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# Regulating for Telecommunications Competition in Developing Countries: the case of Papua New Guinea

Bronwyn E. Howell<sup>1</sup>, Petrus H. Potgieter<sup>2</sup> and Ronald Sofe<sup>3</sup>

## Abstract

Papua New Guinea is a low-middle income developing Asia-Pacific island country with a relatively long history of telecommunications market development under firstly Australian administration, and latterly under a pro-competitive set of regulatory arrangements strongly influenced by Australian policy-making. Nevertheless, it demonstrates some of the weakest sector performance statistics of a range of comparable low-middle income countries in its region. Why does a country with a regulatory regime drawing on current international recommended “best practice” perform so poorly?

To address this question, we develop an inquiry framework (checklist) for assessing the effectiveness of regulatory arrangements in a developing, as opposed to developed country. Whilst the framework is based on guidelines from the World Bank and the International Telecommunications Union (Blackman & Srivastava, 2011), we adapt these to take account of specific challenges arising in developing countries: limited capacity, limited commitment, limited accountability, limited fiscal efficiency and trade-offs between factors that take account of these limits (Laffont, 2005; Estache & Wren-Lewis, 2010).

Applying the inquiry framework to Papua New Guinea, we find that, the most likely explanation for poor performance derives from the government being both regulator and owner of the incumbent, Telikom. Lack of investment and an unstable set of ownership arrangements have constrained Telikom from being an effective competitor. Weaknesses exist in the monitoring and enforcement of regulator accountability provisions, but are unlikely to have altered sector outcomes, although they may have contributed to obscuring poor performance. Introduction of at least one more foreign operator will be beneficial, but only if the government can clearly separate its ownership and regulatory activities and political agents can credibly commit to refraining from

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interfering in the operational activities of both the incumbent firm and regulatory agencies.

## 1. Setting the Scene

Papua New Guinea (PNG) is a low-middle income developing country whose annual per capita purchasing-power Gross National Income (GNI) of around \$2,700 is roughly half that of Nigeria or Pakistan and quite close to that of Tanzania or Laos (World Bank, 2017a). The economy is dominated by extractive industries for export, with the agricultural and manufacturing sectors aimed overwhelmingly at servicing the domestic market. The population of PNG is heavily rural with only 13% living in urban areas, but few apart from the capital Port Moresby are of reasonable size (World Bank, 2017b). It has a challenging geography, being largely mountainous and covered by dense forests. Furthermore, 97% of the land is held under customary tenure, with control fragmented across several hundred local tribal chieftains (Filer, 2014). As a result of both geography and the property rights regime, significant challenges are posed to the deployment of infrastructures such as roads, electricity and, especially, telecommunications.

A national telephone system was introduced to PNG under Australian administration in 1964, when a Telecommunication Division of the Department of Posts and Telegraph was established. Australian influence has been significant in the development of PNG's subsequent competition and regulation policy and legislation (Duncan, 2013). The structural elements of the institutional arrangements have closely followed the recommended "best practice" advocated by the World Bank and International Telecommunications Union (Blackman & Srivastava, 2011), with the exception that the incumbent operator remains fully government-owned (Howell, Potgieter & Sofe, 2018).

### 1.1 Weak International Performance

Nonetheless, PNG currently exhibits poorly developed use of telecommunications (World Bank, 2017c) and only a modest number of Internet users (World Bank, 2017d). Table 1 compares 2017 statistics for PNG with a range of Asia-Pacific and low- and middle-income countries. Although fixed line prices are comparable with East Asia-Pacific averages, and fixed line connection numbers resemble other low-middle income countries, higher mobile prices and lower connection numbers than comparators prevail. Only Kiribati (data) and the Solomon Islands (data, handsets and voice calls) exhibit higher mobile prices than PNG, whilst only Kiribati has fewer mobile connections per 100 people. PNG prices for mobile voice calls, data and handsets are nearly four times those of the East Asia-Pacific and lower-middle income averages. Prices are slightly higher than Vanuatu, but one third higher than those in Samoa and over twice those in Timor-Leste, which face similar characteristics to PNG as island states with challenging geographic and socio-economic conditions.

Furthermore, despite having a reasonably long history of telecommunications provision, the rate of sector development also appears slower than in other, initially less-developed countries, and countries with much lower per-capita Gross National Income (GNI). For

example, in 2009 in Myanmar, mobile penetration was below 1% whereas in PNG it was over 20% already. By 2015, Myanmar had overtaken PNG, with a much higher penetration rate of 76% (against 47% for PNG). The growth of mobile penetration in Myanmar has been much faster than in PNG even though the latter is twice as wealthy in terms of per capita GNI and PNG has always had a higher fixed-line telephony penetration rate than Myanmar as well.

A further distinguishing characteristic of the PNG telecommunications sector is the very high degree of concentration in *both* the fixed and mobile markets. The incumbent faces only a small amount of fixed line competition (from VoIP). Furthermore, despite the incumbent being the first to offer mobile services, its sole rival, Digicel, is reported to have a 95% market share, giving a Herfindahl-Hirschman Index (HHI) of 9,050 in 2017 for the mobile market. By comparison, Myanmar currently has four licensed mobile operators, all of whom are partly foreign-owned, as well as an operator run by the military. Myanmar's HHI in 2017 is 3,339 (Howell, Potgieter & Sofo, 2018).

These data raise the question of why, despite having an apparently near 'textbook' set of policies, legislation and regulatory institutions (as assessed using World Bank and ITU guidelines), PNG has been apparently unable to develop a vibrant and competitive market in mobile services in particular, as has been observed in other comparator developing countries.

## 1.2 Critiquing the Regulatory Regime

To address this question, we draw on the literature addressing challenges in regulating in developing as opposed to developed countries, (Laffont, 2005; Estache & Wren-Lewis, 2010; Freiburg, 2010) to create a checklist of factors against which to assess the effectiveness of the structure and implementation of the PNG regulatory arrangements. A mix of desk research using secondary data and primary interviews with key stakeholders was used to address the checklist items.

We find that the power exerted by the government as both regulator and owner of the incumbent, and the extent to which political actors have been able to exert direct influence in both sector regulation and the day-to-day operation of the incumbent, have resulted in impediments to the development of effective competition in both the fixed and mobile sectors. The incumbent government owned operator struggles to create a viable business model to make profit and deliver efficient services. This has occurred despite a relatively stable set of policies and institutional arrangements ostensibly supporting increased telecommunications sector competition and liberalisation. In large part, this appears to derive from a concomitant strongly nationalistic state-owned enterprises policy. Consequently, telecommunications markets are less well-developed in PNG than in comparator countries, and this has harmed progress towards both economic and social welfare improvement objectives.

We propose that the introduction of at least one more foreign mobile sector operator will be beneficial, but only if the government can clearly separate its ownership and regulatory activities, and political agents can credibly commit to refraining from

interfering in the operational activities of both the incumbent firm and regulatory agencies.

The paper proceeds as follows. Section 2 summarises the history of telecommunications policy and regulation in PNG, and its intersection with market developments. Section 3 reviews the relevant literature and constructs the checklist. In Section 4, the checklist is used to interrogate the PNG case facts and identify areas of concern. In Section 5, conclusions are drawn and recommendations made.

## **2. A brief history of telecommunications regulation in PNG**

Following independence in 1975, in 1982 the Post and Telecommunication Corporation Act established a separate legal entity responsible for postal and telephone services in PNG. The 1994 endorsement by the National Executive Committee (NEC) of a National Policy on Information and Communication resulted in the Telecommunications Act 1996. This Act corporatized and separated Telikom PNG Ltd from Post PNG Ltd to operate services and created the PNG Telecommunications Authority (Pangtel) as sector regulator. Major features were enabling Pangtel to license private mobile operators in competition to the incumbent, and making provision for the future vertical separation of Telikom. In 2002, mobile operations and management of the internet gateway were moved into a wholly-owned Telikom subsidiary.

The Independent Consumer and Competition Commission Act 2002 established a separate competition authority (the ICCC) along the same lines as the Australian Consumer and Competition Commission. The ICCC was granted general powers to investigate competition matters, declare services and regulate prices where necessary, and if notified to evaluate proposed mergers in all sectors, including telecommunications. It was specifically charged with regulating Telikom's mobile subsidiary B-Mobile using regulatory contracts. At the same time, the Telecommunications Act 1996 was amended, passing responsibility for operator licensing from Pangtel to the ICCC. Pangtel's responsibilities reverted to primarily technical oversight of the sector, including radio spectrum licensing and management.

The December 2005 decision by the NEC to allow competition in mobile telephony was central to expanding mobile telecommunications services in PNG, albeit that the process was hampered by a highly unstable policy environment.

The NEC mandated the ICCC to run a competitive tendering process to issue two new mobile operating licences. Services were to commence by March 2007. In response to disagreement between Telikom and the ICCC about the ceding of Telikom's mobile monopoly, in September 2006 the government released a new ICT policy reversing the 2005 competition decision. On the basis of the new policy, Telikom unsuccessfully petitioned the courts to stop the ICCC process. In the absence of any new legislation, the ICCC maintained its original liberalisation timeframe, announcing successful tenderers in September 2006 and issuing operating licenses in March 2007. Pangtel first issued, but then subsequently withdrew, a spectrum license to Digicel in March 2007, citing adherence to the new policy provisions. In order to protect its investments made

on the basis of the September 2006 tender undertakings, Digicel obtained a court order overriding Pangtel, and commenced operations. Furthermore, Digicel engaged in direct negotiation with the government, and there is evidence that international pressure was applied to the PNG government to abide by its obligations to the World Trade Organisation (WTO) (Duncan, 2013). Even though it was unable to obtain a nationwide interconnection agreement with Telikom until July 2008, Digicel's entry led to an immediate fall in prices and a 700% increase in the number of mobile subscribers in the first year of competition (Batten, Guoy & Duncan, 2009).

Further ICT policies were announced in 2007 and 2008, but it was not until March 2009 that clear objectives and a timeframe for further reforms were translated into legislation. This policy appears still to prevail. It presaged the National Information Communication Technology Authority (NICTA) as a stand-alone statutory sector regulator (established under the NICT Act 2009), combining the operational licensing functions formerly undertaken by the ICCC with the technical functions of Pangtel. Telecommunications ceased to be a regulated industry. The NICT Act specifies a limited range of powers under which NICTA can license operators, undertake inquiries, determine interconnection prices, make recommendations to the Minister to declare (regulate) specific services and oversee a Universal Access Service programme. The Minister can accept or reject NICTA recommendations, albeit that if no explicit decision is announced after 60 days, the NICTA recommendation comes into force. Between 2009 and 2017, five inquiries were instigated: two resulting in recommendations to declare services (capping Digicel's on-net call discount – overturned; wholesale internet connectivity – declared); one where no declaration was recommended (wholesale mobile markets); one renewal of declared services (mobile/fixed termination); and one ongoing (mobile number portability).

NICTA is funded solely by license fee revenues. Operator fees are proportional to firm revenues, so the vast majority of NICTA's operating budget is paid by Telikom and Digicel. Following the completion of a World Bank funding programme, Universal Access Service (UAS) contributions were levied for the first time (in arrears) in 2016, again on the basis of regulated firm revenues. They have proved controversial, and have resulted in ongoing litigation, in part because of perceived conflicts between NICTA's regulatory (setting US levies) and funding (selecting eligible US projects) roles.

NICTA's powers and processes are remarkably similar to those of New Zealand's Telecommunications Commissioner, and the telecommunications regulatory duties of the ACCC. Major differences are the independence of the regulator from the competition authority, and the license-based funding.

The government, either directly or via its investment vehicles the Independent Public Business Corporation (IPBC – 2002-2015) and Kumul Consolidated Holdings (KCH – from 2016) has been the main investor in fixed-line telecommunications infrastructure and operations in PNG. While initial policy saw the historic Telikom separated into network and retail operations, with privatisation of its mobile assets (in part achieved with the sale of B-Mobile to a consortium headed by Trilogy Partners in 2008), subsequent restructuring in the sector saw creation of telecommunication wholesaler,

PNG Dataco responsible to construct and operate major network to accommodate fibre optic cables, satellite and microwave assets. However, recent government decisions resulted in reconsolidation of assets and the repurchase and reintegration of B-mobile and PNG Dataco into Telikom. Telikom now forms part of a KCH asset portfolio intended to generate revenues to pay dividends to the State. Despite ongoing government ownership, investment in mobile infrastructure has been negligible, and the state of fixed line infrastructure remains poor (notably an unreliable link between the capital Port Moresby and the major international cable connection at Madang). Furthermore, KCH firms have been subject to ad-hoc dividend demands from Ministers, further restricting the ability to reinvest profits in better equipment and services (Howell, Potgieter & Sofe, 2018a).

### **3. Telecommunications Regulation in Developing Countries**

Since the 1980s, a consensus has developed in international telecommunications policy of the importance of market liberalisation and (at least partial) privatisation of formerly government-owned telecommunications firms in order for the sector to deliver the desired consumer welfare and economic development outcomes (Blackman & Srivastava, 2011). Simultaneously, as technological innovation has changed the range of products and services traded and the underlying economic characteristics of production, telecommunications markets worldwide have generally transitioned from monopolies (either government- or privately-owned) to more complex, imperfectly competitive institutions governed by a mixture of competition law and regulation (Howell, 2009). To facilitate this transition, it is widely agreed that some form of legislated oversight of markets is necessary to: avoid market failure; foster the development of effective competition; protect consumer interests and increase access to technology and services (Blackman & Srivastava, 2011).

Sector oversight typically requires consideration of trade-offs between the effectiveness of sector-specific, forward-looking rules characteristic of ex ante regulation approaches and ex post competition law-based frameworks. Over time, experience and research have led to a consensus that an over-arching approach to regulation that seeks to prevent market failures through the implementation of sector-specific, forward-looking rules can be less effective than ex post competition-based frameworks in fostering the more innovative markets (InfoDev, 2012).

#### **3.1 Components of Effective Regulation**

As telecommunications sector evolution is at different stages in different jurisdictions, no one specific policy or set of institutional arrangements exists that can be considered as international “best practice”. However, international organisations such as the World Bank, OECD, ITU and WTO have developed guidelines to assist policy makers. At the highest level, the processes by which the policy and regulatory framework is created, and its content, come together in a set of overarching objectives for the regulatory reform process articulated in the Telecommunications Regulation Handbook (the

Handbook) issued jointly by the World Bank, ITU and International Finance Corporation (Blackman & Srivastava, 2011).

To facilitate transition to an effective competitive environment, the Handbook recommends regulatory measures that address: (i) creating functional regulators to oversee the introduction of competition; (ii) preparing the incumbent operator to face competition; (iii) allocating and managing scarce resources in a non-discriminatory way; (iv) expanding and enhancing access to telecommunications and ICT networks and services; and (v) promoting and protecting consumer interests, including universal access and privacy (ibid, p10-11). Where greater reliance is to be placed on ex ante regulation, it is recommended that measures should reflect national conditions and goals (including, but not limited to, the prevailing legal system and cultural norms), should first attempt to resolve market failure issues at a wholesale level, and measures implemented should be reviewed periodically and phased out when warranted. The last of these governs the rate at which the transition to a more ex-post, competition law-focused system can progress.

According to the Handbook, an effective regulator (either sector-specific or embedded within a competition law governance framework), should be structurally, financially and functionally independent. While financing can be from government budgets or sector license fees, the key independence objective is ensuring both funding and functional activities are free from political and private interest influence. An effective regulator should also demonstrate other characteristics, including accountability, transparency and predictability. There should be well-defined functions and responsibilities, with appropriate well- and clearly-defined decision-making authority, enforcement and dispute resolution powers. There should also be clear rules regarding the skills required of, appointment, removal and mandate of the regulatory authority staff, incentives to promote professional expertise and adequate provisions to address ethical and conflict of interest concerns. Effective functionality also requires consistency, timeliness and accountability of regulatory decisions, and procedures to ensure transparency and public engagement in the regulatory process. Together, structural financial and functional independence and effectiveness underpin regulator credibility (ibid, p 16).

Regulator credibility can be enhanced, and the pace of reform accelerated, in countries making regional and global commitments to opening up their telecommunications markets to competition. The World Trade Organisation (WTO) General Agreement on Trade in Services (GATS) Telecommunications Service Reference Paper framework offers one such commitment avenue. WTO commitments are legally binding and enforceable through the WTO's dispute resolution process. Voluntary commitment by a sovereign government subjects it to a degree of accountability for its actions in respect of the national policy and regulatory frameworks implemented. The six principles of the Reference Paper provide a checklist for success of regulatory reforms. The principles, which echo the Handbook effective regulator criteria, relate to: (i) competitive safeguards; (ii) interconnection guarantees; (iii) transparent and competition-neutral universal service mechanisms; (iv) public availability of licensing criteria; (v) independence of regulators; and (vi) equitable procedures for use of scarce resources (ibid, p21).

Together, these features allow a checklist to be constructed to underpin evaluation of the effectiveness of a given set of telecommunications sector policies and regulatory arrangements. The first set of criteria (objective) interrogate the extent of policy commitment to progress towards the introduction of effective competition, and the establishment of institutions (structures, legislation, etc.) to support that objective. The second set of criteria (structural) concern the extent to which the regulatory institutions exhibit financial and functional independence from sector and political influence. The third set of criteria (procedural) address the accountability, transparency and predictability of the policies and institutions. The fourth set of criteria address efficiency and equity of the arrangements. Table 2 (columns 1 and 2) summarises.

## **3.2 Considerations for Developing Countries**

Table 2 provides a generic set of criteria and artefacts for assessing the effectiveness of regulatory regimes. However, what will be observed when using Table 2 to assess a regulatory regime will necessarily differ between developing and developed countries. First, developing countries may not have strong established legal frameworks for governing competitive markets, so a stronger reliance on ex ante regulation than ex post competition law is expected. Second, the later arrival of technologies in developing countries means that the technological mix is expected to differ – notably with a developing country emphasis on mobile technologies and the absence of a well-developed fixed line incumbent. However, the third and likely most important consideration is that institutional capacity differences between developed and developing countries lead to limits in the effectiveness of institutional arrangements used successfully in developed countries when introduced to developing countries. Drawing on Laffont (2005), Estache and Wren-Lewis (2010) suggest that the institutional issues typically challenging the effectiveness of telecommunications regulation in developing countries can be organised into four categories: limited capacity; limited commitment; limited accountability and limited fiscal efficiency.

### **3.2.1 Limited Capacity**

Limited capacity may manifest as inexperienced staff and lack of financial resources, reducing the regulator's ability to observe behaviour and enforce contracts and statutory obligations. Two possible resolutions – centralising regulatory functions into a single multi-sectoral agency, and contracting out elements of regulation to a third party – are feasible but invoke trade-offs. Contracting out allows the use of more sophisticated regulatory arrangements, but may be expensive and not result in the desired long-run institutional capacity building required for independent operation of the regulatory function. Less complex arrangements are easier to manage, but may allow too much discretion, thereby increasing the risk of regulatory capture. Although theoretically such simplicity is sub-optimal, provided care is taken to manage the risks of capture the effective delivery of simple arrangements may be better than the imperfect delivery of a capacity-constrained alternative.

### 3.2.2 Limited Commitment

Evidence suggests that in developing countries, infrastructure sector contracts do not engender the same degree of underlying commitment from the participants as observed in developed countries. Greater fear of future regulatory renegotiation increases costs and reduces investment relative to developed countries, as firms cannot be assured of obtaining sufficient returns. This risk is illustrated in PNG by the 2007 withdrawal by Pangtel of Digicel's spectrum licence, which amounted to a unilateral 'renegotiation' of previously-agreed terms under the ICCC process. The classic institutional resolution to problems of commitment is to increase the independence of the regulator. However, this will be effective only if:

- the regulator can tie its hands in a way the government cannot (e.g. constrained by the judiciary to a greater extent than the government); or
- the regulator has a greater concern for its reputation than does the government (e.g. promotion concerns); or
- tighter control on the behaviour of the executive exists (e.g. splitting up regulatory roles).

Care needs to be taken with the allocation of risk between consumers and the regulated firm(s). If the government or regulator is unable to enforce firm performance when its losses are high, then the firm's downside risk should be minimised. However, this will lead to higher prices. On the other hand, if high prices lead to consumer pressure on the government to renegotiate, then it may not be possible to allocate too much risk to consumers (Howell & Sadowski, 2018). If political responsiveness to the regulated firms is likely to be higher than responsiveness to consumers, then tighter control on the executive may be indicated. Arguably, it was the exertion of controls by the WHO and other international stakeholders that was relied upon to address the lack of commitment by the PNG government and its agent Pangtel in 2007.

At a practical level, it is important for both parties to recognise what they can and cannot commit to. Contingencies against which commitments cannot be made are inevitable. However, efficiency may be retained if the parties can at least fix, ex ante, their respective bargaining powers and default positions in the event of future renegotiation – for example specifying a mutually-acceptable arbitration process. However, making the arbitration process more efficient without balancing the payoffs appropriately may increase renegotiation risk. As reliable enforcement may be as serious a problem as government opportunism, close attention should be paid to which party is most likely to prompt the need for renegotiation.

### 3.2.3 Limited Accountability

Regulatory and other institutions in developing countries are often less accountable than those in the developed world, making collusion between the government (including the regulator) and various interest groups more likely. Capture of the regulator is the most likely manifestation. Increased collusion can result in more effort spent on rent-seeking. The presence of subsidies for specific services also likely increases the stakes for rent-seeking.

As collusion or corruption is at least partly unobservable, it cannot be prevented directly using contractual terms, but instead can be minimised with more direct monitoring (Milgrom & Roberts, 1992). However, increasing accountability decreases regulator independence. If the government is relatively benevolent, then a regulator inside the ministry (close to political influence) may be less likely to collude than one outside. If both the government and the regulator are non-benevolent, then independence may be inadvisable if it permits greater ability for the regulator to engage in corrupt activities. In very corrupt environments, accountability may be more important than independence.

However, increasing the transparency of the regulator – e.g. more frequent monitoring and auditing, or making the regulator directly accountable to the legislature – can make it more accountable without reducing its independence. Having different agencies collect and broadcast similar information may reduce the risk of capture but invokes higher costs. Also, steps have to be taken to prevent the different agencies from colluding. And even if the regulator is independent and trustworthy, a non-benevolent government may be the capturing instrument – especially if statutory restrictions and oversight stack the deck so that the regulator’s incentives are more closely aligned with those of the government. In this case, the best protection is to ensure that the government responsible for regulation is accountable as possible.

### **3.2.4 Limited fiscal efficiency**

In developing countries where both fiscal surpluses and the ability of the majority of users to pay are limited, network investment will be slower than in developed countries. Thus some form of subsidy is likely necessary if network expansion is to occur.

However, subsidies inevitably require the political context to be considered. Subsidies mean providers are no longer financially autonomous. Furthermore, the government may not be able to afford the subsidies in the first place. Taxes on affluent service users can be used to raise revenues to subsidise network expansion and service delivery to less-affluent users. Yet weaknesses in the tax regimes means this arrangement may not be viable. Price restrictions make services affordable, but destroy incentives for network expansion. Price restrictions and service requirements may sap competition, pushing prices up in the long run, raising the effective cost of creating new connections, and lowering quality levels.

To the extent that subsidies are inevitable, making them output-based and separating the tasks of sector regulation and distributing the subsidies may be desirable. The latter arrangement makes capture more difficult at the same time as it avoids giving the regulator extra discretion. However, ultimately the high cost of public funds means using regulated prices to effect cross-subsidies may be preferable, even if such arrangements necessarily distort incentives and increase the prices faced by some users. The damaging effects that cross-subsidies can have on competition can be muted by opening up opportunities to firms other than the incumbent to serve underserved communities. Auctions of these rights may increase cost transparency, albeit being vulnerable to collusion. Affordability may also be enhanced by removing quality constraints (e.g. minimum quality standards) and by allowing new services to be offered. However, effective monitoring of the actual quality supplied under these offers may be necessary.

Even if subsidies are ineffective, their rapid removal may be best avoided. If removing them leads to sharp price increases, the unpopularity of the move may derail reform by rallying interest groups to influence the regulatory arrangements. Hence, subsidy change needs to start off as a gradual move from the status quo. Priority should be given to increasing access so long as large proportions of the population remain unconnected. Affordability at all times needs to be kept at a level where support for the reforms remains in place.

### **3.2.5 Trade-offs and interactions**

In practice, most developing countries suffer from a combination of all four constraints discussed in the preceding subsections. Solutions addressing one problem may interact with solutions addressing another, and even if the chosen solutions are compatible, budget constraints may necessitate prioritisation. Tensions and trade-offs are inevitable.

If accountability is weak, then stronger commitment mechanisms may be dangerous. Moreover, even if the government is accountable, increasing the commitment power of a less-accountable (more independent) regulator may increase the incentives to collude with the regulated firm(s) and become captured by them. Yet increasing accountability compromises regulatory independence. Increased regulatory independence may not increase collusion risk if limited accountability of government means political or executive capture is a greater risk than regulatory capture. Making the regulator's workings transparent to all parties likely addresses risks of capture and imperfect commitment, but having them selected by the legislature does not. Decomposing independence may be particularly important when the political context of a developing country prevents the possibility of a completely independent regulator – a regulator that is 'too independent' may be undermined by other parts of government. In this case, it may be better to create a partially-independent institution that can become more independent over time.

Theoretically, the benefits of separating regulatory responsibilities across agencies are likely higher in developing countries as rents, commitment and capture are all likely to be greater problems than in developed countries. But if human and financial resources are constrained, multiple regulators may not be feasible. Moreover, separation of responsibilities alters participant incentives. However, as capacity is freed up, it is worth considering greater separation. Similarly, localised regulation may allow local tailoring and may ensure greater local compliance, but cost constraints favour centralisation.

## **3.3 Modifying the Checklist**

The general criteria for assessing the components of an effective regulatory regime outlined in Table 2 are relevant for developing countries, but are augmented by the comments added in column 3 to take account of the effects of limited capacity, commitment, accountability, and fiscal efficiency, and the necessary trade-offs that these invoke.

## 4. Applying the Checklist to PNG

Applying Table 2 to the PNG case reveals that the reasons for poor performance of its telecommunications markets are **not** necessarily due to the design and operation of its regulatory institutions. Rather, the institutions can only function as well as the wider policy environment allows them to.

### 4.1 Competition Policy and Objectives

The initial policy intention was to introduce competition, at least in mobile markets, from 2005. The establishment of the ICCC and assignment to it of responsibility for the introduction of mobile competition, with separation of spectrum licensing and technical matters within Pangtel is consistent with a greater reliance on competition law principles rather than industry-specific regulation in the PNG arrangements. Consistent with the historic origins of PNG governance, both the policy and its institutional manifestations as well as legal framework resemble those in Australia (and to a lesser extent New Zealand).

However, equal commitment to the devolution of the incumbent operator from centralised government control to a more decentralised arrangement or even partial privatisation is not evident. Ongoing government ownership of Telikom has left it starved of new equity capital for infrastructure development and created an avenue for continued political engagement in sector activities. In practice, despite the outward manifestation of Telikom as a corporation at arms-length from political influence, it continues to operate more like an instrument of government. Petitions to protect it from competition and politicians' willingness to respond created the policy and legal instability observed in 2006-7. To counter the local political influence of Telikom, Digicel has been required to engage in local and international political processes (Duncan, 2013). It may not be co-incidental that despite an apparent lack of competition in mobile markets, the government has indicated no intention to increase the number of mobile operator licenses.

Ongoing instability in the policy governing and the operation of the holding companies managing the State-Owned Enterprise portfolio has weakened Telikom's accountabilities, increasing the potential for both poor firm performance and political interference. It has also exacerbated the difficulties faced in obtaining development capital. Despite separation aspirations, Telikom continues to operate as a vertically-integrated firm, selling wholesale capacity to its rivals as well as self-supplying. B-Mobile has been sold to competing interests and subsequently repurchased, reducing the number of mobile firms from three to two (Howell, Potgieter & Sofe, 2018).

### 4.2 Independence and Competence

The structural provisions of PNG's regulatory arrangements post 2009 appear consistent with the guidelines. Given the relatively weak state of competition and the propensity for both political and industry intervention, the separation of responsibilities between the generic competition authority the ICCC and the sector-specific regulator NICTA

provides the potential for each to provide a check on the activities of the other. A risk exists that skilled staff may be spread thinly between the agencies, which is further exacerbated by preferences that key roles be filled by PNG citizens.

Clarification of functional responsibilities in the NICT Act delineates NICTA's obligations from those of the ICCC. However, the mandate for ICCC intervention is less clear, given that telecommunications is no longer explicitly an industry that it regulates. A risk exists that gaps and overlaps in functional responsibilities may occur. Evidence of its manifestation exists in the 2006-7 conflicts between the ICCC and Pangtel, and more recently in the apparent lack of attention to the bifurcation of the industry into a fixed line market dominated by Telikom and a mobile market dominated by Digicel. A further example is the lack of co-ordinated responsibility for recording complaints about service availability and quality (Howell, Potgieter & Sofe, 2018).

Fiscal constraints are responsible for NICTA being funded by licence fees rather than government budgets. This lessens the potential for political direction in day-to-day activities, but increases the potential for industry capture, as its revenues are proportional to licensed firms' revenues. A further tension exists because the Universal Access Service fund is levied and administered by NICTA on the same basis. The perception of a bias towards serving the interests of the two large firms is created, though little evidence could be found when examining NICTA decisions. However, the funding arrangements have likely contributed, along with its tightly-specified legislative duties, to NICTA becoming a predominantly reactive regulator responding to specific identified impediments (e.g. interconnection, overseas bandwidth access) rather than proactively addressing the emergence of the technologically-bifurcated market. As proactive intervention stands in the short term to reduce the revenues of the two major funders at the same time as increasing NICTA's costs, the incentives for NICTA to address the problem appear low and reinforces impressions that NICTA is captured by (is biased towards) the two large firms, at the expense of smaller competitors and consumers.

### 4.3 Procedural Issues

The NICT Act specifies in detail the processes for appointment of the governing entities and key staff at the NICTA Appeals Board and Universal Access Service Fund (albeit with the NEC having strong influence) and the content and frequency of reporting obligations. It also specifies the process by which NICTA recommendations can proceed into becoming law, and once law how they must be reviewed to maintain their currency. These provisions directly address issues of accountability, transparency and predictability, so are consistent with the objectives of an effective regulatory regime.

However, three major concerns exist.

First, a gap in the NICT Act concerning procedures when a recommendation is appealed and there is no explicit Ministerial response to the recommendation. Lack of Ministerial response within 60 days is addressed by the recommendation becoming binding. However, if the recommendation is appealed, the recommendation can become law during the progression of the appeal process. This has led to appealing parties seeking

court injunctions to stop the recommendation becoming binding until the appeal is heard. A change in the Act to clarify this is a simple change, but has not yet occurred.

Second, despite having clearly articulated and legislated accountability and transparency provisions, in practice these are seldom adhered to. For example, despite annual budgets being required to be available on the NICTA website, the latest one found in 2017 related to 2012. Furthermore, the website, where most disclosures are to be made, is frequently unavailable. These lapses suggest significant internal governance practice shortfalls within the regulatory agencies. Board members ultimately responsible for holding staff to account for the provision of essential documentation have failed to perform to a satisfactory standard. As the civil society institutions holding agencies to account in a developed country (e.g. a strong media, citizen welfare organisations) cannot be relied upon to the same extent in a developed country, it is unsurprising but disappointing that these lapses persist in PNG. Oversight by international entities can identify such lapses, but cannot hold the PNG agencies to account. More active oversight by other parts of the PNG government – for example policy ministries - or utilising the separation of NICTA and the ICCC so each provides a check on the other's adherence to reporting obligations. However, ultimately it is the responsibility of the political agents appointing board members to ensure the institutions work in the long term interests of consumers.

Third, the governance (and operation of the Universal Access Service fund within NICTA (common chair, CEO sits on both boards) poses a significant conflict of interest. PNG's large rural footprint means US funding forms a significant component of new sector investment. If NICTA is to be an effective independent regulator, then it cannot also be responsible for disbursing and administering the application of substantial sums to industry participants. In the past, international input from the World Bank has ensured a level of accountability not possible now as full responsibility has been returned to PNG. Although skilled human capital is limited, and currently resides within NICTA, separation of this function appears essential if more efficient and effective outcomes are to be achieved, in perception if not in reality.

#### **4.4 Efficiency and Equity**

The PNG regulatory arrangements have the potential to deliver a more efficient outcome, but are constrained by the factors identified above. Nonetheless, NICTA has made good progress with the use of its powers to address wholesale access to interconnection and international data services. Although in principle, UAS-funded towers are required to be made available to other providers, this has not eventuated because of the lack of competition in the mobile market. Even if regulated sharing provisions existed, they will not be effective without at least two mobile operators being committed to compete

### **5. Conclusions**

Overall, the structural and legislative provisions of PNG's regulatory regime follow the guidelines laid out by international agencies. They should have led to sector outcomes

comparable to other low- and middle-income developing countries. However, despite a promising start when Digicel entered in 2007, progress has been very disappointing.

The most likely explanation for the failure of competitive markets to develop lies in weak governance performance by political principals, acting as both owners of the incumbent firm and overseers of the regulatory regime. Effective competition cannot develop if one of two mobile sector participants lacks both the financial capability and a stable ownership environment necessary to participate fully. And even the best-designed regulatory instruments cannot operate effectively without active monitoring and enforcement of the provisions via which regulatory agents are to be held to account.

While there is room for improvement in the PNG arrangements by separating responsibility for the UAS fund from NICTA, incentivising ICCC and NICTA to interact as effective checks on each other, and holding NICTA to account for the delivery of important performance information, change for PNG consumers will not eventuate if Telikom as the holder of the second and third mobile operator licenses cannot or will not actively compete with Digicel. Increased mobile competition can only come from issuing at least one more operator licence, preferably to a foreign operator prepared to invest capital in the PNG market. However, based on the Digicel experience, entry will not occur unless politicians can credibly commit to refrain from intervening either formally or informally to alter the current regulatory settings. With such entry, there is no reason why PNG cannot demonstrate sector outcomes more reminiscent of Myanmar and Timor Leste than Kiribati and the Solomon Islands.

**Table 1: Comparisons of Key Telecommunications Market Indicators, 2017**

Data	East Asia	Lower-mid	Solomon					Timor-					South				
	PNG	Pacific	Income	Vanuatu	Kiribati	Islands	Fiji*	Samoa	Tonga	Philippines	Leste	Myanmar	Indonesia	Vietnam	Laos	Africa*	Namibia*
<b>Prices</b>																	
Mobile cellular sub-basket (\$/month)	22.5	6.8	6.9	21.9	20.8	15.6	17	16.5	11.7	10	14	1.9	5.4	4.4	6.8	7.1	4.3
Fixed broadband sub-basket (\$/month)	21.7	20.5	14.3	54.9	187.8	275.2	16.8	38.7	32.2	22	49	18.2	28.8	2.8	18.4	12.9	27.4
Mobile broadband prepaid handset --based 500MB (\$/month)	23.8	6	5.8	7.8	22.5	31.6	8.6	19.5	8.2	4.4	10	2.4	4.1	3.5	6.1	7.8	10.1
Mobile broadband postpaid computer-based 1GB (\$/month)	39.3	11	10	36.9	56.3	72.6	12	20.2		19.7	12.5	7.3	4.1	5.5	6.8	6.7	17.2
<b>Access</b>																	
Fixed subscriptions (per 100 people)	2	17.3	3.5	1.8	1.4	1.3	8.1	5.6	12.4	3	0.2	1	8.8	6.3	13.7	7.7	7.6
Mobile-cellular telephone subscriptions (per 100 people)	46.6	104.2	90.5	66.2	38.8	72.7	108.2	58.5	65.6	118.1	117.4	76.7	132.3	130.6	53.1	159.3	102.1
Fixed broadband subscriptions (per 100 people)	0.2	15.8	1.9	1.6	0.1	0.2	1.4	1.1	1.9	3.4	0.1	0.3	1.1	8.1	0.5	5.3	1.7
Households with a computer (%)	3.8	47.7	19.3	24.8	6.7	6.7	39.2	22.6	37.1	27	18.9	14	18.7	22	11.4	23.4	17.7
Households with internet access at home (%)	5.3	55.5	24.3	34.5	6.3	6.3	31.3	25.5	39.5	28.3	21.7	15	38.4	24.1	11.4	50.6	24.5
<b>Usage</b>																	
Int'l voice traffic (minutes/subscription/month)		2.2	7.5					21.1					1.5		10.7	3.4	1.6
Domestic mobile traffic (minutes/subscription/month)		176	152								94.5				18.2	79.7	103.8
Individuals using the internet (%)	7.9	49.8	28.6	22.4	13	10	46.3	25.4	45	40.7	13.4	21.8	22	52.7	18.2	51.9	22.3
<b>Quality</b>																	
Population covered by at least a 3G mobile network (%)		65		51	63	12	68	1	70	78	96	79	60		65	98	37
International internet bandwidth (bit/s per internet user)	9,122	37,552	10,372	8,477	2,916	4,277	27,399	7,842	14,623	37,409	2,546	3,676	6,584	24,374	16,795	147,630	22,546

Key: \* indicates an upper-middle income country (all others are low-middle income)

Pink shading indicates a worse performance in the statistic than PNG

Source: International Telecommunications Union, [http://www.itu.int/en/ITU-D/Statistics/Documents/publications/ldb/LDB\\_ICT\\_2017.pdf](http://www.itu.int/en/ITU-D/Statistics/Documents/publications/ldb/LDB_ICT_2017.pdf)

**Table 2: Checklist for Regulatory Effectiveness Evaluation**

<b>Criteria</b>	<b>Artefacts</b>	<b>Comments re</b>
<b>1. Objectives</b>		<b>Developing Countries</b>
Degree of effective competition	Policy statements Competition authority competence Consumer welfare objectives	Greater reliance on ex ante regulation Trade-offs due to financial and human capital constraints
<b>2. Independence and competence</b>		
Structural	Allocation of regulatory tasks across agencies Potential for political influence Neutral appointments processes Central vs decentralised regulatory activities	Degree of political benevolence matters Separation of responsibilities reduces rent-seeking opportunities
Financial	Funding of regulatory bodies – level and source Potential for regulator capture	Effect of subsidies Greater reliance on licence funding
Functional	Clearly-delineated functional definitions Timeliness of decisions/actions Competence of agency staff	Limited commitment affects regulator incentive strength,
<b>3. Procedural</b>		
Accountability	Appeals processes Reporting obligations – including frequency Governance expectations International obligations Potential for regulatory capture	Trade-offs between regulator independence and accountability effectiveness
Transparency	Publicly-available decisions, documentation	Importance of International commitments
Predictability	Review cycles (instruments and policies)	Degree of political commitment and benevolence matters
<b>4. Other</b>		
Efficiency	Non-discriminatory allocation of resources (e.g. spectrum) Cost-based pricing principles Degree of regulator commitment	Greater need for checks and balances if other institutions are weak or unpredictable reduces efficiency potential
Equity	Universal service provisions Other subsidy arrangements Non-discrimination principles	Greater importance of subsidies

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