate's action was that, from the industry's very beginning, local connection and long-distance calling were functionally separated. The Russian-owned telegraph service continued to provide long-distance messaging services for the public, and telegraphy remained the predominant means of long-distance, time-dependent communication for the majority of the public until private telephones became widespread in the 1920s. Following independence in 1917 and the passing of the Telegraph Law in 1919, the state-owned Telegraph Office (later to become the Post and Telegraph Office) assumed full ownership of

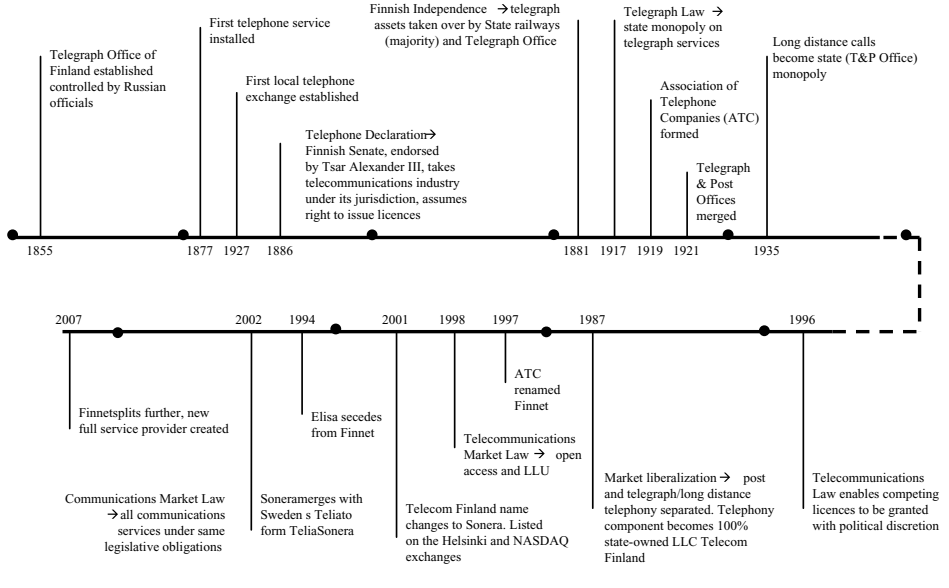

Figure 2. Selected events in the evolution of the Finnish telecommunications market.

telegraph services. This monopoly was expanded to cover long-distance telephone calls only from 1935.

Dispersed Ownership of Local Calling Systems By contrast, local telephony developed along a very different path. The Finnish Senate made an early decision to pursue a devolved, localised model of telephony development. From a fiscal perspective, the advantage of this approach was that all investment came from the private sector. There were no state subsidies. The sector thus developed almost completely without government involvement and political influence.

The Senate granted multiple licenses to build and operate local exchanges, with the first beginning operations in Turku in 1881. By 1938, 815 firms provided 150,000 connections (a third of which were managed by the Helsinki Telephone Association), at an average size of only 180 subscriptions. There was no explicit policy on an 'ideal' or 'preferred' institutional form of the licensee firms. In practice, the Senate granted licences to firms that mostly enjoyed a local geographic monopoly. Some of these firms were private for-profit firms and local municipal authorities, but most were local consumer-owned co-operatives. Co-operatives predominated partly because tax laws at the time favoured co-operative asset ownership over other private ownership forms, but also partly because this was an ownership form that promoted efficient operations and benefited the user-owners. The user-owners' transferable membership shares, direct governance controls, and substantial service discounts (historically outperforming the expected return from a long-term investment in a bank account) gave them natural incentives to ensure good management, service adequacy and prices in line with costs. Because of such incentives the co-operatives were able to jointly develop a set of self-regulatory mechanisms, avoiding the overhead of a government-mandated stand-alone regulatory agency.

The local co-operative firms provided telephony services to both members (shareholders) and non-members, but offered significant connection and fixed charge discounts to members (call charges were the same for all customers). Each co-operative levied its own unique charges, and undertook initial network development in response to demand and locally specific improvements in economic conditions. Because of their access to local shareholder capital, the co-operatives were also able to grow the network in times when access to corporate debt capital was difficult or costly to acquire.

Development of Mega-co-operatives Over time, technological progress resulted in the minimum efficient scale of the telephone firms increasing. In addition, decentralised ownership resulted in open competition between equipment manufacturers, and therefore many different technical standards. Because mergers and takeovers offered the opportunity to address both issues simultaneously, they became a feature of the Finnish industry from its outset. Another driver for mergers and takeovers was the strategic threat posed by the Post and Telegraph Office's expansion into the connection market and long-distance calling. The Post and Telegraph Office's (and later, Sonera's) business model allowed it to cross-subsidise connections from long-distance calling—something that the small local companies were less well-placed to manage.

In response, many co-operatives federated to form 'mega-co-operatives'. The first mega-co-operative formed was the Association of Telephone Companies (later renamed Finnet) in 1921. Over time, most of the small firms either joined the

Association or were taken over by the Post and Telegraph Office (or its corporatised successor, Sonera). Each co-operative firm in the Association undertook its own operations, but co-operated with others in respect of those activities that benefited them jointly, such as brokering interconnection agreements, setting standards, and creating joint venture companies to carry out new business [notably long-distance (Kaukoverkko), international (Finnet International) and mobile (Radiolinja) calling, and data transmission (Datatie) services]. Importantly, the mega-co-operative also provided industry self-governance functions.

Consequently, the industry developed with a strong overlay of competitive tension between the state-owned and private sector camps. The Association of Telephone Companies actively lobbied against expansion of the state's role in the industry, and was able to prevent planned nationalisations in 1931 and 1948. The tension between public and private ownership appears to have fostered the evolution of a remarkably competitive industry in Finland.

Market Liberalisation Market liberalisation essentially began with the passing of the Telecommunications Law in 1987, which gave the Senate discretion to grant competing licences (thereby facilitating the development of a competitive mobile market—previously only the Post and Telegraph Office had been able to legally offer mobile services). The Senate granted the first competing licence for GSM services in 1990. In 1994, the Senate further increased competition by removing long-distance calling from the Post and Telegraph Office's jurisdiction to form the 100% state-owned limited liability company Telecom Finland (later re-named Sonera),[28] and opening the long-distance calling market to competition. The Telecommunications Market Law of 1997 furthered these reforms by requiring operators to lease lines to their competitors (that is, open access and local loop unbundling).

In accordance with European Union (EU) principles, the reforms divided legislative and regulatory powers between the Ministry of Transport and Communications (which has responsibility for formulating policy and issuing licences) and an independent regulator, the Finnish Communications Regulatory Authority (FICORA). FICORA administers industry-specific regulation. For example, it reviews tariffs set by operators, intervening only if there is evidence that they deviate from cost-based principles. FICORA takes no active part in negotiations between firms (for example, to determine access prices). Although firm-specific charges have become the most contentious element of Finnish regulation, the presence of many firms enables FICORA to have access to a rich base of information to benchmark prices and thereby guide its activities, in particular in establishing the thresholds at which intervention is indicated.

Mobile Telephony and Internet Shake Up Industry Structure Although Finnet (formerly, the Association of Telephone Companies) initially flourished in the liberalised market environment—within months of market opening, its companies achieved a market share in excess of 50%—and was largely free of Senate involvement, it was not immune to damaging internal political forces. The mega-co-operative's stability relied critically upon the alignment of the objectives of its smaller and larger firms (the largest of which was the Helsinki co-operative, subsequently Elisa, which had as many subscribers as all the other firms combined).

The delicate alignment between the mega-co-operative members included agreements on interconnection and billing. Under the Finnish 'peering' (or 'bill

and keep') system, the originating firm would bill the originating customer and keep all proceeds. As long as traffic between firms was approximately symmetric, the arrangement was relatively stable and low-cost, as it overcame the need for each firm to have a separate contractual agreement with each of the other local firms and multiple long-distance providers. These pricing arrangements were extended to include long-distance calls connected by Sonera.

The emergence of mobile telephony and the Internet were also responsible for dramatically changing relations between the local firms. The growth of mobile calling (later assisted by the Communications Law of 2002, which mandated technology neutrality)[29] put the previously well-balanced charging arrangements in jeopardy. Unlike local calling, mobile traffic was not well balanced (mobile was used more for outgoing than incoming calls). Accordingly, in 1994 the operators agreed to a variation of the previous charging arrangement, whereby the originating operator charged a local access fee covering both the originating and terminating segments of fixed calls and calls to mobile phones. Like the previous arrangements, this system too was simple and self-regulatory, with the local call charge acting as a termination price ceiling. Furthermore, as termination charges were paid from local call charges, the system maintained the principle of keeping local charges fully separate from long-distance charges.

However, the Finnish charging arrangements failed to meet EU requirements that each network operator should set termination charges based upon its own specific costs, and that termination charges should be included in long-distance charges where applicable. By making changes to meet the EU mandates, the Finnish system lost many of its self-regulatory features. It also gained a layer of transaction costs (for both firms and FICORA) as a result of the new need to establish and justify firm-specific charges. These changes forced co-operative members to abandon collaboration over interconnection and become commercial opponents. The intervention also blurred the boundaries between operators and their charges. Interconnection tariffs and retail charges immediately increased, in some cases doubling, requiring even more regulation.

New financial stresses caused by the emergence of mobile and Internet competition also interfered with the alignment of Finnet member objectives. In particular, Elisa, the largest firm in the mega-co-operative, came under significant pressure to access capital to improve its networks for Internet transmission. In response, in 1997 the company converted to a for-profit company and listed on the Helsinki stock exchange. It unbundled share ownership and the right to a line, and began distributing dividends to owners instead of discounts to members. Elisa subsequently acquired a significant stake in other listed companies and took over some of the smaller co-operatives. Given the very different strategic directions being undertaken by Elisa and the remaining members, the mega-co-operative could not continue.

In 2001, Elisa and its associates seceded from Finnet and formed their own federation. In 2007 a further split occurred when a number of the larger Finnet members took over the mobile firm DNA and converted it into a full service provider. The effect of these successive industry splits and mergers was to bring about a near complete transformation of the Finnish industry: from vertically separated network operators and long-distance companies, each with a local monopoly but competing on benchmark performance, into three (potentially four) fully vertically integrated providers competing nationwide over a range of products and services.

Different Cultures and Effects on Market Performance

The two industry histories presented in the preceding sections clearly show how the diametrically opposed industry approaches in New Zealand and Finland have led to diametrically opposed cultures, norms, values and attitudes in the two countries. Under the analytical framework presented at the beginning of this paper, such cultures, norms, values and attitudes, and the way they influence actions and interact with factors such as technology and policies, are essential for understanding market evolution. Historical actors, institutions and interactions inevitably shape current market interactions and outcomes.

One of the most significant differences between New Zealand and Finland's industry approaches has been in property rights. In both rural New Zealand and most of Finland, individuals seeking connection to telecommunications infrastructure had to pay for the connection assets. In Finland, those who invested in the assets retained a designated share in the ensuing business. In contrast, in New Zealand ownership and governance of the assets was subsumed into the wider political processes. This difference appears to have had a significant part to play in Finland's development of a dominant commercial culture, and New Zealand's development of a (diametrically opposed) dominant political culture. Individual property rights engender a far greater sense of local ownership and participation in governance and self-regulation than communal rights.[30] Finnish consumers owned shares in their service providers, and could exert commercial influence at both an individual and collective level. In contrast, New Zealand consumers were subject to both a collective ownership 'tragedy of the commons' and the dilution of their telecommunications interests amongst all other government activities. Deprived of a commercial means of interaction, the only recourse for New Zealanders was political.

These different approaches to fundamentals such as property rights, in turn, have affected the way that each country's industry has responded to its government's more recent adoption of new sets of rules and institutional structures. Even though many of the current rules and structures are very similar between New Zealand and Finland, industry participant responses in each country have been very different. Participants in the Finnish industry have had more experience with private ownership, and with commercial principles governing sector interactions. As a result, the industry has undergone incremental changes, driven by commercial responses to technological imperatives. For Finland, liberalisation involved the government exiting its historic ownership interests in some providers (where many were already privately owned), and refining an already light-handed regulatory framework. In an environment where market participants already had over 100 years of experience with commercial interaction, such change served to build on and consolidate the prevailing commercial culture. In contrast, the New Zealand industry has undergone revolutionary changes. Liberalisation took place alongside privatisation, in an environment where market participants had been conditioned to political interaction and lacked commercial experience. Such dramatic shifts have resulted in perennial recourse to the prevailing culture of political intervention.

Understanding such historical interactions and developments lends important insights into present-day differences. New Zealand has a comparatively low mobile and broadband uptake; the country's politically dominated industry, and the consequent entrenchment of politically, rather than commercially, oriented

policies such as free local calling, have undoubtedly contributed to this situation. In contrast, Finland has a comparatively low 3G handset uptake; this appears to be a perverse consequence of the country's light-handed regulatory history, which has focussed on eliminating barriers to competition and technology neutrality (a largely successful approach, the 3G anomaly aside).

New Zealand's History and Culture, and Effects on Mobile and Broadband Uptake

As stressed above, New Zealand's long history of government ownership, investment and control resulted in an industry where commercial considerations were suborned to bureaucratic, administrative and political processes. Technologies could influence market structure only inasmuch as policy changes reflected their presence. Customers could alter their individual outcomes only by influencing government decision-making. Throughout the nineteenth and most of the twentieth centuries, the government controlled both industry policy and service delivery, and thus determined who the industry participants were and how the sector's institutions were shaped. As a result, the government had a strong hand in influencing the evolution of the telecommunications sector's cultures, norms, values and attitudes. Although the government radically altered the *formal* rules and institutions in the 1980s reforms, this did not instantly change the entrenched cultures, norms, values and attitudes—which, as Williamson assesses, only change over the course of decades or centuries.[31]

Two significant policies that have remained entrenched for political, rather than economic or commercial reasons are those promoting free local calling and requiring universal service provision. Such policies help explain New Zealand's low mobile and broadband uptake compared to Finland, and have posed substantial barriers to the introduction of genuine competition in the New Zealand market.

Free local calling is responsible for traffic in New Zealand being five times that in Finland, simply because callers do not face the marginal cost of their usage (however, the costs of calling must be recouped from other services—notably fixed line connection charges, which must be higher than if a per-call charge is levied; New Zealanders thus pay higher line rentals than Finns). As fixed line and mobile calling are close substitutes, the presence of a non-charged fixed line voice call option in New Zealand must inevitably affect the volume of voice calling on the mobile networks. The difference is further exacerbated by higher mobile call charges in New Zealand.

Universal service prices have also affected the rate of substitution from fixed line to mobile connections. In rural areas, the subsidy for fixed line rentals likely lowers the price to consumers below the cost of a mobile connection, thereby slowing the diffusion of rural mobile connections. In urban areas, substitution effects are slightly less clear, as the bundle of both line rental and calling must be balanced in determining the optimal point of substitution from fixed to mobile. Nonetheless, free local calling has undoubtedly dampened the extent to which calls are substituted from fixed to mobile networks.

The relative uptake of broadband connections is critically affected by both the free local calling and universal service obligations. As dial-up Internet access is a partial substitute for broadband, universal service subsidies affect the timing and location of investment in broadband infrastructure, precluding investment where it would be more efficient.[32] In Finland, these problems are avoided by pricing fixed line services according to costs.

Finland's History and Culture, and Effects on 3G Handset Take-up

As in New Zealand, the Finnish industry developed a set of cultures, norms, values and attitudes from its own unique historic origins. In Finland, the early predominance of co-operative and predominantly privately owned operators helped shape an industry based on government interaction and consultation with commercially oriented industry participants, and co-operation between firms. This was complemented by a political approach aiming for simplicity in legislation. The result is a modern Finnish telecommunications policy that relies strongly on market forces rather than regulatory intervention—regulatory intervention is seen as a last resort rather than a first recourse. This approach has been widely attributed as a significant factor in Finland's status as an early adopter of new technologies, and its potential as a 'test bed' for new products and services that might otherwise incur regulatory attention in other jurisdictions (a status also enjoyed by New Zealand until recent, more interventionist regulatory rules were mandated).

However, EU mandates have threatened Finland's culture of industry self-regulation and innovation. EU-compliant arrangements pitted firms (who had previously operated as peers) against each other as rivals. These arrangements also undermined the role of long-distance operators as clearing houses—they now had to broker separate agreements with each of the local operators, and the trust that had previously existed could no longer be relied upon.

In response to the changes, industry participants initially expressed fear that commercial disputes would inevitably escalate into costly and litigious courtroom battles (as has occurred in other EU regimes and in New Zealand). Nearly a decade on, however, these fears do not appear to have materialised. Rather, the response appears to have been characteristically and pragmatically Finnish. Although the formal rules may have changed, the approach of the Finnish individuals, institutions (including regulatory bodies and Finnish rule-makers), and cultures appear essentially unchanged. The industry still appears to be characterised by the same principles of decentralised, industry-based decision-making, with commercial interaction and co-operation necessary for advancing mutual agendas.

The Finnish industry continues to be able to adapt rapidly and innovatively to technological changes. A key feature of Finnish policy has been its objective of technological neutrality, encompassed in the 2002 Communications Market Law. The rapid expansion of mobile telephony in the country has been in part attributed to this technology-neutral approach. Unlike other countries, but consistent with its original policy in granting fixed-line telephony licences, Finland has not charged mobile operators for spectrum licences (rather, the rights have been allocated on the basis of a 'beauty contest'). As a consequence, Finnish mobile prices have been amongst the lowest in Europe.

However, technology 'neutrality' has not always been successful. Until 2005, Finland precluded mobile network operators from bundling handset purchase with monthly account subscriptions—in part to enable Finnish handset manufacturer Nokia to maintain profit margins and branding on handsets. The consequence was a comparatively old handset stock and slow migration to new 3G technologies. Since the Senate removed the bundling ban in 2005, the average handset age has decreased substantially, and the diffusion and usage of 3G accounts has accelerated.[33] New Zealand's earlier uptake and higher current level of 3G handsets is most likely attributable to more aggressive and highly targeted bundling behaviour in the market.

Possible Lessons

The focus of this paper has been on analysing past market differences, and their effects on the present, rather than on providing prescriptions for the future. Nevertheless, some interesting policy lessons may be drawn from our review of the two countries' industry histories.

The first lesson from Finland is that neither a single firm nor industry-specific regulation is imperative in the construction of new local public good networks. Co-operative ownership, with shareholdings, provides a viable alternative that engenders both consumer participation in governance and industry self-regulation and standards-setting, and the emergence of benchmark competition.

The second Finnish lesson is that competition is antithetic to the principle of universal service pricing. Local prices must reflect local costs if efficient competition is to emerge. With local pricing, operators of new, cheaper technologies can make local entry decisions based upon real (not subsidised) prices, bringing forward the time when inefficient incumbents can be ousted. In Finland this happened as early as 1931, when the Senate issued a competing licence to remove an underperforming incumbent in Loviisa; and, more recently, when mobile replaced fixed-line telephony in parts of the country.

The third lesson from Finland is that a light-handed approach to regulation is feasible, but that it requires a consistent underlying culture of co-operation and trust to operate effectively. The government must use its regulatory powers very selectively in order to maintain the underlying culture of trust and co-operation, and must be attuned to commercial interaction.

The main strategic lessons from New Zealand are, firstly, that judicious bundling can accelerate the diffusion of new technologies (as evidenced by handset bundling); and, secondly, that universal service and 'all you can consume' usage packages can delay the substitution from a legacy technology to a new one (as evidenced by the Kiwi Share distortions in the fixed line market).

A further lesson from comparing both countries is that it takes more than simply changing the rules and ownership of the institutions to develop a competitive market. Unless the rules and institutions are consistent with the cultures, norms, values and attitudes of the actors involved, revolutionary change may lead simply to more revolutionary change that is not necessarily consistent with the original objectives. Where a more measured approach is taken over time, institutions, rules, actors and cultures can evolve alongside industry developments.

This last lesson stands as an insight for all countries attempting to adopt regulatory harmony by imposing a standard set of rules and institutions. As the Finnish and New Zealand comparison shows, unless the other elements are consistent, the result may be less rather than more harmony.

Notes and References

1. This article is based on a longer working paper for the New Zealand Institute for the Study of Competition and Regulation (ISCR), entitled 'Telecommunications Market Evolution in Finland and New Zealand: Unbundling the Differences' (see www.iscr.co.nz), in which the authors acknowledge in more detail the numerous contributors to their work. The authors would also like to acknowledge the assistance of Seini O'Connor in providing research and editorial assistance for the preparation of this condensed article.
2. J. Poot, *On the Edge in the Global Economy*, Elgar, Cheltenham, UK and Northampton, USA, 2004.

3. A. Wilson, *Wire and Wireless: a History of Telecommunications in New Zealand, 1860–1987*, Dunmore Press, Palmerston North, New Zealand, 1994.
4. B. Howell and M. Sangekar, *Telecommunications Market Evolution in Finland and New Zealand: Unbundling the Differences*, New Zealand Institute for the Study of Competition and Regulation, Working Paper, 2008.
5. OECD, *Communications Outlook 2007*, Organization for Economic Co-operation and Development, Paris, 2007.
6. P. Spiller and C. Cardilli, 'The frontier of telecommunications deregulation: small countries leading the pack', *Journal of Economic Perspectives*, 11, 4, 1997, pp. 127–38.
7. Finland's regulatory regime has historically been characterised by extensive self-regulation and minimal political interference, and was perceived as extremely 'light-handed', even by the notably liberal Nordic standards. This approach led it into conflict with the European Union, whose membership requirements mandated an industry-specific regulatory approach to which Finland has subsequently acquiesced. New Zealand's variant of 'light-handed' regulation stems from its world-leading reliance upon competition law and contractual agreements to govern the telecommunications sector when, in the Telecommunications Act 1987, industry-specific regulation was eschewed. New Zealand, too, has adjusted its regulatory stance over the past seven years to one more consistent with European Union mandates, again in part in response to a political desire for international regulatory conformity. For more on these points, see: L. Waverman and E. Sirel, 'European telecommunications markets on the verge of full liberalization', *Journal of Economic Perspectives*, 11, 4, 1997, pp. 113–26; J. Müller, E. Bohlin, J. Karpakka, C. Riis and K.-E. Skouby, 'Telecommunications liberalization in the Nordic countries', *Telecommunications Policy*, 17, 8, 1993, pp. 623–30; H. Pursiainen, *Finnish Telecom Policy*, Ministry of Transport and Communications, Helsinki, Finland, 2003; D. Boles de Boer and L. Evans, 'The economic efficiency of telecommunications in a deregulated market: the case of New Zealand', *Economic Record*, 72, 216, 1996, pp. 24–39; B. Howell, 'The end or the means? The pursuit of competition in regulated telecommunications markets', paper presented at the *International Telecommunications Society 7th Biennial Conference*, Montreal, Canada, 24–27 June 2008; B. Howell, 'Regulated retail tariff structures, dial-up substitution and broadband diffusion: learning from New Zealand's experience', paper presented at the *European Association of Researchers in Industrial Economics Conference*, Toulouse, France, 4–6 September 2008; B. Howell, *A Pendulous Progression: New Zealand's Telecommunications Regulation 1987–2007*, New Zealand Institute for the Study of Competition and Regulation, Working Paper, 2007.
8. Whilst Finland has been at the forefront of the OECD in the number of broadband accounts sold per capita (in 2007 it was ranked 8th in the OECD, with 27.2 per 100 at December 2006), New Zealand has languished in the lower third (by comparison 21st with 14.0 per 100 at December 2006). Nevertheless, at the end of 2006, the average New Zealand price for a connection of 2Mbps or higher was nearly one third lower (in purchasing power parity terms) than the average Finnish charge. Moreover, whereas the basic New Zealand service offered to all customers in 2006 was 'best efforts' on a connection with a minimum capacity of 2Mbps, only 27% of Finnish consumers subscribed to services of this quality or higher. See: FICORA, *Market Review, Quarter 4 2006*, Finnish Communications Regulatory Authority, Helsinki, Finland, 2006.
9. Finland has been at the forefront of mobile telephony development, has some of the lowest prices in the OECD, and exhibits more than twice the number of call minutes per connection than New Zealand. Neverthless, in 2005 over 20% of New Zealand's mobile connections were to leading-edge 3G networks whereas the comparable figure for Finland was less than 2% (OECD, *op. cit.*).
10. The low 3G purchase rate has occurred despite Finland being the first European country to license 3G operators, a Finnish connection growth of 9% (in New Zealand, 12.2%) and voice minutes per connection growing by 17.3% (in New Zealand, 4.2%) over the period January 2005 to December 2006 (Pursiainen, *op. cit.*).
11. W. Melody, 'Regulation and network investment: a framework for analysis', in A. Mahan and W. Melody (eds), *Stimulating Investment in Network Development: Roles for Regulators*, WDR Project, Lyngby, Denmark, 2005, pp. 19–38.

12. J. Koppenjan and J. Groenewegen, 'Institutional design for complex technological systems', *International Journal on Technology, Policy and Management*, 2005, pp. 11–34.
13. O. Williamson, 'Transaction cost economics: how it works, where is it headed', *De Economist*, 146, 1, 1988, pp. 23–58; and D. North, *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, Cambridge, MA, 1990.
14. Wilson, *op. cit.*, p. 20.
15. *Ibid*, p. 28.
16. *Ibid*, p. 63.
17. *Ibid.*
18. *Ibid*, p. 70.
19. *Ibid*, p. 66.
20. The last such 'lumpy' investment under government ownership was the decision taken in 1985 to fully digitalise the network (completed in 1995, when the firm was in private hands). Current plans announced by Telecom in 2007 to roll out a 'Next Generation' fibre-based network in all exchanges serving 300 or more lines by 2012 reinforces the continuation of lumpy investment patterns.
21. L. Evans, A. Grimes, B. Wilkinson and D. Teece, 'Economic reforms in New Zealand 1984–1995: the pursuit of efficiency', *Journal of Economic Literature*, 34, 1996, pp. 1856–902.
22. Howell, 2007, *op. cit.*
23. *Ibid.*
24. At the crux of the Clear dispute was the extent to which Telecom could include in the interconnect price a margin to cover the additional costs of the social obligations embodied in the 'Kiwi Share'. Whilst the Privy Council ultimately found that Telecom could legitimately include social costs in interconnection prices, the redistributive objective and political origins of the social objectives combined with the prevailing long-established industry culture, norms values and attitudes to make the court outcome a political issue. Although an inquiry by Treasury and the Ministry of Commerce in 1995 found no need to change the 'light-handed' regulatory arrangements, as the efficiency imperative was largely supported in the decision and industry-specific regulation was a costly alternative, a perception prevailed that Telecom was continuing to act in the high-handed monopolist manner of its Post Office predecessor. The perception of anti-competitive behaviour appeared reinforced by the '0867' case beginning in 1999. The Ministerially approved charge was levied in response to competitors' arbitrage on an interconnect agreement that saw huge cash flows from Telecom to its competitors as a consequence of the rise of Internet usage and the 'free local calling' obligation. These cash flows could potentially have bankrupted the company. Although the action was subsequently found not to be an anti-competitive exertion of a dominant position, Telecom's competitors organised under the banner of the Telecom Users Association of New Zealand responded with a public relations campaign and political pressure claiming that Telecom's actions were unilateral, anti-competitive and evidence of the 'failure' of the 'light-handed' regulatory regime, as it appeared to have militated against rather than facilitated competitive entry sufficient to diminish Telecom's dominant position (Howell, 2007, *op. cit.*).
25. *Ibid.*
26. B. Howell, *Submission: Telecommunications Amendment Bill*, 1996. Available at: www.iscr.org.nz.
27. For the full story of Finnish market development (on which this section draws heavily), see Pursiainen, *op. cit.*
28. In 1998, the name was changed to Sonera, and the firm was listed on the Helsinki and NASDAQ exchanges. Sonera merged with Sweden's Telia in 2002 to form TeliaSonera.
29. Finland allocated spectrum right on the basis of a 'beauty contest'. Whilst the risk existed that spectrum might not be used in a timely manner, or for the most productive purposes, this risk was to some extent mitigated by allocating the initial rights to two fiercely competitive groups-Sonera and the Finnet alliance. Subsequent allocations to smaller new entrants have facilitated rapid entry by fringe players, as they do not face spectrum cost entry barriers. The consequence is that Finnish mobile prices have been amongst the lowest in Europe.

30. H. Hansmann, *The Ownership of Enterprise*, The Belknap Press of Harvard University Press, Cambridge, MA, 1996.
31. Williamson, 1988, *op. cit.*; and O. Williamson, 'Transaction cost economics: the governance of contractual relations', *Journal of Law and Economics*, 22, 1979, pp. 3–61.
32. As explained further in Howell (2007, *op. cit*), subsidies lower the price at which a user will purchase alternative broadband infrastructures-if the new technology has a lower cost than telephony, but is higher than the subsidised price, investment that would be more efficient does not occur in rural areas. Conversely if urban users pay a price above cost, entry may be induced by new technologies that are less efficient than the incumbent's.
33. A. Kivi, 'Mobile data adoption in Finland 2005–2006', paper presented at *6th Conference on Telecommunication Techno-Economics*, Helsinki, Finland, 14–15 June, 2007.