

The South African Government's ECA amendments Bill: an assessment

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This report, prepared at the request of Vodacom, discusses certain high-level aspects of the proposals in the Draft Bill relating to the regulation of the mobile communications sector in South Africa. They include changes in institutional arrangements and in the substance of regulatory outcomes.

I have been asked to comment on a subset of these changes, including the ones which are likely to have the greatest impact on the performance of the telecommunications sector as a whole.

The report is organised as follows:

- Section 1 outlines the Government's policy goals for the sector and some of the provisions of the draft legislation;
- Section 2 evaluates the likely impact of the proposed redistribution of powers between the legislature, the Minister and the independent regulator, ICASA;
- Section 3 evaluates some proposed regulatory changes, relating particularly to spectrum licensing and open access;
- Section 4 focuses on the policy of introducing into the South African market place a wholesale only access network, or WOAN; and
- Section 5 summarises and evaluates the package as a whole.

Section 1: the policy goals of the sector and the legislative proposals

There are number of objectives for the communications sector in South Africa, including: equality, accessibility, social development, economic growth, investment, innovation and competition, transparency and accountability.² Also important in the present context are the White Paper's principles and values: "In line with this, the following principles and values have guided the development of this policy and will steer implementation of this White Paper framework:

- Any interventions must be *necessary* to meet clearly defined public interest objectives.
- Any interventions must be *proportionate, consistent and evidence-based* and determined through public consultation.

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2 White Paper, pp. 10-11

- The policy maker and regulator must consider the *least intrusive* mechanism to achieve the defined public interest goal/s, and will consider, where appropriate, alternative models such as co-regulation and/or self-regulation.
- The *socio-economic and regulatory impacts* of any action will be assessed and
- The policy maker and regulator will *act fairly* and *ensure regulatory parity* in defining markets and deciding on interventions.
- The regulator must perform regulatory activities and functions in line with policy. When taking decisions the regulator must *function without undue external influences and carry out its decision-making functions independently.*” (Emphasis in the original) (p. 12).

The legislative proposals in the Draft Bill, now to be evaluated in the light of the White Paper’s objectives and its principles and values, fall into the following categories:

- Those relating to the independence of regulation and the distribution of powers between the legislature, the Minister and ICASA. In particular, I note that many discretionary powers over what are conventionally seen as regulatory matters are either pre-empted by the legislation or transferred from ICASA to the Minister, such as the assignment of spectrum, remedies etc. This raises the issue of whether this will diminish the benefits resulting from the independent exercise of authority of the regulator;
- Those relating to spectrum licensing and open access provisions. Many substantive changes in regulation are proposed in the Draft Bill. They raise questions as to their effect on the overall performance of the sector, on the scope of competition and on levels of investment and innovation; and
- Those relating to the plan to create a wholesale open access network or WOAN. Issues arise as to the objectives of the WOAN; the interrelations between the WOAN and existing networks; and the resources to be made available to the WOAN.

Section 2: Effects of the Draft Bill proposals on the independence of the regulator

It is useful to briefly elaborate upon the above-noted principle underlying the White Paper:

“The regulator must perform regulatory activities and functions in line with policy. When taking decisions the regulator must *function without undue external influences and carry out its decision-making functions independently.*” (Emphasis in the original.)

Such a discussion unlocks an important aspect of regulation.

The principle explicitly makes the distinction between policy and regulation. Policy is the preserve of the legislature and the democratically elected government. It goes to the nature of the country's overall goals for advancement and the correct balance amongst them. The political element in the choice is inescapable.

However, it is likely that the technical means by which the objectives are achieved are better off left to a technical agency operating within a clear legislative framework which prescribes agency's objectives, duties, and (in outline) its processes. Such an agency is separated from the hurly-burly of political strife; it can follow clear and internationally recognisable processes and procedures; and it can be made subject to a specified appeal process to a court. This equips it to make technical firm-specific decisions.

Why is this division of responsibilities so widely observed? A basic reason is that many of the assets owned by firms in network industries, such as local access networks, require a commitment of funds which cannot be reversed: in other words, the assets are sunk, or irretrievable. Private sector firms require confidence in the arrangements to make the necessary investments. If there is a lack of confidence in the firm's capacity to recover its efficient costs, willingness to invest in the future will diminish and firms' required rate of return will go up. In the case of mobile communications, this will have not only a direct effect on the sector but will delay the benefits that digital transformation can bring throughout the whole of South Africa's society and economy.

This explains the nearly universal difference in the manner in which policy decisions are taken via by a political process and more technical implementation of those decisions by an independent agency which "*must function without undue external influences and carry out its decision-making functions independently.*" Such a rules-based implementation process can mesh with a variety of policy objectives.

The problem arises in part because regulatory decisions cannot be taken in advance over the lifetime of the major investments required in the telecommunications sector. They have to be adapted to changing conditions of demand, cost and technology, as well as changes in policy objectives. As a result, they cannot be normally set in stone by legislation or other means.

There are some exceptions to this rule. Sometimes, in order to make a decision irreversible, it is embodied in legislation or even in a more fundamental constitutional document.³ Sometimes regulatory objectives are accomplished by the conclusion of a concession agreement which is engrossed in a long-term private law contract, enforceable in the courts.⁴

3 For example, in order to ensure a particular spectrum assignment for a WOAN in Mexico, it was incorporated in a Transitory Article in the Mexican constitution.

4 Such a contract was concluded by the Jamaican government several decades ago as a result of problems with regulation of the telecommunications sector which are noted in section 3 below.

However, it is only on rare occasions that the precise nature of the subsequent interventions (for example, efficient future spectrum assignments or allowable price levels) can be set over the whole lifetime of the assets in which an operator has to invest. In such circumstances, prospective technical decisions can lie either within the competence and discretion either of the Minister, or of a regulator which is bound by specified duties and obligations, subject to certain procedural rules, and open to an appeal process through the courts.

Important examples of such technical decisions which frequently lie within the regulator's remit include the following:

1) Which firms should be awarded what spectrum licences?

The assignment of high value spectrum licences to individual *firms*, often within an overall framework of spectrum allocation to different broad *uses* based on government policy, is a highly technical matter which requires expertise which government departments may not possess. Access to such a valuable resource is often very contentious, and the assignment is often better done by a technical implementing body than by a government department, which is inevitably subject to pressure from applicants and other interested parties.

2) Which firms exercise market power? What remedies are required to prevent it from being used?

These too are technical, quasi-legal determinations which have important consequences for all firms in the market place. For the same reason as specified above, it is widely considered to be better done by a regulatory agency than by a Minister. By the same token, the legislation should not, under normal circumstances, try to pre-empt the regulator's technical choices in such matters, by (for example) limiting the discretion of the regulator to make decisions concerning how to rectify market failures.

While there may be some demarcation problems in deciding what belongs to policy and what to implementation and regulation, experience suggests that there is a high degree of similarity in international practice of such determinations.

Yet the Draft Bill removes discretionary authority from ICASA in a number of ways, either by prescribing what ICASA must do when previously it exercised discretion, or by transferring the exercise of discretion to the Minister.

In more detail, the Draft Bill:

- *gives the Minister the role of deciding what constitutes high demand spectrum;*
- *gives the minister the power to decide the allocation of high demand spectrum, to the WOAN or to other operators;*

- gives the Minister the power, following a report by ICASA, to decide which already assigned high demand spectrum operators should be returned to the Authority for re-assignment;
- requires all vertically integrated mobile operators to produce separated accounts – irrespective of their market size; ctr 8, 43, 1A
- requires ICASA to designate as a ‘deemed entity’ any licensee which has 25% or more of an electronic communication network in an infrastructure market; (44, 3A, (a))
- requires ICASA to mandate that cost oriented access to be offered by MNOs that are declared ‘deemed entities’ by ICASA⁵; ctr 8, 43, 1B
- requires ICASA to develop within 18 months of the Bill, wholesale open access regulations (to facilitate open wholesale access); 8, 44, 1.
- seems to suggest that any licensee that controls exclusively used spectrum should also be designated by ICASA as a deemed entity – this means effectively everyone that controls exclusively any type of spectrum; (44, 3A, (b))
- removes the ability of ICASA not to require access to fibre loops – (44, 7) – this seems to have been a measure to try and encourage investment in fibre;.
- limits ICASA’s power to determine the terms for the award of spectrum to the market participants, by imposing a rule that for a potential bidder to acquire LTE spectrum they have to first commit to buying 30% of the capacity of the WOAN;
- transfers from ICASA to the Minister some of ICASA’s key responsibilities, including
 - the establishment of a National Radio Frequency Planning Committee and a National radio Frequency Planning Division. S29A (d)*
 - responsibility for the Development of the National Radio Frequency Plan which currently resides with ICASA. S29A(e)*
 - ensuring equitable distribution of radio frequency spectrum resources*
 - responsibility for approval of Universal Service Access and Universal Service Obligations.*

This amounts to a substantial ‘hollowing out’ of ICASA’s functions. Accordingly, my conclusion from this section is that the Draft Bill contains provisions for the redistribution of decision-making authority among the legislature, the Minister and regulator (ICASA), which depart from international practice which itself is designed to introduce certainty into the environment in which major investment decisions are made. The resulting greater uncertainty runs the risk of chilling firms’ incentives to invest.

Finally, it is worth pointing out the administrative consequences of the redistribution of powers. When an independent regulator is first created, it typically appoints new staff, some of them may be transferred from the ministry itself, where they may have been performing some tasks now transferred to the regulator. As a result, the ministry loses expertise in tasks now performed elsewhere. When – as is proposed in the Draft Bill here – some of these tasks

5 The Bill also seems to suggest that any licensee that controls exclusively used spectrum should also be designated by ICASA as a deemed entity – this means effectively everyone that controls exclusively any type of spectrum (44, 3A, (b)).

are transferred back, that expertise has to be rebuilt or replicated with the Ministry. This is a difficult and possibly costly process. The blurring of the dividing line between Minister and ICASA may also lead to disputes between the two sides which may take some time to resolve.

Section 3: The likely effects of certain proposed legislative changes relating to spectrum licensing and open access

In this and the following section, I consider three important components of the package in the Draft Bill in the light of the observations above. More particularly, this section discusses the following proposals:

- A) All assignment of high demand spectrum is subject to the principles of open access and non-exclusivity⁶; thus mobile operators should be obliged to open their networks to others on the basis of cost-based pricing.
- B) Currently used spectrum will be returned to the Authority subject to the outcome of an inquiry to be conducted by ICASA (with a possibility of the spectrum being returned before the expiry of the current licences).
- C) Radio spectrum licences will be renewable annually;⁷

The next section discusses the WOAN.

- A. Mobile communications were developed on the basis of heavy reliance on vertically integrated companies, which controlled the infrastructures on which they sold services. This reflected the fact that duplication of infrastructures is quite feasible – unlike the situation in fixed networks.

In recent years, the general trend globally has been to confirm a preference in favour of the maintenance of infrastructure competition; for example, proposed consolidations via mobile mergers have been rejected in the EU and the USA.

This has not precluded substantial network sharing in many jurisdictions, especially of passive assets such as towers. This approach allows cost economies to be exploited while at the same time operators can make choices and compete with respect to the services they provide – for example the quality of service offered, the generation of mobile technology employed, and the geographical extent of the coverage offered. As a result of this differentiation, they are under competitive pressure to offer services which are advanced, of high quality and good value, and to improve them continuously.

6 Draft Bill, Section 31E(6)

7 Chapter 5, 3A, (a).

As noted in Section 2 above, in the case of networks with a market share of more than 25%, the Draft Bill proposes to mandate open access to mobile wholesale products via roaming and/or MVNOs. This involves sharing not just of the passive assets such as towers or spectrum itself⁸. This amounts to full network sharing - offering access in effect to all the components (electronic and non-electronic) in the value chain, with the exception of the retailing activity itself. This raises significant incentive problems, especially in a rapidly changing sector like mobile communications. If access is mandated, then every investment an operator makes in a 4G or 5G is shared with its competitors. This means that the Draft Bill's objective "to promote service-based competition and avoid concentration and duplication of electronic communications infrastructure in urban areas," might suitably be qualified by a recognition that too much network sharing, particularly of network components which support differentiation and innovation, may harm end users' interests.

The Draft Bill contains a further objective of "redressing market dominance and control". Assessing the level of competition in mobile markets, and adopting remedies to prevent the exercise of market dominance, is a world-wide pre-occupation of regulators. In South Africa as in many jurisdictions, the degree of competitive pressure in the mobile market place is the subject of periodic review by the regulator, ICASA. Such a review is shortly forthcoming, and I am in no position to anticipate its conclusions.

However, one acknowledged response to any finding of the exercise of market power is the imposition of appropriately calibrated access obligations. I have suggested above that on-going market reviews of this kind are normally the regulator's responsibility, because they require detailed technical analysis and affect the fortunes of individual firms in a way which make it desirable to insulate them from political decision-taking.

The current legislation provides for such market reviews, and one is projected. One factor which ICASA would have to take into account in its forward-looking market analysis is the WOAN. This introduces a new network player, which by its very nature provides a route to market for any entrant into the retail market. It would therefore be appropriate, before making a decision on open access arrangements, to consider the degree to which the WOAN expands the competitive potential of the mobile sector. In my view, using the existing scheme of regulation is a more satisfactory way of dealing with such decisions than using the legislative process to pre-determine the solution.

⁸ Open access is thus quite different from spectrum sharing, which in many recent applications involves creating a 'pecking order' of access rights to spectrum, which ensures by the primary licensee to spectrum in a band, while unutilised spectrum is made available to secondary users, usually on a dynamic and interruptible basis, using a data base of utilisation.

- B. The Draft Bill contemplates that, following receipt of a report from ICASA, the Minister might decide to withdraw spectrum from existing licensees before the expiry of the current licences.

This falls into the category of a retrospective regulatory change, which in this case carries a particularly high risk of stranding an operator's collateral assets and chilling investment incentives in the future.

The Draft Bill does not specify to what degree the withdrawal would be compensated. But since the operators have made network investment decisions which rely upon licensed access to spectrum, compensating the operators' full economic losses (even after mitigation by the sale of stranded assets) might be large.

If compensation were not paid, then the potential effect on investors' willingness to commit funds would be considerable. I am not aware of an example of such uncompensated appropriation of key spectrum in the mobile sector, but a parallel event occurred in the last century in fixed communications in Jamaica.

That industry went through many vicissitudes of fortune in the late decades of the 20th century.⁹ One notable event involved what has been described as the 'quasi-expropriation' of the incumbent. This was accomplished by the use by the regulator of its wide powers to impose onerous price controls and service obligations; when these have not only deprived the company of any return on its invested capital, but brought into question whether its revenues would cover its operating costs, exit is likely to occur. The Jamaican incumbent accordingly abandoned its business.

In the aftermath of this confidence-sapping event, the Government – after a brief period of running the business as a nationalised industry and a failure to attract other firms - was forced to award a new operator with a new licence which shared many of the features of a private law concession contract, enforceable by an independent judiciary. The price end users had to pay to regain investor confidence was a guaranteed after tax return on equity of about 18% per annum in dollar terms. In my view, this high 'corrective' level of returns demonstrates the possible adverse consequences of a 'quasi-expropriation.'

The retrospective withdrawal of spectrum from operators, especially if they have made parallel investments in assets which are then stranded, risks having effects of the same kind, because it enhances perceived regulatory risk and raises the return investors require. In some circumstances, this would raise prices to end users. But if the cost-based estimate of access charges which the legislation provide for does not take this higher cost of capital into account, the result may be that the company affected withdraws the plan to

⁹ See Pablo Spiller and Cezley Sampson, 'Telecommunications regulation in Jamaica', pp. 36-78 in B Levy and P Spiller (eds.) *Regulations, Institutions and Commitment*, 1996, and Ashley Brown *et al.*, *Handbook for Evaluating Infrastructure Regulatory Systems*, World Bank 2006, p. 118

invest. If investors in other sectors witness this occurring in the mobile sector, they may revise upwards their estimate of regulatory risk not only in the mobile sector alone, but more widely in the South African economy. This would have a greater chilling effect.

C. Switching spectrum licences to an annually renewable basis poses a problem of the same kind for operators. If they are guaranteed access to spectrum for only one year at a time, how can they risk making investments in collateral assets which might be of little or no value without spectrum access? This consideration has led or is leading to the lengthening of the duration of spectrum licenses in other jurisdictions, notable the US and the European Union.

I believe that these concerns are not theoretical only. Operators are likely to factor regulatory risks of the kind described here into the ‘hurdle rate’ they use to justify future investments in any jurisdiction. These chilling effects are not likely to be very conspicuous, since they merely generate a void in investment plans, but as they apply to all operators they can have a very large cumulative effect on the sector and indirectly on economic prosperity in general.

This discussion suggests that the three measures considered above would have unintended consequences, particularly in terms of their effect of chilling investment, reducing competitive pressure, and elevating prices.

Section 4: The WOAN proposal

The Draft Bill’s WOAN proposal represents a major structural intervention in mobile communications. It follows in the footsteps of similar ventures in some other countries, but the number of such government-inspired plans for a wholesale only network is still quite small.

Using the spectrum assignment process directly to affect industry structure is as old as the mobile sector itself. The number of licensees in most national markets was ratcheted up from initially one or two to three to six – or in some cases to as many as a dozen.

However the current WOAN proposal has additional features: i) the network created is wholesale only, ii) MNOs which want to keep their own high demand spectrum are required to purchase 30% or more of the network’s capacity and iii) it is likely to have the characteristics of a public/private partnership – which creates the opportunity to pursue non-commercial objectives such as increasing the diversity of mobile ownership and promoting access. I first consider how a WOAN can best be used to keep prices down, and then how it can pursue other objectives.

In the case of the WOAN soon to be implemented in Mexico, the most prominent *raison d’être* was to combat a situation in which a strongly dominant mobile operator (with 70% of

subscribers) had raised prices and restricted take-up in the mobile sector.¹⁰ This was accomplished by assigning the 700MHz band to a public private partnership, for which the private partner has been chosen via a tendering process.

In competition terms, it is noteworthy that the impact of a WOAN is to enhance network competition by an additional network, and to expand service competition by as many new retailers as can be enticed by the WOAN into the market.

The WOAN's impact on increasing network numbers should benefit customers because it will put downwards pressure on costs, limit profit margins and encourage the innovation which has been such a visible and beneficial feature of mobile communications since the sector came into existence a very few decades ago. Its pro-competitive effect will be felt less strongly in more densely populated areas in South Africa, where as many as four networks are already in place, than in under-served areas where there is either no network or only one or two small number.

However, I believe it would be very risky to use spectrum assignments to focus incremental capacity from 2018 on the WOAN alone, by granting it priority access to new bands, and possibly in addition by transferring to it bands currently held by existing mobile networks. That would effectively leave almost all network investment decisions in the hands of a single gate-keeper - the WOAN, which would have little incentive to take timely and well-thought out decisions, and – in considering network up-grades - would be influenced by the knowledge that households and firms would have nowhere else to go for new services. A possible by-product of this would be the elimination of the 'races' currently observed between two or more rival network operators to bring new network services to the South African market place.

It would also very quickly make the WOAN a dominant supplier of data services in South Africa. This is demonstrated by the Cisco projections of mobile data growth in South Africa.¹¹ Between 2017 and 2022 mobile data traffic is projected to grow by a factor of 2.4. – from 447 to 1062 Peta Bytes. If this increment were largely provided for by the WOAN – because rival networks were deprived of additional spectrum - the WOAN would quickly build up a powerful market share in terms of data volume carried.

I believe that a non-dominant WOAN can usefully be introduced in South Africa. It should maintain and in (in some geographies) enhance existing levels of network competition, and deliver better, cheaper services to end users. It will also promote service competition.

If this policy were adopted it would be necessary for competition between the WOAN and existing MNOs to be put on a fair. To achieve this 'fair competition' objective alone, this would mean that the WOAN should not as a matter of course receive all special advantages

10 See OECD Review of Telecommunications and Regulation in Mexico, 2012.

11 See https://www.cisco.com/c/dam/m/en_us/solutions/service-provider/vni-forecast-widget/forecast-widget/wizard.html

mentioned in the Draft Bill, such as waivers of or reductions in lower spectrum fees, and privileged access to rights of way.

However, it should transparently receive resources to recover its costs which are incurred in respect of the important non-commercial goals which it is pursuing, including increased diversity and extended coverage.

As the white paper makes clear, enhancing the diversity of providers of mobile services is a major objective of policy.

Another major goal is likely to be the promotion of access to advanced mobile voice and data services in under-served areas. This same objective, in conjunction with enhancing competition, is a particularly important element in the Mexican shared network. This raises an important question concerning how to deploy the WOAN. There is a case for starting the deployment in under-served areas, where a shared network has several advantages: it can naturally support retail competition in such areas, and has no motive to discriminate among its retail customers, which can include local collectives. Second, it is a possible repository for subsidies from universal service or other funds responsible for rural and underserved areas.

The WOAN's coverage strategy will have to be determined in the light of its objectives, as set out in the White Paper, in conjunction with its business plan, which will likely impose some constraints on the proportions in which it will seek to rely on ordinary commercial revenues and subsidies.

As for implementation of the WOAN, I note that ICASA has already responded to the policy push towards a WOAN in its preliminary reservation of some spectrum for it.

ICASA will also, in its forthcoming market review, conduct an investigation into the question of market power in mobile markets, which will illuminate the WOAN's role in imposing an additional competitive constraint on the market. As noted above, the existence of a WOAN is likely to reduce the need for fuller access remedies, and in particular, the need going forward for open access provisions on existing operators. At the same time, with the WOAN existing 'universal service' provisions for the wider availability of mobile services in under-served areas will have an additional instrument to deliver these benefits.

In my view, these are good illustrations of the above-noted White Paper principle that:

“The regulator must perform regulatory activities and functions in line with policy. When taking decisions the regulator must *function without undue external influences and carry out its decision-making functions independently.*”

There is no doubt that a number of major decisions concerning the WOAN are still outstanding. I have mentioned a subset of them, with a focus on how to bring the benefits of choice and competition to end users, and will consider the role which the WOAN can play in

other objectives below. A range of other key organisational, administrative and legal questions are identified in the Annex.

Section 5: The draft bill package as a whole

The goal of this report has been to provide a high-level review of the South African Government's proposals in the Draft Bill for the mobile sector.

I note that a major feature of the draft Bill is its proposal to rebalance power among legislators, the Minister and ICASA, to the detriment of ICASA. Thus much more of the regime is prescribed in law than before, and discretion formerly exercised by the regulator is transferred to the Minister. I am concerned that taking decisions of a technical rather than a policy nature from a neutral implementing body to a more political institution runs the risk of introducing greater uncertainty into the sector, to the harm of end users.

The second aspect considered is the Draft Bill's explicit intention to impose harsher access obligations on existing operators, and to revisit their spectrum entitlements. I am concerned that such policies risk increasing perceived regulatory risks and discouraging much needed investment in the sector.

Finally, I welcome the introduction of a WOAN, to enhance both service and network competition and to achieve equity objective such as increased participation in the sector and wider access to mobile services. However, the introduction of a WOAN should not be allowed to allow the emergence of a new dominant firm, which - by virtue of its privileged access to spectrum - would become first the monopoly provider of incremental capacity, and then – as other firms left – an overall monopolist. This would have a very adverse effect on the South African mobile sector, and on the whole economy.

Annex: some major decisions required to implement the WOAN

There is no doubt that a number of major organisational, administrative and legal decisions required to make the WOAN a success. These include:

- How the investment is financed: thus in Mexico, in the public/private partnership (PPP) which has come into existence to run the Red Compartida (or shared network), the government will provide the spectrum and a new operator which has emerged from the competitive tendering process will raise the finance to build and operate the network. A different approach is envisaged in South Africa, with some finance from existing operators.
- How to set wholesale prices to be charged: again in Mexico these emerged from a tendering or negotiation process. But if (as seems inevitable) the public private partnership requires agreement on a long-term pricing trajectory, there has to be price adjustment mechanism (probably with escalator clauses or arbitration) over, say, a 20 year time horizon.
- How decisions within a government/ operator coalition might in practice be made. We know from experience of co-investments undertaken by firms, that there is a mixed record. Thus passive infrastructure sharing agreements entered into by mobile operators have been implemented fairly painlessly, since the parties have basically the same objectives; but ex ante co-investment agreements to build new networks can easily founder upon the parties' differences in cost structures, market segments attacked, costs of capital etc. The presence of the government as a major player in the decision-making process may lead to other complications.
- How to configure the relationship with existing telecommunications providers. This places each operator in the dual position of having access to its existing one network over which it exercises sole ownership and control, and sharing ownership and control over something akin to a joint venture running another substitutable network. The former network offers its owner wholesale services at marginal cost, and the latter at a weighted average of its marginal cost and its marginal price (the weights depending on the operator's share in the joint venture). If the WOAN is priced at a standard per unit charge, each operator will have a preference for using their own network first, until it is full up and marginal costs start rising. This can be, and is, combated by imposing obligations on other networks to make purchases from the WOAN or by more complex WOAN tariffs involving a 'take or pay' element. But calibrating these obligations and tariff over a long period is a complex task. The more general point is that conflicts of interest within and among operators must be very carefully managed.

In my opinion it is essential to deal successfully with all these issues, if the WOAN is to do its job.

**Curriculum vitae of
Professor Martin Cave, B.A., BPhil, DPhil**

Date of birth : 13 December 1948

Education

BA, First Class, Philosophy, Politics and Economics, Balliol College, University of Oxford, 1969

BPhil in Economics, Nuffield College, University of Oxford, 1971

DPhil, Nuffield College, University of Oxford, 1977

Principal Academic Employment

1974 to 1989 Lecturer, Senior Lecturer and Professor of Economics, Brunel University.

1989 to 2001 Dean of the Faculty of Social Sciences, Pro-Vice Chancellor and Vice-Principal (Deputy Vice Chancellor), Brunel University.

2001 to 2010 Professor and Director, Centre for Management under Regulation, Warwick Business School, University of Warwick

2010 to 2011 BP Centennial Professor, London School of Economics and Political Science

2011 to 2017 Visiting Professor, Imperial College Business School, London.

2018 to 2021 Visiting Professor, London School of Economics.

Principal Public Sector Advisory and Other Activities

From 2012 to 2017 I was successively **deputy chair of Competition Commission** and **deputy panel chair of the Competition and Markets Authority**. My role was to chair merger inquiries, market investigations and regulatory appeals.

I have conducted a number of independent reviews for the UK Government, as follows:

- Appointed by the **Chancellor of the Exchequer and the Secretary of State for Trade and Industry** to conduct an independent review of radio spectrum Management 2001-02

- Appointed by the **Chancellor of Exchequer** to conduct an independent audit of major spectrum holdings, 2004 - 05

- Appointed by **Secretary of State for Communities and Local Government** to undertake an independent review of the regulation of social housing, 2006-07

Appointed by the **Chancellor of the Exchequer and the Secretary of State for DEFRA** to conduct a review of competition and innovation in the water sector, 2009-10.

- Appointed by the **Secretary of State for Transport** to chair an expert panel on airport regulation, 2008-09

Also:

-Member, panel advising **UK Government** on spectrum valuation, 2014/5

-Member, panel advising **French Government** on fibre policy, 2013/14

- Consultant to the UK **Office of Railway Regulation** on competitive and contestable regulation, 2010-11
- Regulatory adviser to UK Government **Review of Royal Mail**, 2010
- Member, **UK Payments Council**, 2006-2011; Acting Chair, Nov 2009-April 2010.
- Special adviser to **European Commissioner Reding** on the reform of European telecommunications regulation, 2006..
- Adviser to **Lord Chancellor's Department** on reforms in legal regulation 2004-5.
- Economic Advisor to **Ofcom**, 2003 to 2006.
- Non-Executive Advisory Director at **OFWAT**, 2001 - 2005.
- Member, **MMC/Competition Commission**, 1996-2002.
- Adviser to **Oftel**, 1990-2000.
- Economic Adviser, part-time, **at HM Treasury**, 1986-90.

I am joint academic director, at the **Centre on Regulation in Europe (CERRE)**, a Brussels-based think tank.

Selected books and articles

Selected books, reports etc.

(with Richard Feasey) *European Policy towards Competition in High Speed Broadband in Europe*, CERRE, March 2017. Available at http://www.cerre.eu/sites/cerre/files/170220_CERRE_BroadbandReport_Final.pdf

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(with Ernesto Flores-Roux) ‘Co-ordinating policies to realize the benefits from the digital economy: the case of Mexico’, *Anti-trust Bulletin*, 2017.

(with Rob Nicholls) ‘The use of spectrum auctions to attain multiple objectives: policy implications,’ *Telecommunications Policy*, 2017

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