# AJTDE Volume 4, Number 4, December 2016

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# Telecommunications Market Evolution and the Need for Legislative Stability

## Editorial

Mark A Gregory
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Abstract: It would be wrong to expect either market or legislative stability in any large and complex industry today. The Australian telecommunications industry is no exception and in the lead-up to 2017 there have been a number of government reviews and inquiries announced that are certain to add to the instability if the outcomes do not focus on the long-term interests of end users. Whilst stability may not be achievable in an industry that is dependent on rapidly changing technology, there are aspects of telecommunications competition policy that are broken and need to be fixed urgently. Now is not the time to take an axe to the telecommunications competition legislation, especially when the underlying government policy is the cause of the instability. Mr Graham Shepherd, a leading member of the TelSoc Board and the Journal Board for many years, has retired from the TelSoc Board.

## In This Issue

In this issue the *Journal* includes articles that cover a range of telecommunications policy related issues including papers from around the world that analyse the national telecommunications legislation and regulation environment. The excellent series of papers on the history of Australian telecommunications continues with a paper on the Telstra Research Laboratories and a paper on customer leadership.

*The Telstra Research Laboratories* includes three selected papers detailing the breadth of the research undertaken by the Research Laboratories of the Postmaster-General's Department (now Telstra).

*Towards Customer Leadership, Building a Sales Force in Telecom Australia in the 1980's* provides a brief history of Telecom's decision to build a sales force to reposition the company as a retail focused organisation.



http://doi.org/10.18080/ajtde.v4n4.80

*Net Neutrality: A perspective responding to recent developments in the European Union* explores the scope and application of the European Union's recently adopted net neutrality regulations.

*Market Evolution and Regulation in the Italian Telecommunications Industry* provides a review and analysis of the evolution of the Italian telecommunications market from the beginning of the liberalisation and privatisation process that commenced in the early 1990s.

*Spain: from monopoly to (progressive) liberalization, Two decades of telecommunications regulation* provides a review of telecommunications in Spain and highlights the evolution whilst touching on the relationship and tensions with European Union legislation.

*What Influences International Differences in Broadband Prices?* discusses the factors influencing international differences in broadband pricing, why this discussion receives limited attention in the academic and policy literature and how broadband pricing affects Australian consumers.

*Reciprocity of Government Restructuring/Policy Changes and the Convergent Environment in South Korea* analyses the interaction between government ministries, regulators and the telecommunications industry in South Korea relating to telecommunications convergence and the emerging broadband ecosystem.

*A review of New Zealand Telecommunications: Legislation, Regulations and Recommendations* provides a review of existing telecommunications legislation and regulations in New Zealand, highlights the existing legislation in the country and discusses the organizations responsible for regulating the underlying laws and provides recommendations for changes to the existing legislation and regulations in New Zealand.

*The Australian Telecommunications Regulatory Environment, An overview* provides an overview of the changing legal and regulatory regime for telecommunications and related services in Australia by charting the changes in regulation from 1901 to the present, and by indicating some of the changes that are still evolving.

*The Shape and Implications of Korea's Telecommunication Industry: Crisis, Opportunity and Challenge* provides a brief history of Korean telecommunications is supplemented by an overview of the social and economic factors the Korea is experiencing, the government's role as a key player within industry and relevant policy and an analysis of the market competition and regulation systems as well as customer protections and the future of IoT and 5G.

*Telecommunications in Poland, Infrastructure, market and services* describes the telecommunications market in Poland, and explores the organisation and infrastructure of



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Poland's networks as well as the evolution of this sector within the last few decades and put a number of issues in the Polish experience in perspective.

*The retention and disclosure of location information and location identifiers, OTT content and communications services* describes how Australia's metadata retention and disclosure regime addresses the retention and disclosure of location information and location identifiers by locally licensed telecommunications service providers and those that do not require a licence to operate in Australia.

## Mr Graham Shepherd's retirement

Graham Shepherd stepped down from the TelSoc Board in 2016, but has remained an active contributor to TelSoc's operations, albeit at a reduced pace, not least in supervising the administration of the TelSoc website. He remains a member of the Editorial Board of this Journal.

Graham was one of the seven founding directors of TelSoc, and his contributions were fundamental to TelSoc's creation and its ongoing success. Graham researched the pros and cons of the alternative legal structures available to the new Society. Having persuaded his fellow founders to choose a registered Association, he obtained a set of Model rules which were easily adapted to TelSoc's purposes, and was then instrumental in creating the financial and administrative processes and resources that underpin Telsoc's operations today.

Crucially, Graham, singlehandedly, created an operational website that the new Society has used ever since. Without this website, the Society might have struggled to find its feet as it sought to move forward following the instability created during the demise of the Telecommunications Society of Australia. For a fledgling Society being able to communicate with the membership is crucial and Graham's website provided the tools necessary to support the Society's activities.

Graham persuaded Peter Gerrand, the long-time Managing Editor of the Telecommunications Journal of Australia (TJA), of the advantages of publishing the Journal through the TelSoc website rather than on an independent site as before, for the benefit of both TelSoc members and Journal authors. Graham went on to add further functionality to the website, including a history section relevant to the Australian telecommunications industry.

Graham became a member of the Editorial Board of TJA and its successor the Australian Journal of Telecommunications and the Digital Economy, where his contributions to strategy and in reviewing authors' submissions have been greatly appreciated. Members of the Journal Board thank Graham for his tireless efforts over many years.



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## Looking Forward

The key themes for 2017 will be *International Telecommunications Legislation and Regulations* and *International Mobile Cellular Regulation and Competition*. As the global digital economy evolves it is timely to consider the different telecommunications markets and how each is coping with the transition to next generation networks – the 'gigabit race' – and how competition is being fostered with the market. Mobile cellular continues to be an expensive consumer product and for many nations the promise of a competitive mobile cellular market has not eventuated due to the inherent advantages enjoyed by incumbent telecommunication companies during the deregulation years.

Papers are invited for upcoming issues and with your contributions the Journal will continue to provide the readership with exciting and informative papers covering a range of local and international topics. The Editorial Board values input from our readership so please let us know what themes you would like to see in the coming year.

All papers related to telecommunications and the digital economy are welcome and will be considered for publication after a peer-review process.

*Mark A Gregory*



http://doi.org/10.18080/ajtde.v4n4.80

# The Telstra Research Laboratories

Simon Moorhead
Ericsson Australia & New Zealand

Summary:

Three historic papers detailing the breadth of research undertaken by the Research Laboratories of the Postmaster-General's Department (now Telstra).

## Introduction

Fundamental changes to the Telstra Research Laboratories (TRL) in 2005 by the new Telstra management under CEO Sol Trujillo led to the closure of the main Blackburn Road, Clayton research facility. The transition of TRL to the Chief Technology Office was controversial and a majority of research staff eventually took redundancy. This change ended over 80 years of independent research and development in various telecommunications fields.

Three historic papers are provided which detail the breadth of research undertaken by TRL.

Paper 1 – (Harris 1963) describes the general responsibilities and organisation of TRL in 1963. It highlights the increasing complexity of the science of telecommunications and the need to attract outstanding researchers.

Paper 2 – (Technical News Item 1974) provides a summary of the Australian Post Office Research Laboratories Golden Jubilee celebrations.

Paper 3 – (Sandbach 1984) is a letter from E. F. Sandbach the Director of TRL to J. H. Curtis on the History of Technology. This letter details the major achievements of TRL from 1923 to 1984. It can be found on the web site by Richard Coxhill dedicated to the history of TRL (http://www.coxhill.com/trlhistory/history/history.htm). Richard worked at TRL from 1963 to 2003 and the site contains many fascinating TRL papers, audio and video clips as well as numerous photographs.

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Harris, L. M. 1963. "The Research Laboratories of the Postmaster-Generals Department", *Telecommunication Journal of Australia*, Vol. 14 No. 2 1963, pages 160-163.

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ISSN 2203-1693.  http://doi.org/10.7790/ajtde.v4n4.71

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# The historical papers



# THE RESEARCH LABORATORIES OF THE POSTMASTER-GENERAL'S DEPARTMENT

*L. M. HARRIS, B.Sc.**

## INTRODUCTION

In spite of the large resources of scientific manpower and facilities that are devoted to telecommunications research in overseas countries, the Postmaster-General's Department has found it advantageous to maintain its own independent research and development group so that it is in a position to contribute to its own technical advancement in those areas where overseas research and development or local industrial development does not adequately meet the needs of the Administration. The Laboratories must of course be geared to the resources available on the one hand, and to the unsatisfied needs of the Department on the other. This means that the Laboratories do not attempt to carry out research that can be done more effectively elsewhere, nor attempt to develop systems or apparatus if suitable items are available for purchase from commercial sources at economic rates. It does mean however, as experience has shown, that there are many areas where research and development effort is necessary by the Department, and its Research Laboratories have the responsibility to provide this effort.

* See page 169.

## GENERAL RESPONSIBILITIES

Briefly the functions of the Laboratories are as follows:

(i) To conduct research and development work with the aim of developing telecommunications theory and practice, as applying in particular to Australian conditions.

(ii) To develop and design forms of telecommunication or mail-handling plant suitable for use in Australia, in collaboration with user groups.

(iii) To collaborate with planning and design groups in Engineering and other Divisions in appraising world-wide developments, and in keeping abreast of prospective developments; adaptation and introduction of Laboratories developments into service, including field trials.

(iv) To provide other groups with services calling for a scientific approach or laboratory back-up or specialised testing facilities; to provide the Departmental reference standards, and a scientific and engineering consultative service, including patent, information and library services.

(v) To participate in the work of national or international organisations or committees associated with telecommunications research.

Broadly speaking these functions have not been changed in principle since the Laboratories were founded in 1923 as part of the Headquarters Engineering Division, and mean that the Laboratories have the responsibility to maintain a position at the forefront of knowledge in communication techniques and, from this position, to advise and assist the Department on advances in communications technology. Naturally, over the years, there have been radical changes in emphasis of their activities; for example, two of the early responsibilities of the Laboratories were to provide the scientific and engineering background necessary for the successful introduction of voice frequency

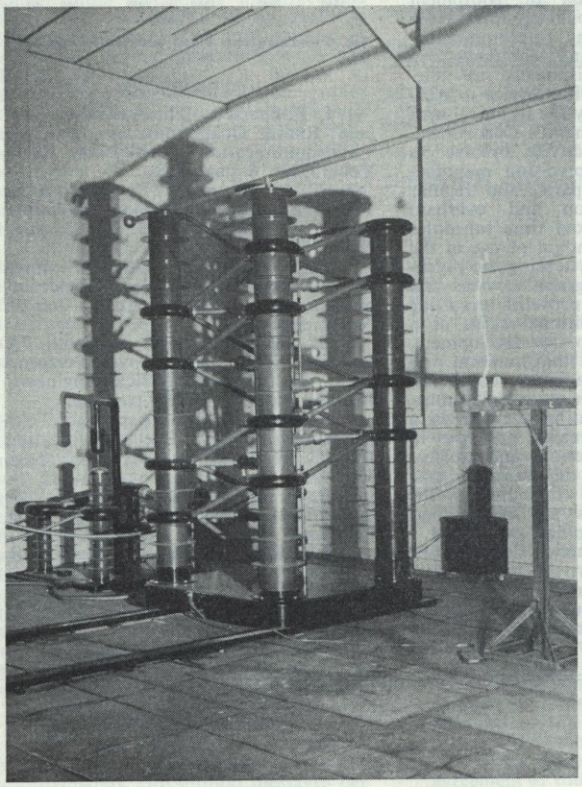

Fig. 1.—1 M.V. Impulse Generator used in Studies of Lightning Protection.

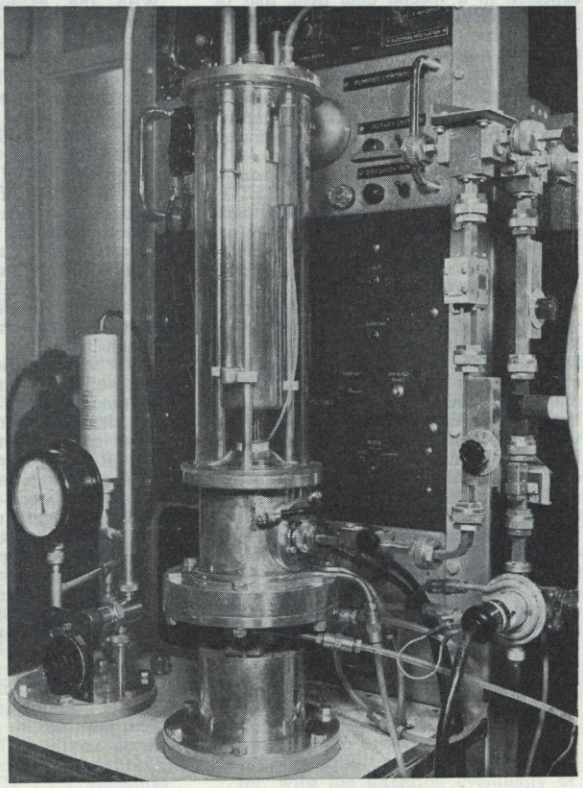

Fig. 2.—Ammonia Gas Maser. A precision oscillator with high order of short-term stability used with the primary frequency standard at the Postmaster-General's Department Research Laboratories. Frequency—23,870 Mc/s approximately.


ISSN 2203-1693.  http://doi.org/10.7790/ajtde.v4n4.71

repeaters and carrier telephony. These were followed by responsibilities in the field of radio broadcasting and radio communications, and during the war years a major interest in Radar for the armed services. At the present time satellite communications and electronic switching are among the activities occupying the attention of the Laboratories.

## ORGANISATION OF LABORATORIES

In recent years it has become increasingly evident that the old break-up of activities into separate areas of Radio and Line Communications was outmoded by modern developments which cut across the distinctions between these areas. Furthermore the increasing complexity of the science of telecommunications increased the demands being made on the Laboratories, particularly in regard to the level and range of talents necessary in the staff, and necessitated conditions that would attract outstanding young research workers to the Laboratories and would provide them with satisfaction and adequate reward in their activities. During 1961-62 a thorough examination was made of the Laboratories' organisation and activities in relation to other Departmental activities and requirements and, as a result of this examination, a new organisation has been adopted.

The basic objectives in planning this organisation were:

(1) To raise the level of attention that can be given to projects by providing an environment which will attract and retain men with the necessary intellectual attainments and abilities. More levels were introduced into the organisation, so that a total of four levels of professional staff now actively participate in research work, with two further levels for supervision and direction.

(2) To provide a classification structure within the Laboratories that will offer adequate advancement opportunities for men with the necessary talent, and will provide positions to which outstanding specialists from outside the Laboratories can be attracted if no suitable men are available from within.

(3) To provide for adequate attention being given at an appropriate level to matters of research policy, and its development and implementation within the framework of the Department.

(4) To provide a flexible organisation that can be modified to take account of the experience and specialist ability of individuals.

(5) To provide a grouping of activities and functions that will facilitate specialist knowledge in one area being made available in another area. With the old type organisation it was not unknown for two groups concerned with development for two different applications to spend a good deal of effort independently on technical problems common to both projects.

(6) To retain sufficient flexibility in the control of projects to facilitate collaboration between various groups at the specialist level without the necessity to observe the formality of a rigid pyramidal structure.

The activities of the Laboratories are divided into 22 Divisions with functions ranging from the theoretical and mathematical concepts that form the basis of telecommunications, to intensely practical matters of design and application. The titles of these Divisions are Circuit Theory, Probability, Telephone Standards, Frequency Standards, Electrical Standards, Radio Systems, Pulse Systems, Multi-Channel Systems, Electronic Switching, Physics, Chemistry, Metallurgy, Mechanical and Electrical Design, Radio Equipment, Telephonometry, General Laboratory Services, Laboratory Equipment, Information, Microwave Techniques, Pulse Techniques, Radio Propagation, and Transmission Lines.

Further expansion of activities in the near future is contemplated, Divisions working on Field Physics, Semi-conductor Circuitry, Materials Evaluation, Mail Handling, and Polymer Applications being possible additions. The existing Divisions are organised in seven groups, and these in turn are arranged in three Sections, namely the Systems Principles and Standards Section, Apparatus and Services Section, and Advanced Techniques Section.

As in most other research establishments, it is realised in the Research Laboratories that their greatest asset is in the special abilities and personal talents of the research workers. For this reason the theoretical organisation of activities can be departed from if by doing so better use can be made of the specialists actually occupying the various key positions.

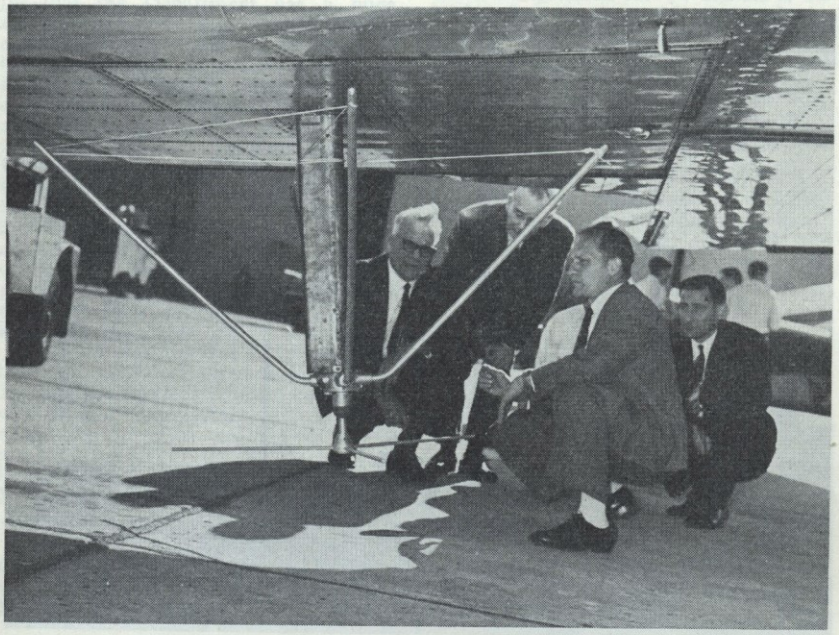

Fig. 3.—Transmitting Aerial for TV Relay Project. An airborne repeater was used circling at 10,000 to 14,000 feet to relay TV over a distance of 500 miles. The aerial is shown in the retracted position under the belly of the DC3 aircraft.

## ACTIVITIES

### Systems Principles and Standards

The Principles and Standards Group has the responsibility to ensure that its communications research and development is based on sound mathematical and theoretical concepts, and that it is supported by adequate standards of measurement. The Circuit Theory Division and the Probability Division are located in this group, as will be the Field Physics Division when created. By its very nature this group is very much of a specialist nature and here is found one of the classical problems of industrial research laboratory organisations, namely to provide adequate opportunities for growth, recognition and advancement by specialist mathematicians. Telephone traffic engineering positions in the State and Headquarters organisations provide possible areas where men with mathematical ability can obtain wider experience of the Department's activities before coming to the Research Laboratories, and also offer avenues of advancement.

Standards activity covers electrical measurements from DC up to UHF frequencies, as well as transmission standards for telephone instruments and networks. In addition, the Departmental Primary Frequency Standard is maintained by the Research Laboratories as an essential Post Office standard.

Advances in engineering technology necessitate advances in standardisation techniques and methods. This group is working to extend the Laboratories' standards of measurement into the higher radio frequency regions, to supplement the frequency standards by molecular and atomic oscillator techniques, and to extend telephone and network standards to take account of the modern under-

Australian Journal of Telecommunications and the Digital Economy Volume 4 Number 4, December 2016
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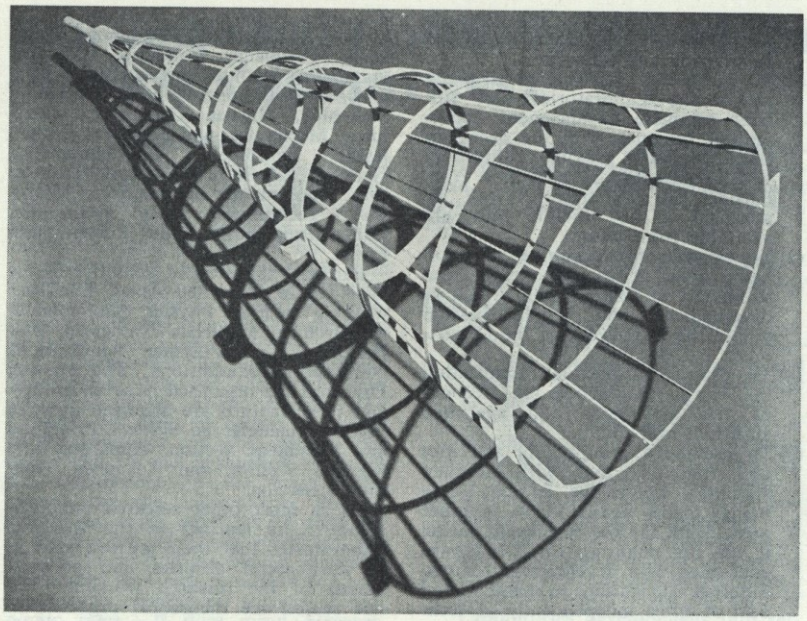

**Fig. 4.—Launching Horn used in Experiments with Surface Wave Transmission Line. Length is approximately seven feet, for broadband operation centred on 300 Mc/s.**

standing of speech and intelligibility.

Systems Development occupies a very important place in the programme of the Laboratories. Communications from one point in the network to another is by means of a system or combination of systems, and in this Group the objective is to keep abreast of modern developments in systems and, in special cases, to develop systems that are found desirable in the Australian network but which have not been developed commercially. A typical project is to improve the service offered to subscribers living in sparsely populated inland areas. In some instances these subscribers are connected by earth return circuits one hundred miles or more in length, and very poor performance is obtained from conventional equipment. The Laboratories have developed a transistorised voice frequency amplifier for use on these circuits. Another example of application in outback areas is the development of a special repeater for use with a 12-channel open wire carrier system between Alice Springs and Darwin. This route traverses 1,000 miles of sparsely populated territory and because of the high cost of providing buildings, power supplies and adequately trained staff, it was decided to reduce the number of conventional repeater stations by developing a pole mounted transistorised repeater. Every third repeater is a conventional 12-channel repeater station and power is supplied over the lines to the two adjacent pole mounted repeaters. Replaceable "plug-in" units keep on-site maintenance to a minimum.

Many new advances in devices, apparatus and systems are taking place overseas and the Department has found it necessary to conduct its own research into modern system developments in order to acquire technical competence so that it is continually in a position to evaluate and if necessary to engineer the introduction of new types of systems into Australia. For example, it is probable that solid state electronic exchanges will be available in the future. If the Department is to take advantage of such an advance it must have staff with experience in the concepts involved. It must have engineers who know the problems and are able to set the standards to be observed and see the pitfalls to be avoided. In the Research Laboratories, research is being conducted on transistorised switching systems and on semiconductor circuitry, not because the Department expects to manufacture solid state telephone exchanges but to gain experience, so that when such exchanges are available the Laboratories will be in a position to assess them and give advice that is based on practical experience and knowledge. Digital methods of communication is another area of work of this Group.

### Apparatus and Services

Even in the largest of research organisations major advances in communications are comparatively rare. Many advances are of a marginal nature—an improved material, a faster assembly technique, or a modified design. Although small in themselves, in the aggregate substantial advantages accrue from these improvements, and there is a great deal to be gained by ensuring that the best materials and the latest techniques are incorporated into equipment, and the resources of modern scientific or engineering knowledge are brought to bear on existing equipment problems as well as on future developments. This is an important function of the Section of the Laboratories which deals with Apparatus and Services.

The Physical Sciences Group is staffed with physicists, chemists and metallurgists whose responsibility is to bring the knowledge of their respective disciplines to bear on the material and equipment problems of the Department. The Materials Evaluation Division and the Polymer Applications Division, when created, will be located in this group. These scientists cannot operate without the tools of their profession and

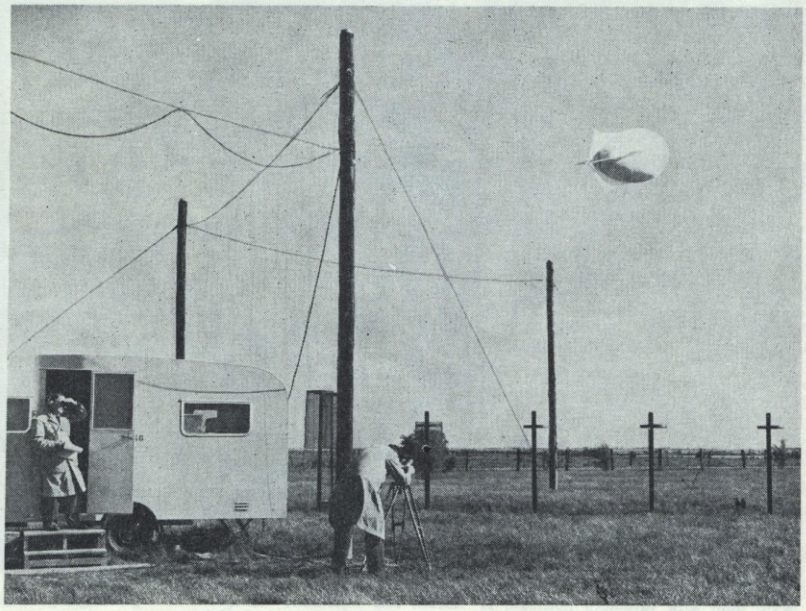

**Fig. 5.—Polar Diagrams of Aerials being Measured at a Field Site using a Kytoon to Position a Signal Source in the Vertical Plane.**

Australian Journal of Telecommunications and the Digital Economy Volume 4 Number 4, December 2016
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the Sub-Section is equipped with a wide range of physical, chemical and metallurgical equipment including facilities for Gas Chromatography, Infra-Red Spectrography, and X-ray Fluorescence Analysis. Whilst not always spectacular, the efforts of this group have made a big contribution in identifying points of weakness in materials and equipment and in the application of physical and chemical methods to plant problems. The introduction of epoxy resins for component encapsulation and for cable jointing techniques, as covered in more detail in another article in this issue, is a typical project by this group, and has been of considerable importance to the work of the Engineering Division.

The Equipment Development Group has responsibility for mechanical and electrical design, for radio equipment development and for development and assessment of subscribers' apparatus. In this group the emphasis is on items of equipment and apparatus rather than on integrated systems. In conjunction with the Physical Sciences Group these Divisions are responsible to see that the very latest advances in material and techniques are incorporated in the items of equipment which go to make up the communications systems. A further aspect of this responsibility is the very practical task of assisting local manufacturers with problems arising in the manufacture of equipment in Australia. A typical project is the development, in association with Broken Hill Pty. Ltd., of a grade of soft magnetic iron that will be a suitable substitute for iron that is otherwise only available from Sweden. Another is the development of an Australian design of telephone dial for local manufacture.

Although the interest of the Engineering Division is primarily in telecommunications, the Laboratories are mindful that the Department has a huge responsibility for mails and that mechanisation and automation, although of long standing in Australia, are being introduced in this area to an increasing extent. Considerable advances in mechanisation have already been made by the Postal Services Division and the Laboratories have assisted in several of these projects. In future developments it can be expected that there will be an increasingly complex component concerned with address coding, reading devices and memory techniques, and the projected Mail Handling Division will deal with these problems in collaboration with the Postal Services Division.

Essential requirements in any laboratory are well organised Library and Information Services, efficient equipment control and maintenance, and a competent Model Shop. These functions are the responsibilities of the Laboratories Services Group and the Library. In recognition of the increasing importance of library services the Library has been completely re-organised and the staff strengthened. The Library works in close association with the Information and Patents Service to provide the latest technical information when and where it is needed. The Model Shop is equipped to carry out precision machine work as well as the more routine fabrication tasks. It is expected also to be up to date with the latest of manufacturing and assembly techniques and to carry out experimentation and trials in this area. Printed circuits, solderless wrapped connections, and epoxy encapsulation are typical projects appropriate to the Model Shop and its controlling engineers.

The whole Laboratories depend on an efficient system of equipment maintenance and calibration and, this together with a specialist instrumentation service, is provided by the Laboratory Equipment Division which also has overall responsibility for the purchase and control of equipment.

### Advanced Techniques

The activities dealt with so far in this paper have been activities that can be defined, for the most part, as applied research and development or the application of effort to achieve practical goals that can be fairly precisely defined. There is also an area of activity in the Laboratories which can be described as objective basic research as defined in the Zuckerman Report*, that is, research in a field of recognised potential but where the final application is a little less clear. Activities of this type are found in the Advanced Techniques Section, intermingled with activities of a more practical nature.

Thin film and laser phenomena receive attention in this Section together with microwave and pulse techniques. Bandwidth compression for TV signals is the basis of a fundamental study of the psycho-physics of human perception. Satellite communication systems and surface wave transmission lines are other projects in this Section, as well as more practical investigations concerning radio propagation, lightning protection, and microwave switching.

The Laboratories C.D.C. 160A Computer is under the control of this Section and is available on the "open shop" principle to other engineers of the Laboratories, many of whom are being trained in programming techniques.

## CONCLUSION

The Research Laboratories are not restricted to research and development only, but are also called on to fulfil pressing needs of a working Department. Included in their activities are functions covering almost the full spectrum of research and investigation, from objective basic research through applied research to development, design and testing and, in some special instances, to maintenance trouble shooting. They are responsible also to use influence to foster the study of telecommunications problems in Universities and Colleges, and to collaborate with other government and industrial research and development laboratories working in similar fields.

The normal method of publication of the results of work is through Australian Post Office Research Laboratory Reports, which in many cases are circulated to interested bodies throughout Australia and overseas. It is recognised however that such publication reaches only a limited audience, and staff are encouraged to publish their work through papers delivered to the appropriate learned societies and published in the technical press.

As examples, the following references illustrate types of papers by staff of the Research Laboratories which have been published in this *Journal* during the past few years.

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3. R. Smith, "An Automatic Traffic Recorder"; Vol. 13, No. 4, page 306.

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7. J. F. M. Bryant, "Electrical Noise in Automatic Telephone Exchanges"; Vol. 12, No. 3, page 173.

8. M. W. Farmer and N. A. Cameron, "Switchboard Attachments for Blind Telephonists"; Vol. 12, No. 3, page 205.

9. E. Rumpelt, "Methods of Numerical Filter Design"; Vol. 12, No. 1, page 28, No. 2, page 133, No. 3, page 185, No. 4, page 271, No. 5, page 360, and No. 6, page 440; Vol. 13, No. 1, page 69, No. 2, page 140, and No. 3, page 317.

10. R. W. Kett, "Acoustic Shock Absorbers"; Vol. 12, No. 5, page 353.

11. J. F. M. Bryant, "Reduction of Engine Noise"; Vol. 12, No. 2, page 114, and No. 3, page 211.

12. E. F. Sandbach, "Time Signals in Australia"; Vol. 12, No. 4, page 280.

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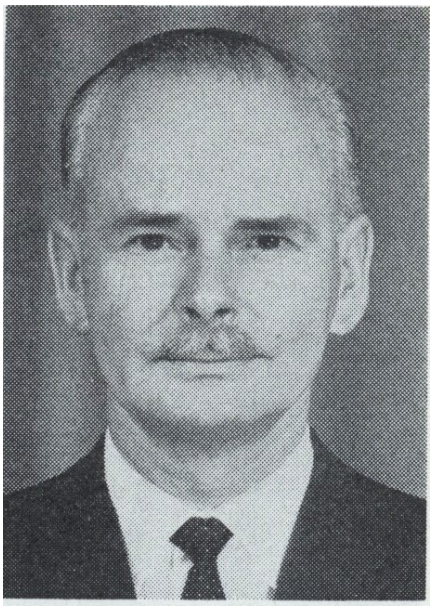
ISSN 2203-1693.  http://doi.org/10.7790/ajtde.v4n4.71



*L. M. HARRIS*

L. M. HARRIS, author of the article "The Research Laboratories of the Postmaster - General's Department", joined the Postmaster-General's Department as a Cadet Engineer in June, 1926. After qualifying as an engineer and obtaining the degree of Bachelor of Science in Physics at the University of Melbourne, he joined the staff of the Research Laboratories to work in Line Communications. He rose to the position of Sectional Engineer in this Sub-Section and was promoted to the position of Supervising Engineer, Long Line Equipment, in 1955, returning to the Laboratories as Supervising Engineer early in 1961. Upon re-organisation of the Laboratories later that year, he was promoted to the position of Assistant Engineer-in-Chief (Research). In 1951, Mr. Harris went to Florence as official delegate to the C.C.I.F., and since then has made several contributions to C.C.I.T.T. work as an official delegate of the Department including attendance as deputy leader of the delegation to the 2nd Plenary Assembly of the C.C.I.T.T. in New Delhi, November-December, 1960. He was a member of the official delegation to the Commonwealth Conference on Satellite Communications held in London in April, 1962, and is to lead the delegation to the Extraordinary Administrative Radio Conference on Frequency Allocation for Space Systems and Radio Astronomy to be held in Geneva in October, 1963.

# Technical News Item

## AUSTRALIAN POST OFFICE RESEARCH LABORATORIES GOLDEN JUBILEE

During August 1973 a number of events marked the celebration of the Golden Jubilee of the APO Research Laboratories. These included:

o A 2-day Symposium on the theme "Whither Communications?" held at the Union Theatre, Melbourne University on 15th and 16th August. Eminent international and local speakers from telecommunications administrations, industry and universities delivered a total of 13 papers to present a range of views on the future development in communications services and technology and on their social implications. Key note speakers included Professor W. J. Bray, Director of Research, of the British Post Office, Dr. W. A. Tyrrell, Executive Director, Technical Relations, Bell Laboratories, U.S.A.; Professor S. Encel, Professor of Sociology, University of New South Wales; Mr. P. R. Brett, Senior Assistant Director-General, Research, APO; and Professor A. E. Karbowiak, Professor of Electrical Engineering—Communications, University of New South Wales. Other eminent speakers, both local and from overseas, extended the range of topics discussed and an audience of about 650 took part in three panel discussion sessions.

o A week of Open Days, opened by the Postmaster-General and during which official guests and the general public were invited into the Laboratories to see about 110 exhibits and displays selected to demonstrate the work of the Laboratories. During the week (20/8/73 to 24/8/73), an estimated 5000 people visited the Laboratories, some of whom had been attracted by a less extensive display at the State Savings Bank, corner Bourke and Elizabeth Streets, Melbourne, several weeks before the Open Days proper.

o The issue of a special Golden Jubilee edition of the annual APO Research Laboratories Review of Activities. This special edition not only reviewed selected current activities of the Laboratories as is usual, but also devoted a significant number of pages to an historical review of the activities and achievements of the Laboratories since their inception in 1923.

The events drew compliments from those attending and it is obvious that they were most successful in enhancing the public image not only of the Laboratories but also of the Department as an enterprise which is abreast of the technology and science of modern communications.



Australian Journal of Telecommunications and the Digital Economy Volume 4 Number 4, December 2016
ISSN 2203-1693. Copyright © 2016 http://doi.org/10.7790/ajtde.v4n4.71

## AN OUTLINE HISTORY OF THE RESEARCH LABORATORIES

### TELECOM AUSTRALIA

19/3/1923 : The Research Laboratories (PMG's Department) were established as a one-man Section at HQ. The founding father was Mr. S.H. WITT. Since then, Heads of the Laboratories have been :

| | |
|---|---|
| Mr. S.H. Witt | 1923 to 1945 |
| Mr. E.P. Wright, B.Sc | 1945 to 1953 |
| Mr. N.J. McCay, B.Sc | 1953 to 1960 |
| Mr. L.M. Harris, OBE, B.Sc | 1960 to 1964 |
| Mr. P.R. Brett, OBE, B.Sc | 1964 to 1975 |
| Mr. E.F. Sandbach, AM, B.A. B.Sc, F.I.E. (Aust), FTS | 1975 to present (1984) |

(Refer Review of Activities, 1972/73, for biographies of Witt to Brett and to Review of Activities, 1975/76, for Brett and Sandbach)

The original charter of the Laboratories was to study "the latest discoveries, inventions and developments in electrical communications" and to advise the Chief Engineer on those "which are promising and likely to benefit the Department's telephone and telegraph services". This charter remains relevant today, except that there is greater diversity of services and greater complexity in telecommunications techniques and technologies.

The initial work of the Laboratories concerned the application of vacuum tube repeaters in the infant Australian trunk network, which was then based on the use of open wire lines. The first 2-wire VF repeaters were introduced into the Sydney-Melbourne trunk route on an experimental basis in 1922 following a visit by Mr. R.N. Partington, acting Chief Engineer, and Mr. S.H. Witt to the USA, England and Europe. (This visit led to the establishment of the Laboratories in 1923).

1923 : The Laboratories established the PMG Department's first reference standards for telephone transmission performance and telephone quality assurance. This work has since extended to subjective and objective measurement of transmission performance and to contributions to

international efforts to standardise measurement techniques and to define key performance parameters. Key figures in this work have included G.N. Smith, J.C. Wilson, D.A. Gray, E. Koop and R.W. Kett. The work has continued to keep up with developments in telephone instruments and transmission systems and it now engages specialist attention in both the Research Laboratories and the Engineering and Commercial Services Departments at HQ.

23/4/1925 : The Laboratories were more firmly established as a Section of five staff (3 engineers, a mechanic and a clerk). The principal field of activity centred on voice frequency trunk transmission and the application of repeaters, which were one of the early applications of the vacuum tube amplifier. This work extended shortly into 3-channel carrier systems and later 12-channel carrier systems.

The staff were :

| | |
|---|---|
| Mr. S.H. Witt | Supervising Engineer |
| Mr. E.P. Wright | Engineer |
| Mr. A.A. Lorimer | Engineer |
| Mr. G.G. Robb | Mechanic |
| Miss F. Terrell | Clerk/Typist |

1925 : Mr. S.H. Witt installed the first 3-channel open-wire carrier system in Australia on the Sydney-Melbourne trunk route; transmission measuring equipment and transmission standards were developed. This work continued in the line transmission field, with 12-channel open-wire carrier systems introduced into the Australian network by Laboratories and Engineering Department staff in the late 1930s.

1925 : Research activities extended to transmission of radio broadcast programmes over the trunk network. The first simultaneous interstate broadcast was engineered by the Laboratories in 1925 between Melbourne, Sydney, Brisbane and Adelaide via a network hook-up of six stations (2FC, 2BL, 3LO, 3AR, 4QG, 5CL).

1925-27 : The Laboratories begin to establish expertise in radio field strength measurement techniques - applied to MF broadcast transmitters.

1927 : Laboratories staff engineered the national broadcast relay network for the Opening of Parliament House, Canberra, by the Duke of York.

1927 : The Laboratories' measurement facilities and reference standards for the precise measurement of electrical quantities (voltage, current, resistance, capacitance, inductance, etc) were established by Mr. A.A. Lorimer. These facilities have been progressively extended over a widening frequency spectrum to keep pace with the demands of advancing telecommunications technology for increasingly precise measurement accuracies and calibration of test equipment. A key engineer engaged in this field over the last 30 years is Mr. J.M. Warner. The Laboratories expertise and facilities were recognised through NATA accreditation in 1960.

1927-1939 : Mr. S.H. Witt was seconded to plan the Australian National (Radio) Broadcasting System. Laboratories' support was provided to design broadcast transmitters and antennas, and to evaluate studio equipment.

1928 : Laboratories' staff set up the first Australian HF transmitter station on an experimental basis at Lyndhurst, Victoria. The station went into regular service in 1934 to provide broadcast services to those beyond the reach of the MF services. The Laboratories upgraded the station's equipment in 1938.

1928 : The Laboratories' measurement facilities and reference standards for time interval and frequency were first established by Mr. D. O'Donnell - with accuracy traceable to national and international standards. These facilities have been since extended to keep pace with new techniques and technologies. Key engineers in this field were/are Mr. A.H. Cannon, Mr. E. Sandbach and Mr. R. Trainor.

1928-1944 : Laboratories' studies of multichannel telegraph systems and the multiplexing of telephony and voice frequency telegraphy services over carrier systems assisted the establishment of national telegraph services, particularly during World War II when emergency telegraph services were required to be provided. A key figure in this work was Mr. E.H. Palfreyman.

1931 : Physical Sciences activities commenced in the Laboratories under Mr. D. O'Donnell followed by Mr. P.R. Brett. These activities now provide specialist skills and facilities in the fields of analytical chemistry, electro-chemistry, polymer chemistry, metallurgy and applied physics to

underpin Telecom's reliability assessment and quality control activities, with traceability of measurement accuracy in some instances to national standards. NATA registration of the Laboratories facilities and expertise in the environmental testing sphere under controlled temperatures and humidity was obtained in 1979.

1932 : The Laboratories now employ 35 staff, accommodated at 59 Lt. Collins Street, Melbourne, a building they were to occupy until 1983. In 1975, building work started to progressively consolidate the Laboratories in new laboratory buildings at Clayton. Consolidation was achieved in 1983.

1935-1954 : In 1935, the Laboratories assisted in the laying of the coaxial submarine cable between mainland Australia and Tasmania via King Island, which was then the longest submarine cable in the world. A key Laboratories' engineer on this project (representing the Department to the cable laying company) was Mr. G.N. Smith.

In 1954, the Laboratories designed and built a special 9-channel carrier system to extend the capacity of the submarine cable. Prominent engineers on this project were L.M. Harris, E.P. Wright, D.A. Gray and R. Buring.

1937-1938 : The first 12-channel VHF radio telephone system in Australia was engineered by the Laboratories between Mount Tanybryn, Victoria, to Stanley, Tasmania (168 miles) to provide relief while the submarine cable to Tasmania was repaired. Subsequently, in 1942, VHF single channel systems were also installed to link Tasmania and Flinders Island.

1939-1945 : During World War 2, the Laboratories assisted in the development of radar systems and special radio communications systems for the armed services. Radio transmitters and receivers for air, ground and armoured vehicle use were evaluated. A special radio receiving station for overseas transmissions was designed and commissioned at Werribee, Victoria. The station used remote-controlled aerial switching and aerial amplifiers, which were novel features at the time.

1941 : The Australian Government agreed to establish a high power short wave transmitting station in Australia to broadcast to the South Pacific Islands and South-East Asia. The station was to be Radio Australia, Shepparton, and Mr. S.H. Witt was asked to plan the station. Laboratories' and PMG Workshops' staff designed and set up the station, which began operating in May 1944. Other key engineers were A. Kline and R.B. Mair.


ISSN 2203-1693.  http://doi.org/10.7790/ajtde.v4n4.71

1944-1946 : The Laboratories, drawing on radar experience from the wartime activities, developed a 3-channel 2 GHz microwave system for propagation experiments and use between the Laboratories and a field site at Mont Park. The work led to experiments with microwave systems between Melbourne and Sydney and over Port Phillip Bay. Key engineers were J. Campbell, J. Mc Leod, F. Orr, H. Hyamson and O.Moriarty.

1945 to present : Radio telephony investigations extended to VHF and UHF systems, including related work on the technology for the realisation of such systems and on antenna design. Most recently, work has changed emphasis from broadband analogue microwave systems to digital systems for both voice and data transmission.

1946 : The first experimental investigations of VHF (160 MHz) mobile services were conducted.

1947-1960 : The Laboratories engaged in investigations relating to the ultimate introduction of the National TV Broadcasting Service in 1956 - recommending the adoption of a 625-line system standard. The work also examined measurement systems involving advanced high-speed waveform and time domain techniques in anticipation of TV broadcast programme transmission services being provided over the telecommunications network. A video transmission test set was developed in the early 1950s by Dr. A.J. Seyler and Mr. J.B. Potter. Subsequent work examined techniques for bandwidth compression of TV signals and this led to work on Teleconferencing services.

1949-1950 : Microwave propagation studies at 3 and 9 GHz were concentrated on possible applications on the Sydney-Goulburn and Melbourne-Sydney routes. Mr. J. Reen was closely associated with this work.

1953 : The Laboratories designed and commissioned a 900 MHz 120-channel system between Korrumburra and Mt. Oberon to allow the Marconi system across Bass Strait to take additional channels whilst the alternative submarine cable link was being repaired after a serious failure.

1954 : Laboratories' propagation studies resulted in choice of Wilsons Promontory - Flinders Island - Tasmania path for 80-80/160 MHz Marconi System. The Laboratories designed antennas and developed two 160 MHz power amplifiers for the project.

1956 : Laboratories' studies of coaxial cable systems and associated transmission measurement techniques assisted planning and commissioning of the Sydney-Melbourne and subsequent major trunk co-axial cable system implementations in the 1960s.

1959 : The Laboratories designed and built a transistorised single channel carrier system for the Normanton-Burketown route. This was one of the first applications of transistorised equipment in the Australian network.

1960 : Laboratories-designed and constructed transistorised 12-channel repeaters, suitable for pole mounting in open wire carrier systems, were used on the Alice Springs-Darwin route. These repeaters used state-of-the-art solid state transistor technology and circuit packaging techniques in a harsh environment. Key engineers were Dr. E. Rumpelt, D.A. Gray and A.W. Thies.

1960 to present : Preliminary studies of digital coding and transmission techniques utilising the advantages of solid state electronics commenced - later assisting the specification and introduction of PCM systems into the Australian network in the late 1960s. Key engineers were D.A. Gray, H.S. Wragge, R. Smith.

Work on PCM transmission techniques and systems continued through the 1970s, to characterise the analogue network for conversion to digital working, to establish design rules for the expanding use of PCM systems in the junction networks, and to develop digital transmission performance measuring techniques and equipment. This work culminated in the adoption by the CCITT in 1982 of a technique embodied in an invention by Dr. A.J. Gibbs for the characterisation of the crosstalk performance of digital line systems. The novel technique was based on the measurement of a parameter called the Crosstalk Noise Figure to quantify the immunity of a particular PCM repeater to crosstalk interference. Key Laboratories engineers working in the digital transmission field in the 1970s were Mr. R. Smith, Dr. A.J. Gibbs, Dr. B. Smith, Mr. A.Y.C. Quan and Mr. G.J. Semple.

This work expanded in the late 1970s to cover a wide variety of studies of techniques and systems for the digital transmission of voice, data, image and text over dedicated digital networks - ultimately leading to an Integrated Services Digital Network (ISDN).

1960 to present :

The Research Laboratories conducted a preliminary study of the possible uses of satellites in telecommunications shortly after the first 2-way conversation took place using the passive ECHO 1 balloon. In 1961, Mr. E. R. Craig was seconded to the BPO and until 1964, he was responsible for the technical direction of the transmitter installation and operation at the Goonhilly earth station during the historic first exchanges of television and telephony signals between the UK and USA via Telstar 1. Laboratories engineers, notably B.R. Perkins, participated in subsequent international projects involving the Applications Technology Satellite (ATS) of NASA, playing the role of systems engineer at the ATS earth station near Toowoomba and later being seconded to NASA's Goddard Space Flight Centre.

In 1969/70, Laboratories staff commenced studies related to the use of satellites to provide telecommunications services, particularly to outback Australia and for mobile services. In depth propagation studies were conducted to study rain attenuation implications on service standards, and system design, and associated work concerned advanced microwave technology and antennas for satellite ground stations.

Mr. E. Craig played prominent roles both within PMG Dept/Telecom and in CCIR Study Group 4, following his earlier secondment with the BPO from 1961 to 1964 when he was responsible for the technical direction and management of the transmitter installation for the Goonhilly earth station. Mr. P.R. Brett was later Telecom's representative on an inter-Departmental Committee established to examine the potential uses of satellite communications in Australia. More recently, in 1980, the Laboratories have provided OTC(A), the ABC and the Department of Communications with technical assistance to evaluate Home and Community Broadcasting Satellite Services (HACBBS) directly broadcast via satellite transponders to small earth-station receivers, by laboratory simulation of the satellite transponder. In particular, the laboratory tests sought to measure inter-modulation effects when sound service was combined with TV service. Spectrum management issues were also studied and Messrs. E. Sandbach and E. Craig played key roles in WARC meetings.


ISSN 2203-1693.  http://doi.org/10.7790/ajtde.v4n4.71

1971 : Laboratories, staff, in collaboration with CSIRO, commenced studies of a liquid-filled optical fibre invented by the CSIRO Division of Tribophysics. This work has since expanded in scale to consider multi-mode and single-mode optical fibre systems, which are on the point of introduction into regular service in the network. Field trials are now in progress. Considerable liaison has occurred over the last decade between Telecom, the Department of Defence, industry and academia to develop Australian capabilities in this important new field of telecommunications technology. Early work concentrated on characterising the transmission performance of fibres as media and this involved the development of specialised test instrumentation. Recent work extends from optical devices and media to transmission techniques and systems for immediate and longer term application. Telecom, through the Radio Research Board, has played an important role in bringing together Australian researchers in the field in regular Optical Communications Workshops. Key workers have included Dr. R. Morgan, Mr. G. Kidd, Dr. A. Gibbs, Mr. R. Ayre, Mr. G. Rosman.

1972 : The Laboratories developed a prototype Videoconferencing System which underwent successful trials via satellite link between Australia and Britain in 1973 and was later commissioned on a trial basis between Melbourne and Sydney. Subsequent work has concerned alternative forms of teleconferencing services and has involved human factors research and user studies in addition to the development of systems for experimental trials. Dr. A.J. Seyler was a key engineer leading this work.

1979 : Laboratories engineers, notably Dr. J. Steel, Dr. R. Coutts and Mr. G. Champion, conceived a specification for a Digital Radio Concentrator System (DRCS) which could be applied to provide automatic telephony services to remoter parts of rural Australia, where subscribers can be over 100


ISSN 2203-1693.  http://doi.org/10.7790/ajtde.v4n4.71

Km from their terminal exchange. These subscribers have only part-time manually operated services over low-quality transmission paths (wire or HF radio). The DRCS utilises PCM encoded speech, time division multiple access techniques, digital burst transmission techniques, cellular frequency assignments and digital regenerative repeaters to provide a novel and cost-efficient means of improving services to these remote subscribers. The DRCS was accepted by the Engineering Department and further development/supply was contracted to NEC Japan. Field trials of the DRCS are to take place in 1983/84, prior to more extensive use in a programme to provide automatic services throughout Australia by 1990.


ISSN 2203-1693.  http://doi.org/10.7790/ajtde.v4n4.71

# Net Neutrality:

## A perspective responding to recent developments in the European Union

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Abstract: The road to net neutrality within the European Union (EU) has been slow and winding. However, a major milestone was reached in August 2016 through the publication of the *BEREC Guidelines on the Implementation by National Regulators of European Net Neutrality Rules*.

This extended article explores the scope of the net neutrality principle as understood and applied in a number of jurisdictions. The approach in the EU is contrasted with the approaches of the Federal Communications Commission (FCC) in the United States (US) and of a number of other countries. Although there are some constants that recur for net neutrality in all of the countries examined, there remain a variety of specific local connotations.

This paper argues that the BEREC Guidelines have effectively and significantly brought to an end the long lasting and highly polarised 'net neutrality' debate that began in the United States in the 1990s then subsequently spread with varying intensity to other parts of the world. The BEREC net neutrality guidelines potentially provide a comprehensive, flexible, readily implementable and globally exportable framework of solutions for balancing the legitimate 'net neutrality' needs — social, economic and regulatory, of all stakeholders regardless of national jurisdiction.

As with the earlier EU ex-ante regulatory frameworks for market analysis and cost-based interconnection, the BEREC paper paves the way for continued export of best practice regulation from the EU to the rest of the world. However, there are issues that demand caution in how the BEREC approach might be implemented.

Keywords: BEREC, Competition, Net Neutrality, Regulation



http://doi.org/10.18080/ajtde.v4n4.79

# 1. Introduction

## What is net neutrality?

Net neutrality is a vague term, without a precise meaning. It holds different meanings for different stakeholders in academia, in consumer groups or in the value chain of providing Internet access services. The net neutrality discussion emerged in the United States (US) in the late 1990s because of concerns about potential harms to the end-to-end nature of the internet. The main concern was that the vertical integration of cable firms with internet service providers (ISPs) in the US could disrupt the end-to-end design[1] principle of the internet.

In the emerging debate, network neutrality (or net neutrality it is now commonly abbreviated) was a term introduced by Tim Wu in a 2003 article[2] (Wu, 2003)as a requirement needed to safeguard evolutionary competition in the internet environment. What did Wu mean by network neutrality when he wrote his article? He said that net neutrality was probably best defined as a network design principle.[3] The concept implies that in such a network all content sites and platforms are treated equally. Therefore, an internet service provider (ISP) operating in such a network should be required to treat all data from all content providers in the same way. If a net neutrality requirement would not exist, ISPs (and/or vertically integrated providers as mentioned above) could "throttle" certain content, slow down its delivery or, in an extreme case, even block it in order to give preferential treatment to its own traffic or to content originating from applications and/or content providers with whom the ISP could sign specific agreements.

There are many definitions of net neutrality in the existing literature; the concept has evolved over time. There are also differences of opinion regarding the usefulness of a net neutrality regulation. To illustrate, a few examples of alternative net neutrality definitions that emerged are given in the next paragraphs. In general, academic work on net neutrality has been primarily concerned with legal and economic suggestions about regulatory policies. Some of them are very vague. A group of leading scholars including prominent economists including William Baumol offers such an example:

> *Network neutrality is a policy proposal that would, among other things, regulate how network providers manage and price the use of their networks* (Baumol et al, 2007)

Gregory Sidak, a Visiting Professor of Law at Georgetown University Law Center, defined it as:

> *a proposed regime of economic regulation for the Internet.* (Sidak, 2007)



http://doi.org/10.18080/ajtde.v4n4.79

The difficulties in defining net neutrality were also acknowledged by other prominent economists:

> *It is not easy to define net neutrality because not only is the concept not clearly and unanimously articulated, but it also spans over vague concepts of fairness and civil liberty much more than economics.* (Cave & Crocioni, 2007)

In other words, the term has connotations that prevent it from being defined in purely economic terms.

Barbara Van Schewick, a strong advocate of net neutrality, refers to it as a set of rules:

> *the term "network neutrality rules" refers to non-discrimination rules that forbid operators of broadband networks to discriminate against third-party applications, content or portals ("independent applications") and to exclude them from their network.* (Van Schewick, 2007)

Robert Hahn and Scott Wallsten, two affiliates with the Brookings Institution, provide a definition that focuses primarily on price discrimination issues:

> *Net neutrality has no widely accepted precise definition, but usually means that broadband service providers charge consumers only once for Internet access, do not favour one content provider over another, and do not charge content providers for sending information over broadband lines to end users.* (Hahn & Wallstein, 2006. )

*Save the Internet*, an online organisation of individuals, businesses, and non-profit organisations established in 2006 for the advocacy of net neutrality, put forward a far more comprehensive definition which includes such issues as freedom of speech:

> *Net Neutrality is the Internet's guiding principle: It preserves our right to communicate freely online. This is the definition of an open Internet. Net Neutrality means an Internet that enables and protects free speech. It means that Internet service providers should provide us with open networks — and should not block or discriminate against any applications or content that ride over those networks.*[4]

A broader definitional approach has also been adopted by the European Union (EU).[5] The first attempt to include net neutrality in the EU regulatory framework was in Article 8 of the Framework Directive[6] as amended in 2009, with the purpose of:

> *promoting the ability of end-users to access and distribute information or run applications and services of their choice.*[7]



http://doi.org/10.18080/ajtde.v4n4.79

For the Body of European Regulators for Electronic Communications (BEREC), a European working group on regulation which assists the European Commission (EC) and the national regulatory authorities (NRAs) in implementing the EU regulatory framework for electronic communications[8], net neutrality is about equal treatment of all internet traffic:

> *To BEREC, "net neutrality" describes the principle of equal treatment of network traffic. A violation of the net neutrality principle is considered unlikely if all traffic is treated on a best effort basis.*[9]

More recently, in Regulation 2015/2120, net neutrality is referred to in the EU regulatory framework as:

> *Common rules to safeguard equal and non-discriminatory treatment of traffic in the provision of internet access services and related end-users rights.* (EU, 2015)

These definitional differences are not merely a matter of alternative perspectives. They also differ in the degree of focus put on the rights of end-users, on the quality experienced by consumers or the price of access to content and applications, depending on the political or economic goals of the definition's proponent. They also show different concerns in a dynamic environment. In the decade since Tim Wu coined the term, net neutrality has become highly and hotly debated.

## Why is net neutrality controversial?

As internet access and use became increasingly widespread and IP networks and high speeds were available, content and application providers were able to interact directly with the consumer through a web page. Acting at the edge of the network over which they are accessed or available, these service providers became independent of the provision of connectivity in the last mile and started supplying bandwidth-hungry products and services, such as video gaming or streaming, to end users. These services created a significant increase in traffic, constraining capacity of networks to properly handle such amounts of traffic without deterioration in service quality and worsening of the user experience. Thus the increase of traffic brought the issue of network congestion into the net neutrality debate

The increase of traffic translated into a need for further network investment. At the same time, however, increased competition from services such as voice-over-IP and messaging, contributed to significant losses of revenue to telecommunications service providers, and reduced their sources of funds to make the necessary network investments.

These facts have since been widely used across the world by telecommunications service providers to support the claim that identical regulation should be enforced on content and



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application service providers ("to create a level playing field") and that a payment should be made by the latter (an interconnection, access or usage fee) to access telecommunications providers' networks. This created a new stream of economic literature regarding the most welfare-enhancing solutions to the pricing alternatives that might be considered.[10]

Adding further complexity to the problem, a trend towards increasingly concentrated access markets and vertical integration of many network operators has directly fed the arguments put forward by defenders of strict net neutrality. Also, technology developments enabling more intrusive and detailed examination of the content of each individual packet, using techniques such as Deep Packet Inspection (DPI), have made possible the identification of sender, content and recipient of the packet, raising fears of discrimination against competitive content providers.[11]

Due to the worldwide adoption of the internet[12], other complex subjects such as freedom of speech, liberty, consumer's privacy or national security have been progressively included in net neutrality conversations, adding political perspectives to a more limited debate that was originally focused on economic modelling of pricing in two-sided markets.

The factors mentioned above have produced a dramatic change in the ICT sector, and during this period academics from different fields and other interested parties offered several new approaches to net neutrality. Although considerable discussion has ensued among legal practitioners and economics professors, no consensus appears to have emerged about a framework for analysing and potentially resolving issues surrounding net neutrality.

## How has net neutrality been implemented?

At its inception, in the 1960s, the internet was established in an academic environment with the objective of exchanging text messages among university researchers. Two fundamental design principles have guided the internet since then: data packets were routed through the network autonomously (the end-to-end principle) and as fast as the network resources available could allow (the best effort principle). These fundamental principles were key elements of the open internet spirit and remain important issues in the context of the net neutrality debate. For a while, prioritisation of packets was not critical because the original internet applications were not delay-sensitive, traffic congestion was not generally an issue, and routers were not capable of identifying packets associated with different applications, and prioritising them accordingly (as they now are).

The rapid increase in traffic in some parts of the internet, the increasing demand by consumers for time-sensitive applications such as VoIP or IPTV, and the improving technical ability to manage traffic, allowed the two fundamental design principles to be followed fairly



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readily over the years. Recently, a significant change has occurred in the value chain of internet services with the emergence of Content Delivery Networks (CDNs).[13] CDNs are service providers to the Content and Application Providers (CAPs) that were designed to enhance the quality of delivery of internet content, through local caching and greatly increased amounts of direct routing.[14]. CDNs invested significant amounts in transit networks in order to improve the flux of traffic in the internet and the quality of service experienced by end users.

These factors have contributed to the overall adherence to the two key net neutrality principles. There are not many reported violations of these principles. Nevertheless, in peak periods operators have always executed some traffic management practices to avoid congestion. If carried out without the purpose of causing harm to end users or competitors in the supply of internet access services, these traffic management practices have been accepted and not considered a violation of net neutrality principles.[15]

## Why net neutrality has become more important

The importance of net neutrality derives from the profusion of services and applications provided over the internet. In the past, telecommunication services were closely coupled with the infrastructure over which they were accessed but, on the internet, content is separated from the network and is either free or paid for directly by the end user. From the user's perspective, it is content that provides value and infrastructure is purely a means of accessing content. As a result, the amount that users are prepared to pay for network access is based on their expectation of current and potential value provided through content and applications.

Around the turn of the century, telecommunications network companies ("telcos") tried to resist these developments by constructing Next Generation Networks (NGNs), using internet protocols but offering higher and guaranteed service levels. One of the perceived advantages of the NGN was its ability to enable telecom operators to deliver a wide range of new, revenue-generating services from within a "walled garden" created by gateways to other networks. But, in practice, the internet (via the World Wide Web) has delivered the vast majority of these new services which have substituted for the revenues anticipated by the telecoms operators. The internet has achieved this because, unlike NGNs, it locates intelligence at the network edge in the servers and clients of end users, and provides an open transport network to link them together, allowing users to innovate without permission and generate a far richer array of applications than the telecom operators ever could. The overall result is that the public internet has come to dominate telecommunications, and increasingly



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it is accessed through mobile devices.[16] (Cisco 2015) Walled gardens have been shown, once again, not to be acceptable to users.

With service revenues inexorably shifting to internet-based application providers, telcos are under increasing financial pressure. Their revenues are at best flat and in many cases are falling. Simultaneously the hyper-demand for bandwidth is pushing up the costs of network infrastructure. Most telcos are investing heavily in order to keep up: developing and implementing technology that can deliver higher bandwidths over existing copper loops; rolling out replacement fibre infrastructure that offers virtually unlimited bandwidth wherever they can afford to do so; and finding ways to squeeze more bandwidth out of finite radiofrequency allocations for mobile services. But as fast as they invest the demand for data continues to rise faster.

Telcos are thus caught in a vicious circle. Starved of service revenues, they do not have the business case to invest sufficiently to meet the capacity requirements of all those services that users are demanding. Something has to give, and that means traffic management of some kind: throttling of demand, blocking of content or prioritisation of some users or applications – perhaps on the basis of payment for higher quality of service. Each of these practices, however, is contrary to net neutrality principles.

## Is there a need to regulate net neutrality?

The FCC's 2015 *Order on Protecting and Promoting the Open Internet*[17] (FCC 2015) regulated internet service providers in three ways:

- **No blocking**: broadband providers may not block access to legal content, applications, services, or non-harmful devices;
- **No throttling**: broadband providers may not impair or degrade lawful internet traffic on the basis of content, applications, services, or non-harmful devices;
- **No paid prioritisation**: broadband providers may not favour some lawful internet traffic over other lawful traffic in exchange for consideration of any kind – in other words, no "fast lanes". This rule also bans ISPs from prioritising content and services of their affiliates.

These tenets have become the mantra of net neutrality regulation generally. It should however be noted that the FCC established these principles not as ex-ante regulation, but as guides for ex-post intervention on a case-by-case basis as required. It is also pertinent that the rules themselves have to be applied carefully as exceptions are permitted for reasonable network management.



http://doi.org/10.18080/ajtde.v4n4.79

The economic basis for this regulation lies in the economic concepts of "network effects" and "two-sided markets". Network effects concern the benefits created when an additional subscriber joins a network service. For example, in a telephone network each new subscriber creates additional calling opportunities for those people who were already part of the network. Similarly, the attractiveness of internet applications such as Twitter or Facebook is directly related to the number of existing users to which a potential new subscriber may connect. Two-sided markets are formed by networks or platforms bringing together two distinct groups, and thus creating value through network effects. For example, Google creates value by bringing together advertisers and end users, while broadband service providers (telcos) create value by linking their subscribers with the many content providers of the internet.

Network effects and two-sided markets provide the conditions for pricing decisions that would be irrational in conventional markets. The platform provider can obtain payment from either side of the market but is incentivised to minimise the price for end-users in order to maximise the network effects. This state of affairs has had two highly significant impacts: it has tended to consolidate market power in a very small number of platform providers and it has created a prevailing culture in which the internet is seen by the end-user as "free".

Taken together, these two impacts create enormous pressure on the telcos that provide broadband access linking the end users with the content providers of the internet. The on-going challenge is for the access network to provide sufficient bandwidth to support all the applications that the internet offers and users demand. They are severely constrained in the end-user price that they can set, so they may seek payment from the other side of the market. However, the market power of the content providers is now so great that the telco may be unable to extract further revenue. Thus starved of money on both sides of the market the telco may seek instead to block content or throttle demand or prioritise paid traffic simply to cover its costs.

Regulators, of course, have been used to stepping in to telecoms markets to rectify exactly these kinds of anti-competitive behaviour. For the past 20 years or so, regulatory authorities have identified telecommunications networks as bottleneck facilities, unable to be economically replicated. They have determined the suppliers of those networks to be dominant and thus justified ex-ante regulation to prevent anti-competitive practices and foster service-level competition. Why should they not step in again now to ensure network neutrality and prevent the pernicious practices identified in the FCC's Open Internet Order?

This paper argues that, while regulators should keep a watching brief over market developments, the imposition of ex-ante regulation of net neutrality is not normally



http://doi.org/10.18080/ajtde.v4n4.79

required. The market can resolve almost all net neutrality issues. Broadband access providers and internet content providers are in a symbiotic relationship – each feeds off the other, requiring the other to help it generate revenues and profits. In economic terms, the presence of increasingly powerful internet content providers is providing the necessary countervailing buyer power to curb the dominance of incumbent access providers in national markets, while the demands of a two-sided market mean that the content providers cannot afford to exploit their economic power to the detriment of the organisations that connect them with the very end-users that are the source of that power. The future role of the regulator is going to be much more one of monitoring agreements rather than intervening to set prices or determine quality of service levels. Net neutrality rules are therefore primarily guidelines for ex-post resolution of disputes – which is exactly what the FCC's Open Internet Order suggested.

### Structure of this Paper

This section has provided an introduction on the nature of net neutrality and the various ways in which it has been defined.

**Section 2** (***The new EU Regulatory Framework***) deals with the new European Union regulatory framework on net neutrality, including the BEREC guidelines for implementing that framework that were published in August 2016 and subjected to very extensive public consultation.

**Section 3** (***What is happening outside of Europe***) compares the EU approach with approaches to net neutrality in a range of other countries. The approach of the American Federal Communications Commission (FCC) is touched on in the introduction to the paper and is further elaborated in Section 3. The other countries in the set have been chosen to provide an indication of the common features and diversity of approaches in the Americas, Australia and Asia.

**Section 4** (***Overall Assessment***) offers an overall assessment of where the public discussion on net neutrality is at present and offers some views on the current and potential importance of the EU framework.

## 2. The new EU Regulatory framework

### The history of net neutrality in the EU

Net neutrality has never made the same kind of waves in Europe that it has in the US. There are many reasons for this, principal among them being the lack of widespread competition from cable operators[18] and the fact that the EU comprises 28 separate nations rather than a



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single nation with an over-arching Federal Communications Commission. As a result of its consensual approach to telecoms regulation, the EU rules on network neutrality that were published in November 2015 have had a long and sometimes troubled gestation period.

The EU regulatory framework for electronic communications services (ECS) was published by the European Commission (EC) in 2002[19] and became law in Member States in 2003. It is important to note that this framework said very little about internet services, and exempted the internet from the majority of its regulatory measures in the way that the 1996 Telecommunications Act did in the US. Consequently, there has been no European equivalent to the legal debate in the US as to the definition of an internet service, precisely because such a definition makes no difference as to the regulatory treatment of the service in question. Instead, the focus of the EU regulatory framework in 2003 (which has been maintained through subsequent amendments in 2009[20]) was on the determination of relevant ECS markets and the imposition of remedies for suppliers in a position of significant market power (SMP) within those markets.

The EC published a list of relevant markets (i.e. markets susceptible to ex-ante regulation on account of SMP) in 2002. The initial list had 18 markets but this was subsequently reduced to 7 markets in 2007, and then further reduced to 5 markets in 2014.[21] These reductions had something to do with creating a manageable workload for the national regulatory authorities (NRAs) in member states that had to conduct the market analyses, but it is notable nevertheless that the focus of each list is on wholesale rather than retail markets, exclusively so in the latest version. In effect, the EU regulatory framework has been successful in the terms that the EU set out in 2002: the imposition of effective wholesale regulatory obligations has enabled the development of effective retail competition in downstream markets and hence the removal over time of all ex-ante regulation of retail competition.

The prevalence of strong competition in retail electronic communications services markets has had a major influence on the development of network neutrality in the EU. Under such conditions net neutrality occurs naturally: any attempt to differentiate service in terms of price or quality that is unacceptable to end-users will tend to be met by a stampede to rival retail offers, and thus will prove unprofitable. Furthermore, an amendment to the Universal Service Directive in 2009 imposes transparency on network operators' traffic management practices, and allows users to change suppliers without penalty if they are dissatisfied with any changes. As a result, there have been very few incidents of unwarranted breaches of net neutrality reported in Europe. In fact, BEREC noted only two relatively minor such incidents in its 2013 annual report and it concluded that:



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> *there is wide agreement among national regulators that the existing regulatory tools enable NRAs to address competition concerns related to net neutrality for the time being*. (BEREC 2013)

So why was a net neutrality regulation necessary? If BEREC concluded that net neutrality incidents were few and the existing rules were sufficient, why did the EC nevertheless include net neutrality proposals in the Telecoms Single Market legislation (EU 2013) that was put to the European Parliament in September 2013?

The answer is harmonisation. At the heart of the Single Market ideal lies the expectation that the same rules should apply in each member state. Rules may be imposed by a Directive (that has to be legislated as law in each member state), or by an EC Regulation (that has direct legal authority of which member states must take "the utmost account"). However, where the regulatory framework is silent (as in the case of network neutrality), member states are free to impose their own rules, which creates the potential for divergence between member states and threatens the continuation of a single European market. This was in fact already happening via decisions taken by NRAs in the Netherlands (see Figure 1) and Slovenia. So, in order to prevent further proliferation across the member states the EC proposed the development of a new Regulation specifically to safeguard non-discriminatory treatment of Internet traffic.

Figure 1: Dutch Network Neutrality Rules

In 2011, the Netherlands became the first country in Europe to enshrine network neutrality in national law. The measure was designed to prevent operators blocking/throttling content or charging over-the-top (OTT) players such as WhatsApp for providing messaging services, and also to ban the use of deep packet inspection (DPI) to monitor usage of some applications. The new law banned charging consumers extra for using internet-based communications services (but it applies only to the open Internet and not to managed services). The law was further revised and strengthened in May 2016, with the final version only approved by the Senate in October 2016.

National net neutrality rules that contradict the EU Regulation may be retained until 31 December 2016. This means that the Dutch Law will need to be amended again if it is found to be inconsistent with the EU Regulation. Responding to the Senate's approval in October 2016, the GSMA says the tighter laws in the Netherlands will stifle development and limit consumer choice and "goes far beyond the intent of the EU Regulation." However, others e.g. Van Eijk (2014) have suggested that the EU Regulations have been established on the same basis as the Dutch Law, and are consistent with it. In truth, both the Dutch Law and the EU Regulation leave room for interpretation. (e.g. when does an "internet service" become a



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"managed service" or a "specialised service" where paid prioritisation is allowed?) It seems more likely that future harmonisation will be in the interpretation of the existing rules rather than changing the Law.

One such example is already taking place. T-Mobile Netherlands offers a music streaming service outside of the user's data cap, and the Dutch competition authority has launched an investigation to determine whether this type of zero-rating contravenes the net neutrality rules.

## The EU Regulation of November 2015

Regulation 2015/2120 of 25 November 2015 has the purpose of "laying down measures concerning open internet access" and amends previous Directives and Regulations necessary for this purpose. *Prima facie* this Regulation has the same purpose as the FCC's Order "in the matter of protecting and promoting the open internet" that was published earlier in 2015.[22] However, as the previous section makes clear, the genesis of the EU Regulation was quite different from that of the FCC Open Internet Order. Consequently, even though the two regulatory frameworks have much in common, it is instructive to examine the discrepancies between the two documents so as to highlight the different political and economic perspectives that exist on either side of the Atlantic.

### Traffic management as part of reasonable network management

The EU Regulation builds upon and adds to the provisions within the FCC's Order in relation to reasonable network management. To see this, it is necessary to quote Article 3(3) of the EU Regulation in its entirety, and after each paragraph to highlight the ways in which it differs from the FCC's position:

> *Providers of internet access services shall treat all traffic equally, when providing internet access services, without discrimination, restriction or interference, and irrespective of the sender and receiver, the content accessed or distributed, the applications or services used or provided, or the terminal equipment used.*

This is effectively a definition of network neutrality, and in particular affirmation of the FCC prohibition on blocking and throttling of internet traffic. However:

> *The first subparagraph shall not prevent providers of internet access services from implementing reasonable traffic management measures. In order to be deemed to be reasonable, such measures shall be transparent, non-discriminatory and proportionate, and shall not be based on*



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> *commercial considerations but on objectively different technical quality of service requirements of specific categories of traffic. Such measures shall not monitor the specific content and shall not be maintained for longer than necessary.*

As with the FCC Order, the prohibition on blocking and throttling is limited by the acceptance of reasonable traffic management. In the FCC Order this is defined as network management "primarily used for, and tailored to, ensuring network security and integrity, including by addressing traffic that is harmful to the network". Likewise, the EU Regulation emphasises the technical rather than commercial nature of reasonable traffic management, but it goes much further in its acceptance of what might be allowable. Essentially, broadly based solutions are acceptable: they must not discriminate against specific users or specific content, and they must be both proportionate and time-limited; nevertheless, the EU regulation appears to condone or even encourage quality-of-service differentiation for different categories of service.

> *Providers of internet access services shall not engage in traffic management measures going beyond those set out in the second subparagraph, and in particular shall not block, slow down, alter, restrict, interfere with, degrade or discriminate between specific content, applications or services, or specific categories thereof, except as necessary, and only for as long as necessary, in order to:*
>
> a) *comply with Union legislative acts, or national legislation that complies with Union law, to which the provider of internet access services is subject, or with measures that comply with Union law giving effect to such Union legislative acts or national legislation, including with orders by courts or public authorities vested with relevant powers;*
>
> b) *preserve the integrity and security of the network, of services provided via that network, and of the terminal equipment of end-users;*
>
> c) *prevent impending network congestion and mitigate the effects of exceptional or temporary network congestion, provided that equivalent categories of traffic are treated equally.*

This third paragraph more or less restates and re-affirms the second paragraph, but in the sub-bullets provides the justification for the exemptions. First and foremost is the need for harmonisation (to "comply with Union legislative acts"); secondly there is the same condition of network integrity and security that is the sole concern of the FCC; finally there is



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licence to mitigate network congestion so long as the mitigation measures are not targeted at specific content providers or end users.

### Service differentiation – quality and price

If the broadly-based exemptions from "pure" network neutrality on the grounds of network management are the thin end of the wedge, at the thicker end is permissibility of service differentiation explicitly on the grounds of quality of service and (implicitly) price. Whereas the FCC Order expressly prohibits "paid prioritisation" and offers no exemption on the grounds of reasonable network management, the EU specifically allows for service differentiation in Article 3.5:

> *Providers of electronic communications to the public, including providers of internet access services, and providers of content, applications and services shall be free to offer services other than internet access services which are optimised for specific content, applications or services, or a combination thereof, where the optimisation is necessary in order to meet requirements of the content, applications or services for a specific level of quality.*
>
> *Providers of electronic communications to the public, including providers of internet access services, may offer or facilitate such services only if the network capacity is sufficient to provide them in addition to any internet access services provided. Such services shall not be usable or offered as a replacement for internet access services, and shall not be to the detriment of the availability or general quality of internet access services for end-users.*

The clear contra-distinction between "internet access services" and "other services" implies paid prioritisation even though the Regulation does not explicitly refer to the commercial terms on which other services are provided and limits the scope of such services to circumstances in which they do not substitute for internet access services. The EU Regulation therefore attempts to keep alive the possibility of the NGN, a project that has absorbed many Euros of investment by European telcos since the millennium.

## The BEREC Guidelines of August 2016

The EU Regulation is motivated by and aims for harmonisation of net neutrality rules across the continent. However, the Regulation itself did not provide sufficient detail to achieve this, and in Article 5(3) it required BEREC to issue implementation guidelines "in order to contribute to the consistent application of this Regulation".



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The public consultation exercise initiated by BEREC generated a staggering 481,547 separate responses. These were broadly split into two camps:

- **Civil society**, including individuals, campaigns supported by individuals and organisations representing citizens or consumers. The civil society respondents (along with the CAPs, which broadly promoted the same agenda as civil society representatives) called for a strict interpretation of network neutrality that is fully application-agnostic, has limited and carefully ring-fenced exemptions for network management purposes, and contains prohibitions on price differentiation and zero rating.
- **Industry**, including ISPs, other industry stakeholders and their representative organisations. The ISPs and their group representatives were adamant that there is a need for flexibility in terms of traffic management, quality of service and price, allowing different rules to apply to different categories of traffic. The claims of the ISP community reached a crescendo in the 5G Manifesto (Paterson et al 2016) signed by the chief executives of 17 leading network companies, which claimed that "BEREC's draft proposal of implementation rules is excessively prescriptive and could make telcos risk-averse thus hampering the exploitation of 5G, ignoring the fundamental agility and elastic nature of 5G Network Slicing to adapt in real time to changes in end-user / application and traffic demand". (Paterson et al 2016)

Faced with these two diametrically opposed groupings, BEREC chose a middle ground position, which is carefully nuanced. The guidelines are sufficiently clear and firm that they have been seen as a win by advocates of the open internet, helped in part by the use of the term "Net Neutrality" in the title (whereas the EC Regulation and FCC Order avoided this term). Nevertheless, in our view the Guidelines provide for effective and proportionate service differentiation where it is required in order to encourage investment and promote new applications without in any way debilitating internet access services.

## Traffic management

BEREC notes that Article 3(3) of the regulation has the principle aim of prohibiting traffic management practices that are unreasonable. The starting point for regulation must therefore always be the seven principles within Article 3, namely:

- No blocking
- No slowing down (throttling)
- No alteration
- No restriction



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- No interference
- No degradation
- No discrimination.

The three exemptions listed in the Article should not be applied without firm supporting evidence. Exemptions on legal grounds have demonstrably to be compliant with the EU Charter of Fundamental Rights. Continuous monitoring of network integrity and security is acceptable, always subject to the over-arching principle of proportionality, but measures that involve active blocking of specific IP addresses or specific content can only be justified in response to concrete security threats and only for as long as is necessary to deal with those threats. Similarly, a traffic management exemption should only be granted for exceptional and temporary congestion, and can only be applied as long as it is necessary.

In this area the Guidelines add considerable strength to the Regulation. BEREC recognises that network management could be used by ISPs as a convenient smokescreen for otherwise prohibited blocking and throttling of internet access. If this exemption is invoked frequently or for a prolonged period then it should be disallowed and the ISP forced properly to dimension its network. If congestion management is required, it should normally be done on an application-agnostic basis, and throttling as opposed to blocking of traffic should be preferred; only in truly exceptional circumstances should application-specific blocking of traffic be acceptable.

## Service differentiation – quality and price

The Guidelines confirm that ISPs and end-users have freedom to conclude agreements with different commercial and technical terms as well as differences in service characteristics such as price, data volumes and speed. However, this freedom is bounded by the absolute requirement that they shall not limit the exercise of end-user rights as laid down in Article 3(1) of the regulation. BEREC considers that end-user rights are likely to be unaffected by application-agnostic offers (i.e. offers that apply equally to all applications) so such offers are likely to be acceptable. Similarly, time-limited offers (e.g. free music streaming to new mobile subscribers) that are not subject to preferential traffic management are allowable.

However, commercial conditions or practices involving price differentiation applied to categories of applications are more likely to restrict user rights. In these cases, BEREC considers that a comprehensive assessment by the NRA may be required, and it provides some suggested indicators to be taken into account. These include:

- The extent to which the ISP or CAP has market power;
- Whether material harm to competition is likely to be caused;



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- Whether the end user's choice of applications is restricted;
- Whether the end user is incentivised to use particular applications;
- The scale of the practice – are many end users impacted?
- The extent to which alternative offers or alternative providers exist.

In conclusion, based on the application of these criteria, BEREC comes down firmly on the side of prohibiting three particular practices:

- Higher prices for data associated with a specific application or class of application. Higher prices provide a disincentive to usage of the applications affected, and hence restrict end-user choice. They also may discourage the development of new applications.
- Zero-rating for data associated with a specific application or class of application. Zero-rating provides an incentive to usage of the applications affected and not others, and hence restricts end-user choice. Furthermore, the lower the data cap, the stronger such influence is likely to be.
- Price differentiation between individual applications within a category. Such price differentiation will impact competition between providers within that class, and thus undermine the goals of the Regulation.

These Guidelines clearly provide strict limitations on the provision of specialised services with different price/quality characteristics from standard internet access services. Nevertheless, the Guidelines leave room for service differentiation within the European Internet, so long as: the differentiation applies to sufficiently broad categories of application; does not significantly restrict or influence user choice; and does not have anti-competitive effect or intent.

There is also room for specialised services under Article 3(5) of the Regulation. BEREC clarifies that these services need to be different from internet access, optimised for specific content or applications, and that a level of quality that cannot be assured over internet access is objectively necessary. Examples of the kind of specialised services that BEREC believes may be justified include VoLTE, linear broadcasting IPTV, and VPNs, as well as sector-specific applications such as remote surgery. Nothing is set in stone, however, as over time both the service requirements and the capabilities of the internet will change; regulators will need to keep a watching brief on such developments and adapt regulations accordingly. In response to the concerns expressed by ISPs, BEREC also makes clear that 5G network slicing[23] may be used to deliver specialised services consistent with the rules.

The Guidelines thus make clear that fast lanes, toll roads or autobahns are permissible in the European internet. However, "it is of the utmost importance that the provisions regarding



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specialised services do not serve as a potential circumvention of the Regulation". This means that specialised services need to be separated from standard internet access and their differentiation needs to be objectively justified. Furthermore, they can be offered if and only if there is sufficient network capacity to ensure that internet access services are not degraded by the provision of specialised services.

Ensuring that standard internet services are not degraded by specialised services is the hardest challenge that NRAs will face. The Guidelines suggest that different approaches are required for fixed access, mobile access and core networks.

- For fixed access, which offers dedicated capacity to an individual end user, the user should be able to choose how to use it, including giving priority to paid services over internet access.
- For mobile access, it is impossible to forecast accurately the number of users and traffic volumes within a given cell at a given time, so small-scale and short-term fluctuations of service quality are to be expected, and should not be seen as constituting a breach of net neutrality rules.
- For core networks, which are shared by multiple users and do not suffer the same unforeseeable fluctuations in traffic, NRAs should measure performance and intervene if metrics such a latency, jitter, packet loss and speed are degraded to a statistically significant extent after the introduction of specialised services.

## What happens next?

The proof of the pudding is in the eating. The worth of the EU Regulation and the BEREC Guidelines will only be discovered in their implementation. This involves NRAs following the detailed guidance that they have been given to monitor traffic management practices, measure performance levels and assess market impacts. Ultimately what matters most is effective enforcement using the powers that NRAs have to:[24]

- require an ISP to take measures to eliminate or remove the factor that is causing the degradation;
- set requirements for technical characteristics to address infringements of the Regulation, for example, to mandate the removal or revision of certain traffic management practices;
- impose minimum QoS requirements;
- impose other appropriate and necessary measures, for example, regarding the ISPs' obligation to ensure sufficient network capacity for the provision of high-quality non-discriminatory internet access services;



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- issue cease-and-desist orders in case of infringements, possibly combined with periodical (daily/weekly) penalties, in accordance with national law;
- impose cease orders for specific specialised services unless sufficient capacity is made available for internet access services within a reasonable and effective timeframe set by the NRA, possibly combined with periodical (daily/weekly) penalties, in accordance with national law;
- impose fines for infringements, in accordance with national law.

BEREC itself will be monitoring developments as part of its annual work programme and publishing an annual report on the implementation of the Guidelines. This annual naming and shaming process worked well in the implementation of the 2003 regulatory framework, and the fact that it is to be adopted again now highlights the importance attached by the EC to harmonised net neutrality rules for Europe.

The question then arises: to what extent can the Regulation and BEREC Guidelines provide a template for elsewhere?

# 3. What is happening outside of Europe

## Introduction

A Web Index survey of the legislative and regulatory provisions on net neutrality implemented up to 2014 shows a wait-and-see attitude in most places, including important jurisdictions where the survey concludes there is traffic discrimination.[25] A more detailed analysis of each country shows a wide range of criteria for regulatory intervention and radically different attitudes towards zero-rating.[26] The range of approaches regarding net neutrality runs from the extreme case of the national legislature imposing strict non-discrimination requirements to doing nothing at all. Between these two poles, some countries have issued guidelines that mainly focus on network management practices by internet access providers: if monitoring detects harmful behaviour this triggers government intervention.

Those nations that have taken some initiatives on net neutrality can be roughly divided in the following categories:[27]

- Countries that have introduced legislation to ensure net neutrality and have prohibited blocking, slowing down and unreasonable discrimination of services, some of them including zero-rating, e.g. US, Brazil, Chile (and the Netherlands in the EU).



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- Countries that have followed a light-touch style whereby provisions on net neutrality were initially established jointly with the industry, such as the Canadian[28] guidelines issued in 2009, or the Korean "Guidelines for Network Neutrality and Internet Traffic Management", published in December 2011. Similar approaches have been adopted in Europe including the Norwegian model of co-regulation and the UK's similar approach that preceded legislation coming out of the European Commission.
- Countries that have taken no specific measures, as the national authorities consider that ex-post institutions and laws can address the issues (e.g. Australia and New Zealand).
- Countries that have initiated public consultations on net neutrality and are still debating what best to do (e.g. India).

In this chapter a series of comparative country case studies are presented to illustrate this range of practices.

## USA

After a number of twists and setbacks, on 26 February 2015 the FCC voted to adopt net neutrality rules. (FCC 2014) The text of the rules, which apply to all providers of broadband internet access services (BIAS) including mobile operators, sets three key provisions ("the Bright-Line Rules"): no blocking,[29] no throttling,[30] no paid prioritisation.[31]

The new rules are based on a "theory" of market evolution, the proposition that the internet's openness continues to enable what the FCC calls a "virtuous cycle":

> *The Internet's openness is critical to these outcomes, because it enables a virtuous circle of innovation in which new uses of the network - including new content, applications, services, and devices - lead to increased end user demand for broadband, which drives network improvements, which in turn lead to further innovative network uses*. (FCC 2010)

The FCC concludes that BIAS have a clear incentive to discriminate (paragraph 78[32]) and that they have done so in the past (paragraph 79[33]) irrespective of whether they have market power over competitive service providers (paragraph 84).

Therefore, according to the FCC, rules requiring an open internet need to be set in place in order to guarantee the sustainability of the "virtuous cycle". Two significant exceptions are made in the FCC rules.



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- broadband internet service providers are allowed to set usage-based pricing (e.g. the use of data caps) and practice "zero-rating"
- the rules do not apply to payment agreements between BIAS and content and application providers, neither between infrastructure owners in the internet value chain: BIAS, content delivery networks (CDNs) or backbone networks.

Interestingly, the FCC's rules refer to the possibility (citing examples of market abuses) that discriminatory behaviour may start to emerge at the points of interconnection between "last mile" internet access providers and the backbone owners of the internet (Internet Traffic Exchange, paragraphs 194–206). In effect this recognises the changing nature of the internet market structure and the need to monitor the emergence of new actors with significant market power.

The logic behind the FCC approach resides in a case-by-case analysis of complaints made to the Commission about unlawful practices. With this in mind the FCC recognises the complexity and trade-offs put forward by both net neutrality objectors and supporters. A case-by-case approach to evaluating specific instances of usage-based pricing and zero-rating is a cautious position. There is recognition of the need for better understanding so as not to kill off potentially welfare-enhancing pricing options in a highly dynamic and rapidly evolving internet digital ecosystem.

Much has been written on the history of net neutrality policy in the US, and many commentators suggest that the US rules are much more stringent than those in Europe. However, in our view the similarities outweigh the differences, with both ultimately preferring ex-post remedies based on clearly-defined regulatory guidelines, so as to address the complexities inherent in the market. Others have also highlighted the parallels between the European and the American net neutrality legal contexts. (Marcus 2014)

## Canada

The Canadian Radio-television and Telecommunications Commission (CRTC) released a net neutrality framework in 2009 (CRTC 2009:657). The policy provides for intervention by the CRTC if internet traffic management practices (ITMP) are of a discriminatory nature, on a case-by-case basis, and in response to a complaint. When a complaint is received, the CRTC will start an investigation and the internet service provider will need to describe the traffic management practices being employed, as well as the need for them, their purpose and effect. The description must also identify whether or not the ITMP results in discrimination or preference. In case the traffic management practice is considered discriminatory, the ISP will need to:



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- demonstrate that the ITMP is designed to address the need and achieve the purpose and effect in question, and nothing else;
- establish that the ITMP results in discrimination or preference as little as reasonably possible;
- demonstrate that any harm to a secondary ISP, end-user, or any other person is as little as reasonably possible; and
- explain why, in the case of a technical ITMP, network investment or economic approaches alone would not reasonably address the need and effectively achieve the same purpose as the ITMP.

These guidelines help the telecommunications sector in defining what are considered acceptable traffic management practices. On the other hand "economic ITMPs"[34] are allowed:

> *In contrast, economic ITMPs would generally not be considered unjustly discriminatory, as they link rates for Internet service to end-user consumption. Economic ITMPs also provide greater transparency to users than technical ITMPs, as they are reflected in monthly bills. Furthermore, these practices match consumer usage with willingness to pay, thus putting users in control and allowing market forces to work.*

The Canadian policy emphasises transparency in the management of traffic on ISP networks and avoids ex-ante intervention in safeguarding net neutrality principles. However, in late 2013, Ben Klass, a Bell Mobility customer, submitted a complaint regarding Bell's Mobile TV application which allowed him, for $5 per month, to consume an extra 10 hours of video content per month, some of which was Bell-owned. Vidéotron, another Canadian telecommunications company operating mainly in the Quebec province, had a similar application that charged $10 per month for 15 hours of content. Because these applications track usage in terms of hours whereas other content not owned by Bell or Videotron was measured in megabytes or gigabytes, Klass argued that these companies were giving preferential treatment to their own data and charging much higher prices. In its decision, the CRTC (2015) ordered Bell Mobility and Vidéotron to halt this practice. Bell Mobility was mandated to eliminate this unlawful practice. Vidéotron had to assure CRTC by 31 March 2015 that its application had been withdrawn and that any new mobile TV service it offered did not give it an unfair preference or advantage over similar services.[35]



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## Chile

Chile was the first nation to enact net neutrality principles into law in July 2010.[36] It did so partly in response to substantial pressure from citizens' groups, most notably NeutralidadSI[37] that petitioned representatives from Congress about the importance of having such a law in place to guarantee the rights of users. They also produced evidence that major ISPs were acting contrary to the principle of net neutrality, such as by blocking ports that allow the exchange of P2P files.[38]

A paper by the Secretary of Telecommunications of the Government of Chile, Pedro Mariano Huichalaf Roa, describes in detail the net neutrality policies followed in Chile.[39] The main legal principles are that:

- ISPs (those who provide access to the Internet) may not arbitrarily interfere with, discriminate against, or throttle in any form the right of any Internet user to use, send, receive or offer any legal content, application or service on the Internet, except when to act to safeguard the privacy of end users, the protection against virus and the security of the network;
- ISPs must provide parental control services;
- ISPs must provide in writing all the data necessary to correctly identify the service purchased by the end user;
- ISPs must guarantee the privacy of end users, protection against malware, and network security.

Despite these apparently strict rules, mobile operators kept offering zero-rated services for selected content such as Facebook and Twitter. This led to further disputes with civic organisations, and complaints that the regulatory authority, Subtel, was failing in its duty by not taking any action regarding the traffic management practices and zero-rating by ISPs. According to ONG Civico,[40] a Non-Governmental Organisation that promotes the development of public technological policies in favour of the citizenship, representing it in the discussions before the authority and the industry, for four years after the approval of the net neutrality law in Chile, Subtel did not monitor the quality of bandwidth provided by ISPs to end-users. In June 2013, Civico brought forward evidence that Subtel was aware of unlawful traffic management practices by ISPs,[41] and Alberto Cerda (a director with Derechos Digitales[42]) in his evaluation of net neutrality regulation in Chile (Cerda, 2013) also alleges negligent supervision of the law by Subtel.

Subtel refuted these allegations (La Segunda, 2013) and in June 2014 it prohibited zero-rated offerings.[43] However, the Chilean case was further complicated when Wikipedia Zero



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announced on 22 September 2014 it had negotiated with Subtel an exemption from the zero-rating rules.[44]

## Brazil

Brazil enacted the *Marco Civil da Internet*,[45] popularly known as the Internet Bill of Rights, in 2014. This Law No. 12/965 was signed by the President of Brazil at the opening ceremony of the Net Mundial conference in São Paulo in April 2014. The *Marco Civil* provides for strong privacy, data security, freedom of expression and network neutrality principles and rules. The network neutrality provisions in the law require internet providers to treat all data on the internet equally, regardless of content, origin and destination, service, terminal or application. Article 9 imposes on ISPs a duty to adhere to the net neutrality principles:

> *The party responsible for the transmission, switching or routing has the duty to process, on an isonomic[46] basis, any data packages, regardless of content, origin and destination, service, terminal or application.[47]*

The law only allows discrimination or degradation of internet traffic in two situations: technical requirements that are essential to the provision of the internet service, and prioritisation of emergency services.

A number of zero-rated offers have been established. Claro, a subsidiary of America Movil, started a partnership with Facebook Zero in 2010. Later, in April 2015, a few days after the President settled an agreement with Facebook to develop Internet.org in Brazil, it changed its commercial strategy and adopted the same approach as in other South American markets.[48] Claro started offering all its Brazilian customers free access to the three most-used social networks (Facebook, WhatsApp and Twitter). The benefit was offered to all types of clients – prepaid, postpaid or controlled plan customers – and data plans. Claro was the first local operator to remove charges simultaneously for all three social networks. TIM (the Brazilian subsidiary of Telecom Italia Mobile) has a partnership with WhatsApp with a zero-rating plan that allows subscribers to use the application when data caps are exceeded, while Oi has a similar arrangement with Twitter. Others, e.g. Vivo and Nextel Brasil, did not implement zero-rated offers.

Anatel, the national regulatory authority, has chosen so far not to regulate zero rating. However, it consulted on net neutrality in the spring of 2015[49] during the course of which the zero-rating issue was thoroughly discussed, and the Ministry of Justice put the *Marco Civil* text into public consultation on 27 January 2016. The *Marco Civil da Internet* had already entered into force, but a further Regulation was required for net neutrality. This Regulation was done in a collaborative way, using a participatory platform, following the pattern of



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public debate used in developing the *Marco Civil*. Consultations (in two phases) were carried out and contributions used as inputs to the draft Regulation. Decree No. 8,771[50], which regulates the *Marco Civil da Internet*, was published in an extra edition of the Official Gazette of 11 May 2016. The Decree deals with discrimination between data packets in the Internet and of traffic degradation, indicates procedures for data protection, indicates transparency measures in the request of personal data by the Public Administration and sets conditions for inspection and verification of infractions.

The Decree was published with significant changes to the draft submitted to public consultation. The provisions introduced by the Decree regarding net neutrality are described below. The Decree specifies in detail a list of what would hypothetically be allowed as exceptions to net neutrality.

According to article 5 of the Decree, "technical requirements essential to the provision of the service" are:

(i) addressing security issues, such as restricting spam and controlling denial of service attacks; and

(ii) addressing exceptional network congestion situations.

Anatel, the national regulatory authority, is the institution responsible for the inspection and verification of infractions related to the exceptions to net neutrality indicated above, considering the guidelines established by an Internet Management Committee, CGIbr. Network traffic management practices, using techniques within established international standards, are also allowed, provided they comply with the parameters issued by Anatel and the guidelines issued by CGIbr (Article 6). Such practices must also be transparent for example by being included in contracts with end users and published on the operator's websites. Prioritisation of data packets due to business arrangements is expressly prohibited. However, the Decree does not make clear whether practices such as zero rating or sponsored access to internet applications are or are not considered a deviation to network neutrality and therefore unlawful.

## India

Concerned with the growing impact on the revenues of network operators, the Telecommunications Regulatory Authority of India (TRAI) issued a consultation paper on "Regulatory Framework for Over-the-top (OTT) services" on 27 March 2015.[51] The objective of the public consultation was to analyse the implications of revenue substitution and consider whether or not the regulatory framework should be changed: e.g., should OTT



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players start being regulated and/or internet service providers be allowed to charge them a termination fee?

In addition, a high-level Committee on Net Neutrality submitted a report, (DoT 2015) released in May 2015, to the Department of Telecommunications. The report examines the issue of net neutrality and other associated areas. The Committee recommendations cover technical, regulatory and public policy matters required to address the net neutrality issue. Relevant recommendations made by the Committee are as follows:

- Telecommunications service providers (TSPs) must not restrict the ability of the user to send, receive, display, use or post any legal content, application or service on the internet, or restrict any kind of lawful internet activity.
- A clause, requiring adherence to the core principles of net neutrality should be incorporated in the license conditions of TSPs.
- Legitimate traffic management practices may be allowed but should be "tested" against the core principles of net neutrality. General criteria against which these practices can be tested are as follows:
- Adequate disclosure of traffic management policies so that users can make informed choices;
- Application-agnostic controls may be used but application-specific controls within the "internet traffic" class are not permitted;
- Practices like deep packet inspection should not be used for unlawful access to the type and content of an application in an IP packet;
- Improper (paid or otherwise) prioritisation is not permitted.
- There should be a separation of "application layer" from "network layer" as application services are delivered over a licensed network.
- The suggested enforcement process is as follows:
    - Core principles of net neutrality may be made part of License conditions, in addition to which the Licensor may issue guidelines from time to time.
    - The DoT should set up a team to deal with net neutrality cases. In case of violations, a two-stage process of review and appeal should be followed to ensure that decisions are objective, transparent and just.
    - Tariffs shall be regulated by TRAI as at present. Whenever a new tariff is introduced it should be tested against the principles of net neutrality.



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However, post-implementation, any complaints regarding a tariff violating the principles of net neutrality should be dealt with by DoT.

- Net neutrality issues arising out of traffic management would have reporting and auditing requirements, which may be performed and enforced by DoT.
- Quality of service and transparency requirements should be dealt with by TRAI.

The Committee was also exercised by the potential for regulatory and pricing arbitrage from OTT services, and specifically VoIP. It argued that there is no case for prescribing regulatory oversight similar to conventional communication services,[52] but called for "a graduated and calibrated public policy response" to ensure that arbitrage "does not dictate winners and losers in a competitive market for service provision".

In December 2015, TRAI issued another Consultation Paper on "Differential Pricing for Data Services".[53] This time, TRAI was concerned with the emergence of differential tariff plans set up by TSPs who started offering zero or discounted tariffs to certain websites, applications or platforms.[54] According to service providers, the objective of such offerings was to enable universal access to specific content on the internet.

Based on the responses received from stakeholders and internal deliberations, in February 2016 TRAI published the "Prohibition of Discriminatory Tariffs for Data Services Regulations, (2) 2016".[55] In the press release to announce the decision, TRAI asserted its commitment to net neutrality principles:

> *While formulating the Regulations, the Authority has largely been guided by the principles of Net Neutrality seeking to ensure that consumers get unhindered and non-discriminatory access to the internet. These Regulations intend to make data tariffs for access to the internet to be content agnostic.*

The regulation prohibits Internet access providers from offering or charging discriminatory tariffs for data services on the basis of the content being accessed by a consumer.

## Australia

Australia does not have in place any specific ex-ante law governing net neutrality. Issues that might collide with net neutrality principles are thought to be addressable through the general competition regime managed by the Australian Competition and Consumer Commission (ACCC) and/or through existing ex-ante telecoms regulation. Internet service providers have put in place zero-rated offers and other forms of traffic management and differentiation.



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There has been a considerable public debate (Daly 2014) on this issue in Australia. The main argument supporting forbearance is based on significant retail competition.

## South Korea

South Korea, a country that has amongst the highest broadband penetration and internet speeds in the world, has not officially adopted any legally binding decision on net neutrality. However, the regulator has published "Guidelines for Network Neutrality and Internet Traffic Management", on 26 December 2011. These guidelines contain basic principles on network neutrality and traffic management practices, namely transparency rules and no unreasonable discrimination or blocking, but also recognise the need for reasonable traffic management.

On 10 February 2012, Korea Telecom blocked its subscribers from having access to internet sites such as YouTube through Samsung Smart TV. Korea Telecom stopped blocking access after serious complaints from its subscribers. However, the blocking of streaming video through Smart TV lasted for four days and reignited the debate over network neutrality in Korea.

In December 2013, the Ministry of Science, ICT and Future Planning (MSIP) intervened to forbid mobile network operators abusing the power of bottleneck ownership and issued new guidelines: "Guidelines Regulation of Internet Access Service Traffic". (Choi & Lee, 2014) The key features of the Guidelines are summarised below:

- The Guidelines apply to internet access services in general, with the exception of managed services.
- Service Providers must take appropriate measures to promote network upgradability in tandem with corresponding increases in internet traffic.
- The Guidelines focus on traffic management issues: traffic management must be implemented only on a limited basis and within a reasonable scope.

The Guidelines seek to establish "Standards for Determining the Reasonableness of Traffic Management" as the previous guidelines failed to clarify this issue. The following items were considered necessary in order to assess the reasonableness of traffic management schemes employed by the internet service providers:

- whether information relating to traffic management is sufficiently disclosed to the users (transparency);
- whether the traffic management scheme in question conforms to its intended goal and purpose (proportionality);



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- whether implementation of the traffic management constitutes an unreasonable discrimination against other similar content (non-discriminatory);
- technical characteristics of the wired/wireless network in question.

The Guidelines also discuss what "Types of Reasonable Traffic Management" may be allowed:

> *The following types of traffic management may be deemed reasonable:*
>
> *(i) where such traffic management is necessary to maintain security and safety of the network by preventing malware, hacking, communication disruption, etc.;*
>
> *(ii) where a service provider implements a traffic management scheme as a minimum necessary measure to protect multiple users from network congestion and to guarantee an environment for fair and equal use of the internet by all users; or*
>
> *(iii) where such traffic management is required for enforcement of related laws or where such traffic management is requested by users based on related laws or user agreements.*

The Guidelines make clear that internet access providers must provide information relating to their services, such as the terms and conditions, procedures and methods of their traffic management schemes, and must also inform users upon implementing measures necessary for traffic management. Traffic management information must be published on the service provider's website. Additionally, the MSIP announced that VoIP services would be allowed on all mobile rate plans.

## 4. Overall assessment

Net neutrality is an alluring concept. It is also an elusive one. It is a term that speaks of fairness and non-discrimination, concepts whose abiding relevance is almost universally acknowledged and central to any policy framework for internet access. But the application of those concepts varies, with the result that there is no one-size-fits-all approach to net neutrality. Instead, having examined the key issues and reviewed the implementation challenges in a variety of countries we have come to the conclusion that:

- There is a minimum set of requirements that has been incorporated, in practice, into the regulatory regime in all countries that have tried to establish net neutrality rules. These include no blocking, no throttling, transparency, reasonable traffic management and QoS requirements.



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- There is room for national variation especially with respect to two key issues: the extent to which paid prioritisation and zero rating is allowed. These practices can be prohibited (the US approach) or they can be allowed under strict rules to ensure that there is no degradation of service to standard internet users (the EU approach).
- In scoping net neutrality rules, there are a number of factors which need to be carefully analysed in each jurisdiction, namely:
    - The existing level of competition of retail broadband internet access services: A key difference between the US and EU is the market structure for internet access service providers. Due to the EU's wholesale unbundling policies, European networks tend to have less concentration in the market for retail broadband internet services, which tends to support net neutrality outcomes even in the absence of regulation.
    - Vertical integration between internet access services providers and content and applications providers. Most significant internet content providers are based in the US, so vertical integration is a much more substantial threat to net neutrality in the US than it is within the EU.[56] The vertically integrated ISP needs to be regulated to prevent favouring its own content and thus breaching net neutrality principles.
    - The level of congestion in the "last mile" and backbone networks at peak times. The more congestion there is the more incentive ISPs have for paid prioritisation and the more likely prioritisation is to affect the quality of ordinary internet services.
    - The amount of existing local content with commercial appeal. In countries with little locally produced content or a fragile industry unable to compete with global players, the policy framework may well set an objective of encouraging locally created content. In such circumstances regulators have to be very careful not to damage the local industry either through zero-rating foreign content or an overly strict application of net neutrality. Instead, some exemptions for local content and applications may be offered.[57]
- Careful consideration needs to be given to the extent to which ex-post regulation is relied upon to deliver net neutrality. It is possible to rely entirely on ex-post decision-making (the Australian approach) but more commonly there is ex-post application of ex-ante guidelines (the US and EU approach). Unless there is a strong track record of relying on ex-post competition law, with the institutional capacity to handle net neutrality cases efficiently and effectively, it is better to



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establish ex-ante guidelines to provide some degree of confidence within the industry as to the nature and consequence of breaches of net neutrality. Ex-ante guidelines can also focus on the perceived weak points of the national environment but they will not, because they cannot, detail all possible circumstances or specify exactly what remedies will be applied. Ex-ante guidelines improve the transparency of decision-making and of intervention for the industry and thereby create improved certainty for investment. So ex-post regulation will also be needed, and the balance between ex-ante guidelines and ex-post decision-making will depend heavily on local circumstances.

It is possible, perhaps with the benefit of post-rationalisation, to see this framework in place within the different countries that have been profiled in this article. For example:

- In the US, deep concerns about the lack of retail competition, especially in fixed broadband, and about vertical integration have led to a strict set of ex-ante rules. Nevertheless, there is a predilection towards ex-post regulation in the US, so the FCC's Open Internet Order will ultimately be tested through the courts, which will also be responsible for imposing remedies (which are not specified in the Order).
- In the EU, competition is less of a concern but investment in new technologies (e.g. 5G mobile), in increased bandwidth (e.g. fibre rollout), and in innovation (e.g. European content) has made regulators more willing to consider quality-of-service differentiation. The ex-ante guidelines that have eventually emerged give freedom to ISPs to offer specialised services at higher prices, but only if ISPs simultaneously preserve the quality of service on the open internet. To achieve both of these goals, especially in the area of network congestion, further network investment will be required. The net neutrality rules may therefore be seen to achieve the overall policy goals of the Digital Agenda for Europe.
- In India the main regulatory concerns are about foreign application providers (OTTs) undermining the revenues of the local network providers and hence restricting their ability to invest in much-needed network roll-out. The net neutrality rules therefore delineate between networks and applications, and allow for traffic management within the network layer so long as there is transparency to the user who can then make informed decisions about the choice of applications.
- In Canada the emphasis has been on enhancing retail competition, giving the user a greater variety of services and enabling informed choices between them. The net neutrality guidelines therefore emphasise transparency and allow for



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variations in the quality/price offer so long as it does not discriminate against competitors.

It is also possible to apply this framework to a range of contemporary issues being faced by regulators in the net neutrality space. For example:

- **Ad-blocking.** In June 2016 the UK mobile operator, *3*, offered a one-day opt-in trial in which it would block all advertising on its network (BBC News, 2016). It said it was doing this because advertisements count towards a customer's data charges, some advertisers exploit customer information and customers do not always want to see advertisements during web-browsing. Would such a service breach the EU's net neutrality rules? Ostensibly, yes, because the "no blocking" rule is sacred. But users already have the opportunity of blocking adverts through commercial applications, and *3*'s offer was simply allowing users to make that choice via another mechanism. If the offer was clearly under the control of the user rather than the ISP, and if it treats all adverts in the same manner, then it may be seen as sufficiently broadly based, transparent and an application-specific form of traffic management.
- **Internet.org**. This Facebook-led initiative aims to overcome issues of accessibility, affordability and awareness to provide internet access in places where people cannot normally obtain or afford it. As of November 2016, 40m people had been connected via internet.org with free access to a range of basic websites. Is this altruistic or exploitative? It all depends on the approach taken to zero-rating, because economically, if not technically, internet.org favours some websites and blocks access to others. In developing countries the "something is better than nothing" philosophy may argue for such an approach, but at some stage regulators should be more concerned about the practice cementing market power and tilting competition in favour of a company whose market capitalisation is about the same as the combined GDP of the 40 poorest African countries. It might be asked, if this is an altruistic exercise, then why cannot internet.org provide free access to the whole internet and not just to a carefully controlled part of it?

It is clear from these examples that net neutrality is really a philosophy rather than an axiom for regulation. At its core is the belief that the internet should be open equally to all, and access to it should not be restricted or controlled by anyone other than the user. But in the real world this article of faith comes up against technical and economic limitations as well as commercial interests. Regulators need to distinguish between the genuine constraints and the self-serving arguments. Guidelines are useful to present the over-riding principles and



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indicate how those principles are likely to be enacted in practice. However, the application of those guidelines and the remedies will need to be applied ex-post, in response to complaints and evidence of anti-competitive behaviour. The EU Regulation coupled with the BEREC Guidelines provides a solid foundation for this approach, and they will (with minor adaptation) be suitable in many other countries.

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## Endnotes

[1] End-to-end design here means that all end users can access all content available in the internet. Vertical integration between content owners and internet access providers could potentially lead to blocking of competing content or services and therefore disrupt this principle.

[2] As mentioned in the article, the concern that the vertical integration of cable firms with ISPs would prove a threat to the end-to-end design of the internet was first highlighted by Mark Lemley and Lawrence Lessig. As discussed in Wu's article several remedies could be thought to mitigate the potential harmful behaviour from ISPs. One of such remedies was allowing consumers their choice of ISPs, usually called an "open access remedy". Another was an anti-discrimination rule. The article argued that a discrimination rule was the best way to prevent harmful behaviour and as a means to keep a network neutral.

[3] As Tim Wu wrote in his website (http://www.timwu.org/network_neutrality.html):

"Network neutrality is best defined as a network design principle. The idea is that a maximally useful public information network aspires to treat all content, sites, and platforms equally. This allows the network to carry every form of information and support every kind of application. The principle suggests that information networks are often more valuable when they are less specialised – when they are a platform for multiple uses, present and future. (For people who know more about network design, what is just described is similar to the "end-to-end" design principle)."

[4] Taken from Save the Internet website, at: http://www.savetheinternet.com/net-neutrality-what-you-need-know-now .

[5] A detailed account of the history of Net neutrality in the European Union is provided in Chapter 2.

[6] Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services.



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[7] Directive 2009/140/EC (Better Regulation Directive)

[8] Also provides advice on request and on its own initiative to the European institutions and complements at European level the regulatory tasks performed at national level by the NRAs.

[9] Summary of BEREC positions on net neutrality, BoR (12) 146b. The key question for BEREC in the net neutrality debate was on how much control operators could legitimately exert over the traffic on their networks.

[10] Being able of setting a price above zero has always been a key claim of ISPs in order to support sustainability and keep up to network investments. Such payments would violate, most would argue, the net neutrality principles whereby no internet service provider should be allowed to charge content and applications providers' traffic in exchange for prioritisation or other discriminating acts against everyone else's traffic arriving simultaneously. Defenders of net neutrality fear that allowing ISPs to charge content and application service providers (CAPs) would lead to a so-called "competitive bottleneck" where CAPs are in danger of being priced excessively. If pricing allows traffic discrimination (fast lanes), new firms with small size will probably not be able to pay these prices. Therefore their content will not be accessed. The likely outcome would be an increasingly concentrated market structure and reduced innovation in the edge of the network.

[11] This capability also allows benign forms of traffic management and filtering of malicious traffic, a desirable feature.

[12] Exponential growth of Internet users (3.2 billion users by the end of 2015 according with the ITU) enlarged its reach to an increasing number of less liberal political regimes and to cultures that have different conceptions regarding what is acceptable to be accessed in the Web. Nowadays, within a particular jurisdiction, technology developments allow subtle and sophisticated forms of breaking privacy of end users or subtracting data packets from the daily flow with variable and disturbing implications for individuals, companies or governments. Reconciling the specific characteristics of each country with the governance of an open Internet model faces considerable problems and certainly trade-offs between political and economic goals have to be reached when defining net neutrality.

[13] Companies such as Akamai and Limelight operate servers closer to the "last mile" internet service provider, hosting content for CAPs.

[14] For more information see Rogerson (2013)

[15] In best effort networks other alternative ways for improving network performance not described here have been developed and have proven to be efficient and cost effective.



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[16] Cisco forecasts that there will be 3.9billion Internet users using 24.4 billion devices and 67% of traffic will be generated by mobile devices in 2019. See Cisco (2015).

[17] For further details see section 3 of this article "What is happening outside Europe – USA".

[18] It is notable that the Netherlands is one of the few EU countries with extensive cable competition and it is also one of the few EU countries in which significant net neutrality battles have been fought. See Figure 1.

[19] The package consisted of five Directives. The Framework Directive (2002/21/EC) provided the basis for future regulation of electronic communications networks and services, and was supplemented by specific Directives on Authorisation, Access and Interconnection, Universal Service and User Rights, and e-Privacy. The full package, including later updates, can be found at: https://ec.europa.eu/digital-single-market/sites/digital-agenda/files/Copy%20of%20Regulatory%20Framework%20for%20Electonic%20Communications%202013%20NO%20CROPS.pdf .

[20] Directive 2009/140/EC (Better Regulation Directive)

[21] The current list of relevant markets is available at: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014H0710&from=EN .

[22] Interestingly, neither document uses the popular term “network neutrality”. Nevertheless, the definitions used by both the FCC and the EC are consistent with common definitions of net neutrality.

[23] Network slicing is an optimisation technique that partitions a single physical network into multiple virtual layers (or slices) each with defined minimum and maximum resource allocation parameters, and hence variable quality of service levels. Each slice can be optimised for different types of services and for different types of customer segments.

[24] This list of possible sanctions comes from Paragraph 178 of the BEREC Guidelines.

[25] Web index available at: http://thewebindex.org/wp-content/themes/wixWordpress_Theme-develop/visualisations/neutrality-full.html .

[26] Zero-rating is a commercial practice used by broadband internet access providers, especially mobile operators, which allows the data volume of particular applications or services not to count against the end user’s purchased data cap.

[27] For example, ITU classified countries in three categories of approach to Net neutrality legislation: a) Cautious Observers, b) Tentative Refiners and c) Active Reformers. See ITU (2013).



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[28] Canada later banned a specific zero-rating practice. For more detailed information read the case study below.

[29] "A person engaged in the provision of broadband Internet access service, insofar as such person is so engaged, shall not block lawful content, applications, services, or non-harmful devices, subject to reasonable network management."

[30] "A person engaged in the provision of broadband Internet access service, insofar as such person is so engaged, shall not impair or degrade lawful Internet traffic on the basis of Internet content, application, or service, or use of a non-harmful device, subject to reasonable network management.

[31] "Paid prioritization refers to the management of a broadband provider's network to directly or indirectly favor some traffic over other traffic, including through use of techniques such as traffic shaping, prioritization, resource reservation, or other forms of preferential traffic management, either (a) in exchange for consideration (monetary or otherwise) from a third party, or (b) to benefit an affiliated entity."

[32] "Broadband providers function as gatekeepers for both their end user customers who access the Internet, and for various transit providers, CDNs, and edge providers attempting to reach the broadband provider's end-user subscribers. As discussed in more detail below, broadband providers (including mobile broadband providers) have the economic incentives and technical ability to engage in practices that pose a threat to Internet openness by harming other network providers, edge providers, and end users."

[33] "As explained in detail in the Open Internet Order, broadband providers not only have the incentive and ability to limit openness, but they had done so in the past."

[34] Footnote (6) of the Telecom Regulatory Policy CRTC 2009-657:"Economic ITMPs include monthly bandwidth capacity limits, where users who exceed a predefined threshold must pay additional money for bandwidth consumed, and time-of-day pricing for bandwidth consumed."



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[35] "In light of the above, the Commission directs Bell Mobility to eliminate its unlawful practice with respect to data charges for its mobile TV service by no later than 29 April 2015. Further, the Commission directs Videotron to confirm by 31 March 2015 that it completed its planned withdrawal of its illico.tv app for Blackberry- and Android-based phones by 31 December 2014, thereby removing any undue preference for its mobile TV service, and ensure that any new mobile TV service complies with the determinations set out in this decision. This decision will favour an open and non-discriminatory marketplace for mobile TV services, enabling innovation and choice for Canadians. The Commission is very supportive of the development of new means by which Canadians can access both Canadian-made and foreign audiovisual content. However, mobile service providers cannot do so in a manner contrary to the Telecommunications Act."

[36] Available (in Spanish) at: http://www.leychile.cl/Navegar?idNorma=1016570 .

[37] See http://www.neutralidadsi.org/ .

[38] See http://www.neutralidadsi.org/2009/02/05/vtr-limita-las-descargas-p2p-pruebas-concretas-nuevamente/ .

[39] Available (in Spanish) at: http://www.regulatel.org/wordpress/wp-content/uploads/2015/07/4.Neutralidad_de_la_red_version%20final.pdf .

[40] See https://ongcivico.org/neutralidad-en-la-red/se-confirma-en-4-anos-subtel-no-ha-fiscalizado-la-calidad-de-la-banda-ancha-en-chile/ .

[41] See https://ongcivico.org/neutralidad-en-la-red/ong-civico-denuncia-abandono-de-deberes-de-subtel-en-fiscalizacion-de-calidad-en-acceso-a-internet/ .

[42]Derechos Digitales is an independent, non-profit Latin American organization founded in 2005 and whose fundamental objective is the development, defense and promotion of human rights in the digital environment: https://www.derechosdigitales.org/ .

[43] http://www.subtel.gob.cl/ley-de-neutralidad-y-redes-sociales-gratis/ .

[44]"Wikipedia Zero works with mobile carriers to waive data charges on mobile devices to allow users free access to all Wikimedia sites. So far, this program has made the knowledge freely accessible to an estimated 375 million mobile phone users in 31 countries." Available at: https://blog.wikimedia.org/2014/09/22/chilean-regulator-welcomes-wikipedia-zero/ .

[45] Available at (in Portuguese): http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2014/lei/l12965.htm .

[46] In an equal way before the law.



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[47] Art. 9: *O responsável pela transmissão, comutação ou roteamento tem o dever de tratar de forma isonômica quaisquer pacotes de dados, sem distinção por conteúdo, origem e destino, serviço, terminal ou aplicação.*

[48] http://www.bnamericas.com/en/news/telecommunications/claro-brasil-launches-plan-with-free-whatsapp-facebook-and-twitter .

[49] (Consulta Pública nº 8/2015 - Tomada de subsídios sobre a regulamentação da neutralidade de rede, prevista no Marco Civil da Internet).

[50] Available at: http://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2016/Decreto/D8771.htm

[51] To understand the underlying issues and prepare the consultation, TRAI conducted a seminar in August 2014, in which representatives of telecommunications service providers, OTT providers and legal experts presented their views. (TRAI, 2014) The consultation is available at: http://www.trai.gov.in/WriteReaddata/ConsultationPaper/Document/OTT-CP-27032015.pdf .

[52] However, national security must be safeguarded: "National security is paramount, regardless of treatment of Net Neutrality. The measures to ensure compliance of security related requirements from OTT service providers, need to be worked out through inter-ministerial consultations."

[53]Available at: http://www.trai.gov.in/Content/ConDis/20761_0.aspx .

[54] In India there were several zero-rated options offered in 2015, one joining Internet.Org, owned by Facebook, with Reliance, and another from Airtel, the largest internet access provider in India. A "battle" between the government and Facebook's Internet.org ended when the authorities finally issued a regulation, the "Prohibition of Discriminatory Tariffs for Data Services Regulations", which bans zero-rated offers altogether. For a detailed description of the zero-rated discussion in India, see Marsden (2016) .

[55] Available at: http://www.trai.gov.in/WriteReadData/WhatsNew/Documents/Regulation_Data_Service.pdf .

[56] For example, so far there has been no merger in Europe equivalent to the proposed merger of AT&T and Time Warner (or of Comcast and NBC-Universal).

[57] See, for example, Futter & Gillwald (2014).



http://doi.org/10.18080/ajtde.v4n4.79

# Market Evolution and Regulation in the Italian Telecommunications Industry

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Abstract: In this paper we analyse the evolution of the Italian telecommunications market since the beginning of the liberalisation and privatisation process in Italy started in the mid-nineties. The role of competition and regulatory authorities is also considered. We present a survey of the main regulatory interventions in the industry as well as the market structure and its dynamics in the period 2000-2015. We also provide some insights on the current state of the ultra-fast broadband access and the evolution of the so called "next generation networks". In this regard, the recent Italian government's plan regarding the deployment of the broadband services is also discussed. Our research can provide helpful information on telecommunications trends in Italy and would help to assess past as well as ongoing policies.

Keywords: access regulation; market evolution; regulatory institutions; next generation networks.

## Introduction

In 1987 the European Commission established a set of directives regarding market liberalisation to be followed by member states. In particular, the Green Paper in telecommunications sector was introduced in order to protect consumers' rights in this sector. As well as in other member states, market liberalisation in Italy was driven by these EC directives. Establishment of the antitrust authority (AGCM) in 1990 and the independent telecommunications regulator (AGCOM) in 1997 is the direct result of implementing these policies. The outcome of the efforts was the full liberalisation of the telecommunications market starting from January 1998. From this date on the focus of the different authorities in the Italian telecom market was to promote competition in the market and to provide regulatory interventions to support this target. On the other hand, since the start of the



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millennium the rate of technological developments has been increasing. Therefore, in order to satisfy consumer needs, the authorities established new sets of regulations to promote investments as well as technological innovations in the telecommunications infrastructure.

In this paper, our aim is to present a brief review of the Italian telecommunications industry and its evolution through the past decades. We will also explain the current status of the industry as well as possible future scenarios of the telecom market in Italy. The structure of the paper will be as follows: in Section 2 a brief history of the telecommunications industry in Italy will be presented and in Section 3 the evolution of the Italian telecommunications regulation and its institutional framework will be discussed. Then we will analyse the past and current market structure as well as the sector dynamics in section 4. Section 5 includes the recent and possible future developments in telecom infrastructure networks and a discussion of the Italian strategy for broadband deployment. Finally, in Section 6 a set of policy recommendations regarding current debates in the sector are provided.

## The history of telecommunications and its liberalisation process in Italy

Liberalisation of the telecommunications industry in Europe started in 1987 when the Green Paper on the *Development of the Common Market for Telecommunications Services* was released and the European Commission provided a set of directives for the liberalisation process. In Italy, as well as in other member states, these directives have been adopted to meet the liberalisation goals, although the efforts did not start until 1992 when the management of previously State-owned telecommunications services, named ASST (Telephone Services State Agency) and the Posts and Telegraphs Administration (PT), were given to concessionaires.

Further in 1994, Telecom Italia was established by merging all the existing concessionaires except one, TELEMAR. Telecom Italia Mobile (TIM) was established a year later in 1995. Meanwhile Omnitel Pronto Italia obtained the government's permission to provide mobile services in a national setting. An agreement was achieved between Telecom Italia and Omnitel and another one between Omnitel and TIM to provide access to Telecom's fixed network as well as national roaming for Omnitel. These were the first signs of a competitive market in the Italian telecommunications industry.

In 1997 the law for the establishment of the telecommunications National Regulatory Agency was approved by the Italian parliament and AGCOM (Autorità per le Garanzie nelle Comunicazioni) started its activities. In the same year Telecom Italia and STET (the holding company) were merged, adopting the name Telecom Italia.



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In 1998, further attempts to promote competition resulted in the privatisation of Telecom Italia by the Ministry of Treasury. However, 3.4% of Telecom Italia's shares remained in control of the Treasury and a "golden share" decree was established in order to protect the vital interests of the public by providing the State the ability to intervene in the company's decisions, setting limits, vetoing choices and even to block an acquisition of Telecom Italia. This special power of the State was adopted to limit the potential lack of interest from the investors to compete in the acquisition of shares of the telecom incumbent. However, in spite of the golden share rule, in 1999 Olivetti managed to take control of Telecom Italia by acquiring 52% of its shares and later, in 2002, to reduce the budget deficit, the shares belonging to the Treasury were also sold. Therefore, from 2002, Telecom Italia has been completely privatised.

# Institutional framework in the Italian telecommunications sector

In this Section we present the legal framework governing the Italian telecommunications sector and introduce the institutions holding regulatory power in the industry. We also provide a brief description of the authorities' duties and the existing regulations.

## The Italian competition authority (AGCM)

In Italy it was in 1990 that the antitrust law was introduced and the main organisation in charge of regulating competition, the Autorità Garante della Concorrenza e del Mercato (AGCM), was established. This means that AGCM is responsible for administering the Competition and Fair Trading Act (law number 287 of 1990). Nevertheless, each infrastructure area has its own sector specific regulator. AGCM is an independent authority, whose core purpose is to ensure that the market is accessible for everyone and competition is not hindered. It also has the responsibility of protecting consumers against unfair commercial practices and misleading advertising (ACCC/AER, 2013). AGCM, furthermore, has the responsibility of identifying market power abuses, mergers resulting in significant market power for one party and any activity which could result in limiting competition in the market.

Participation of the competition authority in the telecommunications sector was intense at least until 1997, when the Autorità per le Garanzie nelle Comunicazioni (AGCOM) was established.



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## The independent telecommunications regulator (AGCOM)

As mentioned before, AGCOM (Autorità per le Garanzie nelle Comunicazioni) was established in 1997 by the Italian parliament by the introduction of the Law No. 249.[i] This institutional organisation has a structure which gives it the unique ability of having horizontal regulatory supervision over the whole communications sector including telecommunications, the audio-visual industries and publishing (OECD 2001). According to the law, AGCOM should be fully independent and not to be influenced by political interests. It has full regulatory authority over the telecommunications sector including the regulation of interconnection and access to fixed networks and spectrum.

AGCOM is based in Naples and Rome and it is composed of a President, a Council and two committees – one for infrastructure and networks, and one for services and products – each of which has four commissioners. The fact that AGCOM members are chosen by the Senate and Parliament has caused some fears about its real level of independence.

Some of the core activities of the two committees are as follows:

The commission for infrastructure and networks deals with:

- Regulating the dominant operator's tariffs in order to balance the price and cost of services;
- Regulating interconnections in order to ensure access to the telecommunications infrastructure for all current and entering operators;
- Determining the scope of the universal service, as well as the principles for calculating and allocating their related costs;
- Planning the frequency allocations, which should be presented to the Ministry of Communications and gain its approval;
- Resolving disputes between service suppliers and consumers.

The commission for services and products deals with:

- Monitoring the level of quality of service;
- Monitoring the distribution of services and products;
- Managing the interplay between network operators and the service resellers.



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The Council, which comprises the President and all Commissioners, also has two tasks including:

- Supervising the functioning of the market, ensuring the existence of market competition and preventing the abuse of market dominance;
- Promoting technological innovation.

Simultaneous operation of the competition authority (AGCM) alongside the sector specific regulator (AGCOM), can cause contradictions in the decision-making processes of the two organisations. In order to avoid this problem, the two authorities communicate continuously (in the form of non-binding opinions and advices) regarding diverse issues such as mergers and acquisitions, abuses of dominant power, universal service funding, conditions of access to networks, etc.

## Main regulatory approaches

In this section some of the regulatory capabilities and interventions of the AGCOM in the telecommunications industry will be presented.

**Licensing:** As the liberalisation process in the telecommunications market started, a licensing regime was established to replace the traditional 'concession allocation' approach. Telecom Italia, TIM and Omnitel which had been concessioners earlier, became licensees as of 2001, while their previous exclusive rights had been annulled in 1998. Individual licences are required for activities such as provision of voice and mobile telephony, provision of networks, installation and management of networks and any combinations of these activities. The licences should be received from the Ministry of Communications (as of March 2001 the responsibility for granting licences has been passed from AGCOM to the Ministry of Communications) for a duration of 15 years (which can be renewed) and a licence fee should be paid to cover the related administrative expenses.

**Rights of way:** In Italy each region has its own regulatory power and legislative system to grant rights of way; therefore there is a possibility of discrimination in granting these rights. The role of the AGCOM is to integrate the various rights of way mechanisms in different municipal areas in order to avoid the negative effects of this diversity. The AGCOM should have the regulatory power to resolve disputes between the operators and the regional authorities in issues such as facility and property sharing.

**Interconnection and local loop unbundling:** In Italy the main existing local loop to terminate calls is the one which belongs to Telecom Italia (around 90% of market share in access lines at the end of 2015); therefore, all other operators need to negotiate interconnection agreements in order to have access to this local loop.



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As part of the liberalisation process of the telecommunications sector, the European Commission has established a set of policies regarding unbundling of the local loops. According to these policies the incumbent operators (which are recognised as the operators with significant market power) are requested to provide unbundled access to their facilities so that the new entrants would only pay for the facilities they use in order to offer their services, specialising in the type of entry that suits their business plan (OECD 2001). In Italy, as with several other European Union member states, AGCOM decided to pass the related regulations in 2000. Bregni & Melen (2002) summarise the regulations as: "the incumbent operator Telecom Italia has to provide both unbundled physical access to copper and fibre loops and a digital channel service, as a fallback solution in cases of technical difficulties in offering the unbundling of a specific line".

There are also regulations regarding pricing. As is highlighted by Buigues (2001), "pricing rules for local loops should foster fair and sustainable competition" while they should also "ensure that the local loop provider is able to cover its appropriate costs in this regard plus a reasonable return".

Recently, AGCOM has decided to apply the Bottom Up Long Run Incremental Costs (BU-LRIC) costing methodology in order to determine the overall LLU wholesale price. However, when AGCOM announced that it would set higher access prices for LLU services in 2010, the European Commission (2010b) requested AGCOM to re-examine its cost calculations stating that:

> "*the prices proposed by AGCOM do not sufficiently reflect the maintenance and commercial costs of an efficient operator managing a newly-built copper network*".

**Universal service:** According to the relevant European Commission directive (2002/22/EC of 7 March 2002), member states are required to provide universal service for all users. The concept of universal service is related to the act of providing a baseline set of services to all users without considering their location at an affordable rate. In Italy Telecom Italia is the operator in charge of providing the universal service and AGCOM is the authority which sets the net cost of the service. The net cost then would be reimbursed to Telecom Italia by a fund which is approved by the Ministry of Communications and is provided by the contributions of all the market operators.

**Numbering:** In Italy it is the AGCOM, under supervision of the Ministry of Communications, which is the authority in charge of the numbering resources. Four different types of numbers, including special national services, mobile services, geographic services and non-geographic services, are allocated on a first-come first-served basis and an



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annual numbering fee should be paid by the operators for the use of numbers per number basis (OECD 2001).

**Service Quality:** Following the EU directives requiring the member states to establish quality targets both for technical assessments and customer care and service quality, AGCOM has provided a set of actions to be performed by the operators. The operators are required to annually publish service quality requirements, possible methods of improvement and proper measurement tools. The AGCOM has the responsibility to supervise and inspect the implementation of these quality measures.

**Convergence:** Due to the rapid technological convergence between various sectors of the telecommunications industry including broadcasting, content and communications, there is inevitably a need for improved types of regulation. Fortunately, the structure of AGCOM allows it to manage this issue in a technologically neutral way which is necessary in order to promote fair competition in the sector (OECD 2001).

# Structure and dynamics of the Italian telecommunications market

## Market structure

After the introduction of market liberalisation, its monopolistic structure — which had been the dominant one until 1988 — has been modified gradually, and competition started being introduced (and mostly implemented) in the sector. Following the market liberalisation efforts, the AGCOM was established in 1997 in order to govern and implement the relevant regulatory reforms.

In the early stages of the liberalisation process, taking advantage of the newly launched and highly unbalanced tariff structure, many operators focused on business users, which were more profitable than residential ones (Cambini et al 2003). Data services and Internet were offered at competitive prices as well. However, the increased access to Internet and mobile networks resulted in a reduction of long distance calls and forced the operators to reduce the relative prices. Overall, as a result of the competitive market and the regulatory decisions, prices have declined significantly.

The new characteristics of the market alongside the technological developments in the sector, internationalisation and rapid changes of consumer demand led to a huge number of companies entering the fixed telephone market in the late 1990s. The long distance sector as well as the local sector followed the same trend.



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Moreover, the telecommunications industry is characterised by high fixed costs and large investments. Since most of the new companies are not large entities and cannot afford construction of their own infrastructures or usage of the incumbent's facilities, the entering rate started to decline from 2001. Several existing companies, facing prospective failures, started to merge with each other and the propensity for merging increased in 2003 as a result of poor economic conditions. The most recent merger was between H3G and Wind, which was finalised in 2016.

However, the increased number of market entries (for instance the increasing number of MVNOs in mobile markets) has significantly affected the state of market power in the telecommunications sector. In different segments, both fixed and mobile, the market is moving towards a more competitive structure. Figure 1 shows the changes of the Herfindahl–Hirschman Index in fixed, mobile and fixed broadband lines between 2004 and 2014. As it can be observed, in all segments, market concentration has declined. This can be considered as proof that the Italian telecommunications market is constantly moving towards a more competitive structure.

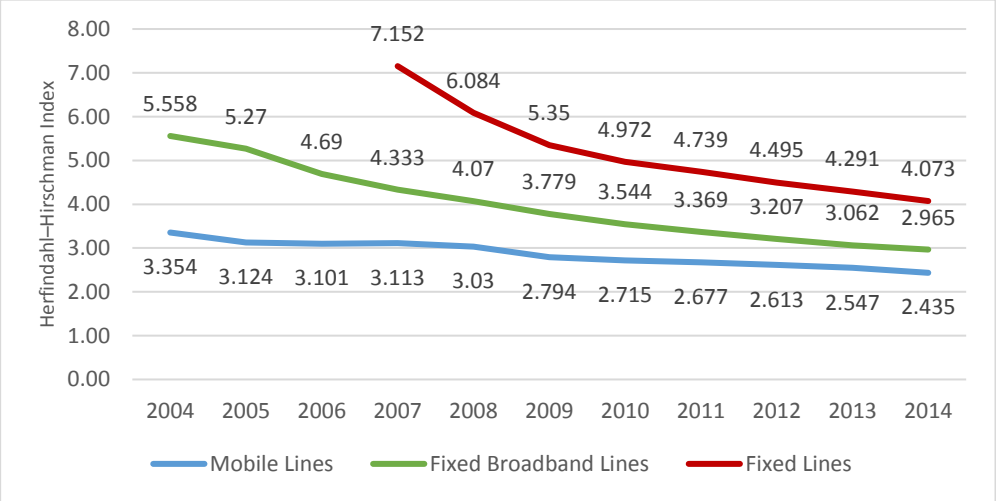


**Figure 1. Herfindahl–Hirschman Concentration Index in telecommunications market**
Source: AGCOM's 2015 annual report

## Sector dynamics

In this Section the characteristics of the Italian telecommunications market over the 2000-2015 period will be analysed.

In Italy, the market privatisation process coincided with introduction of new technological developments in the telecommunications sector (especially Internet-based technologies). These developments led to rapid convergence between various sectors of the industry such as broadcasting, content and communications. As a result of these events, the revenue of the telecommunications industry began to grow at the beginning of the 21st century. However,



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while fixed network turnovers did not change substantially, the growth has been mainly due to the increase in the revenues generated by the mobile network services (see Figure 2).

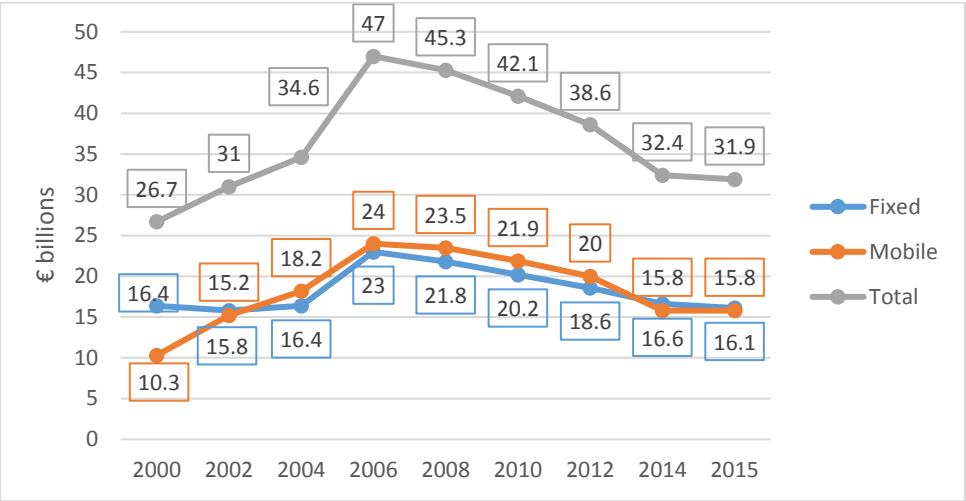


**Figure 2. Total revenues in fixed and mobile telecommunications (€ billions)**
Data Source: AGCOM annual reports

The increasing trend continued until 2006, when the total revenues reached as much as 47 billion euros. Afterwards, the revenues from both fixed and mobile sectors started to decline on an annual basis. The revenue reduction was slightly more in the mobile sector than in the fixed one (with an annual average decline of 8% in the former compared to 7% in the latter). This could be a result of the introduction and deployment of ultra-fast broadband services into the telecommunications market.

The investments in fixed assets, as is shown in Figure 3, do not necessarily demonstrate a sustainable trend in the years between 2000 and 2015. In 2002 the market experienced a boost of 18% in investments compared to 2000. However, after that, the amount of investments declined slightly until 2014 (except in 2012 in which it increased by 6%). In 2015 the investments faced an increase of 20% comparing to 2014. It is mainly due to the 24% increase in fixed networks' investments while the corresponding amount in the mobile sector was approximately 16%.



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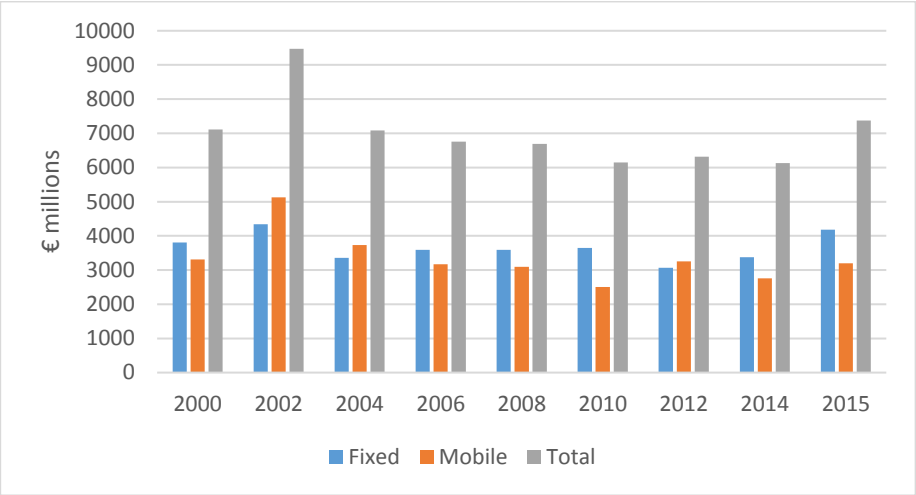


**Figure 3. Investments in fixed assets (€ millions)**
Data Source: AGCOM annual reports

The share of fixed and mobile networks in total investments has been fluctuating during the period under investigation (see Figure 4). However, in most cases more than 50% of the investments was allocated to fixed networks. This can be explained by the fact that in recent years two of the main investors in the fixed networks segment of the Italian telecommunications market, Telecom Italia and Vodafone, have increased their investments (AGCOM 2015).

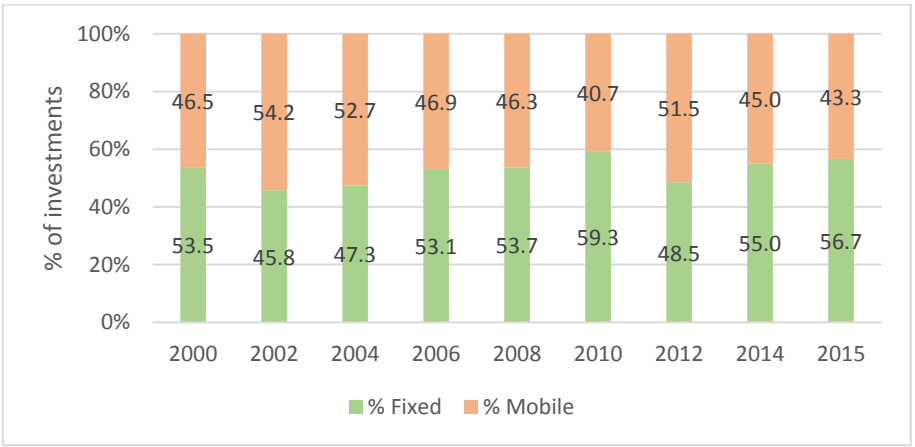


**Figure 4. Shares of fixed and mobile networks in total investments (%)**
Data Source: AGCOM annual reports

The trend in total expenditures of private and business users is almost the same as the total revenues figure. As is shown in Figure 5, until 2006 total expenditures increased in a steady way until it reached almost 35.8 billion euros. However, from 2006 until 2014 a downward trend was evident. Although the total amount of expenditures has dropped also in 2015 comparing to 2014, the decrease was not as intense as in past years (1% comparing to an average of 7%).



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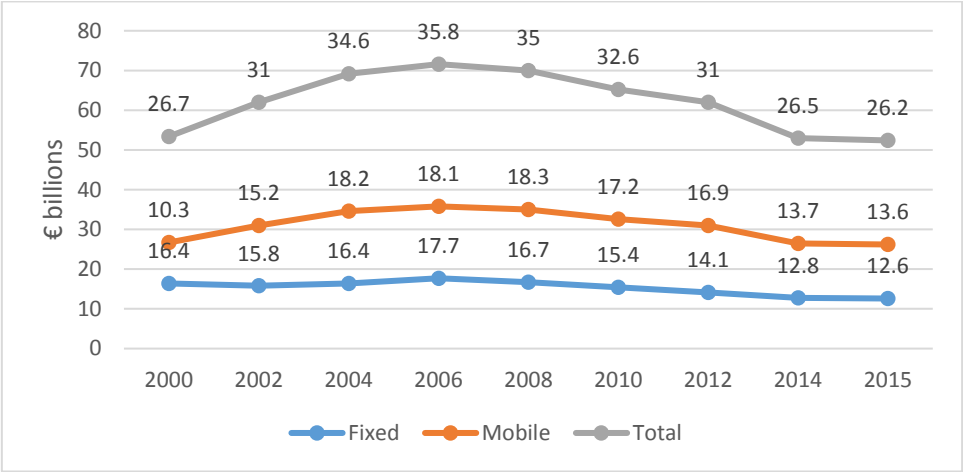


**Figure 5. Final user expenditures (€ billions)**
Data Source: AGCOM annual reports

Further, as the total user expenditures (i.e. the portion of household spending on telecommunications) strongly influences the total amount of revenues, the perceived trend in the corresponding diagram can be used to explain the similar pattern in total revenues.

## The fixed telephony markets

As has been shown in the figures of total revenues and investments, while the revenues in fixed networks have been declining since 2006, the investments in this sector followed an increasing trend since 2012. The investment shares of active operators in the fixed networks market is shown in Figure 6. Although during all the years between 2000 and 2015, Telecom Italia was the major investor in the fixed networks, it is notable that since 2004 its share of investments has been declining and other licensed operators slightly increased their share of investments.

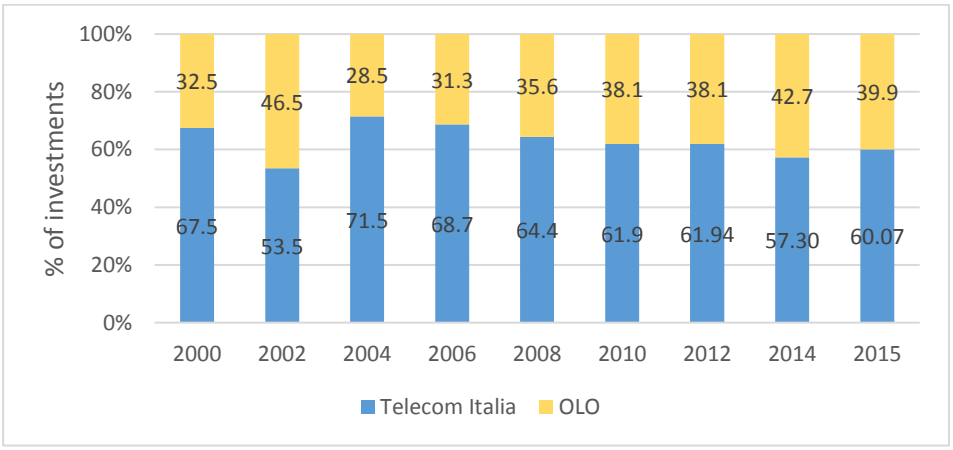


**Figure 6. Operators' investment shares in fixed networks (%)**
Data Source: AGCOM annual reports



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Competition in the fixed networks market has improved in recent years. Figure 7 shows how shares of access of operators to fixed networks have changed between the years 2008 and 2013. The share of Telecom Italia has declined 17%, which gave opportunities for other operators to improve their position. In particular, Fastweb, Wind and Vodafone Italia have benefited from this situation.

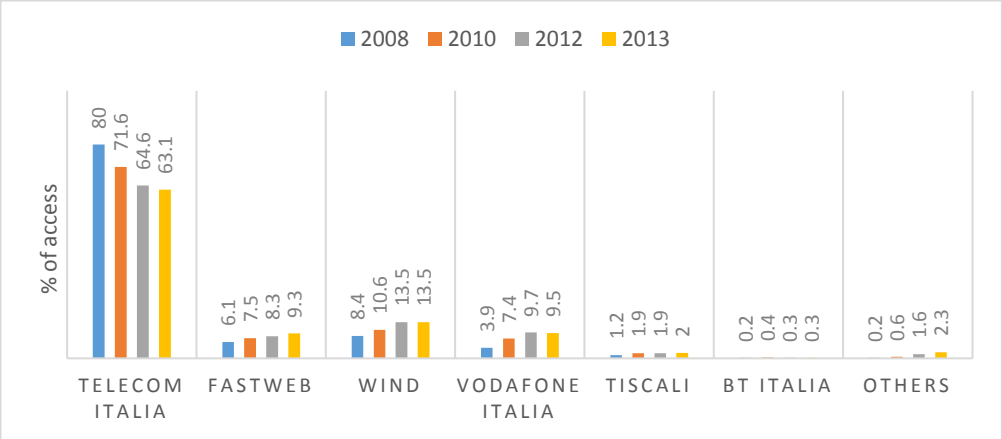


**Figure 7. Shares of access to fixed networks (%)**
Data Source: AGCOM annual reports

Regarding the usage of unbundled local lines (ULLs), it seems that the regulatory decisions of AGCOM have been successful. By persuading the incumbent, Telecom Italia, to provide access to its broadband infrastructure for other licensed operators and implementing proper access pricing mechanisms, the usage of unbundled local lines has been increasing in the past decade. In a timespan of 10 years, the ULL usage, compared to total retail broadband lines, increased from 19% in 2003 to 38% in 2013 (Figure 8).

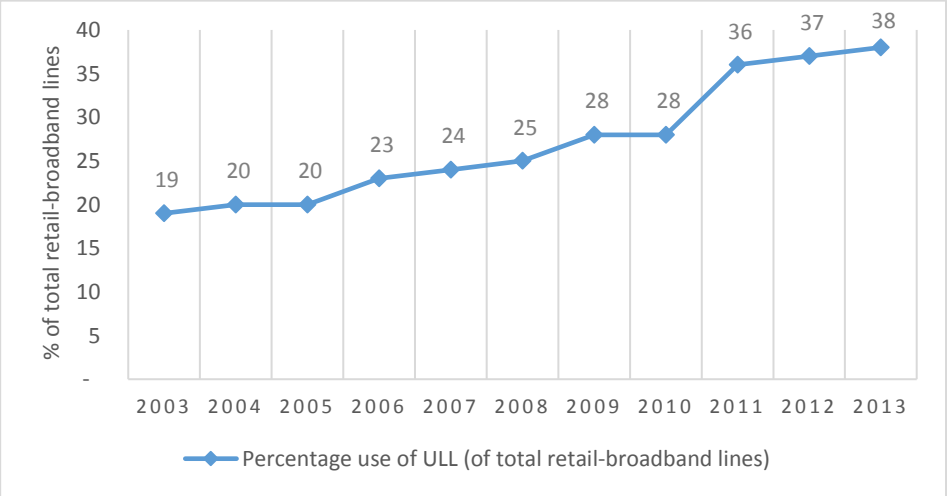


**Figure 8. Percentage use of ULL (of total retail-broadband lines)**
Data Source: European Commission, Digital Scoreboard



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## The mobile networks market

In the mobile segment of the telecommunications market as well as the fixed one, revenues have been declining since 2006. As is stated in AGCOM's 2015 annual report:

> "*This trend is largely due to the concurrent action of several factors including: the regulatory action put in place by the Authority; the increasing price competition at retail level; the rapid technological changes that characterize the high-technology sectors; changes in the users' consumption habits; and the continuing economic crisis with the consequent reduction in average household expenditure.*"

The two main segments of mobile networks are voice and data services. By means of recent technological developments, usage of traditional person-to-person voice services has declined relative to data-based services. For instance, the revenues generated by sending SMS have dropped sharply mainly due to the growing usage of social communication tools and Internet-based services. These changes in revenues would affect the operators' choice of investment (i.e. selecting business strategies which are more focused on improving data traffic based services).

The changes in mobile number portability are an indicator which is often used to assess the competitiveness of the mobile networks market. Figure 9 shows the trend in the cumulative and annual number of portability operations from 2005 until 2015. As can be seen, the cumulative values have increased continuously and have reached as much as 89 million units. This may be the result of resolutions no. 147/11/CIR and 651/13/CONS which require that customers should not be charged for the number portability service and that the requested service be implemented as soon as possible. However, the annual number of operations does not follow the same trend. In 2014 the annual measure declined by 32% which may be the result of new business strategies taken by the operators to increase customers' loyalty. Nevertheless, in 2015 the annual value increased again by 10%.



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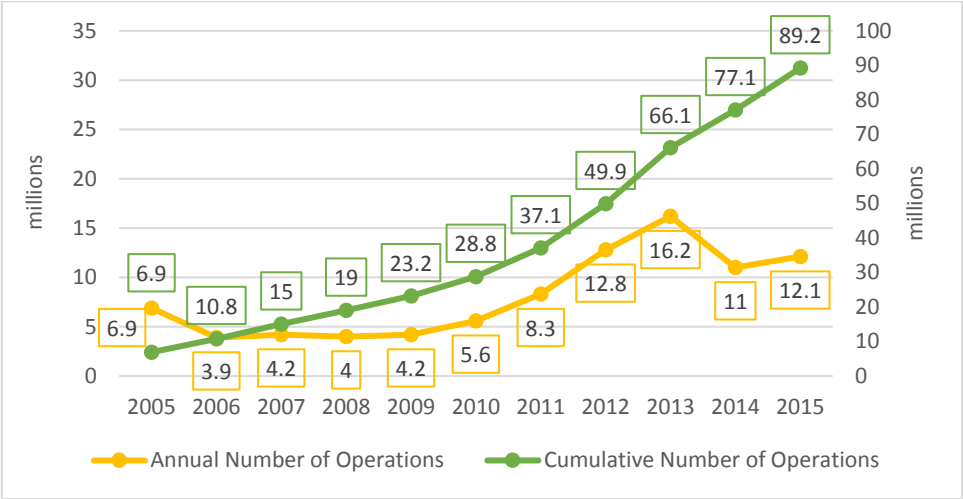


**Figure 9. Mobile number portability (millions)**
Data Source: AGCOM annual reports

To understand the mobile market dynamics, it is useful to show the market shares of different operators in voice and data services. In both services the market concentration has declined significantly while the market share of operators other than Telecom Italia has increased in the past years. Another interesting point in the mobile networks market is the growth of operators providing mobile virtual services (MVNOs), which have obtained an increasing share in voice services and a stable one in data services since 2011.

As is shown in Figure 10, the market shares of two main mobile voice service providers, Telecom Italia and Vodafone, have followed a decreasing trend since 2005. Among others, Wind has particularly benefited from the situation and increased its share to 22.5% in 2015 compared to 13.2% in 2005. It is noticeable that in 2015, for the first time, Telecom Italia is no longer the leading operator with the highest market share as Vodafone has replaced it.

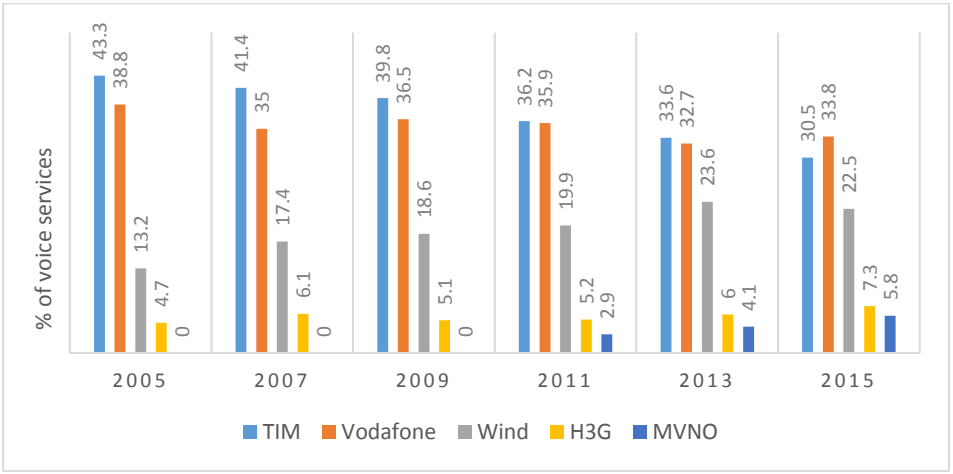


**Figure 10. Market shares of voice services (%)**
Data Source: AGCOM annual reports



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In mobile data services the same trend as that of the voice services can be seen (Figure 11). The competition in the market has improved. However, in the data market, Telecom Italia and Vodafone had more intense competition and changed places as the market leader more often. Meanwhile, Wind and H3G have enjoyed an increasing market share since 2007, although the former had a greater improvement than the latter.

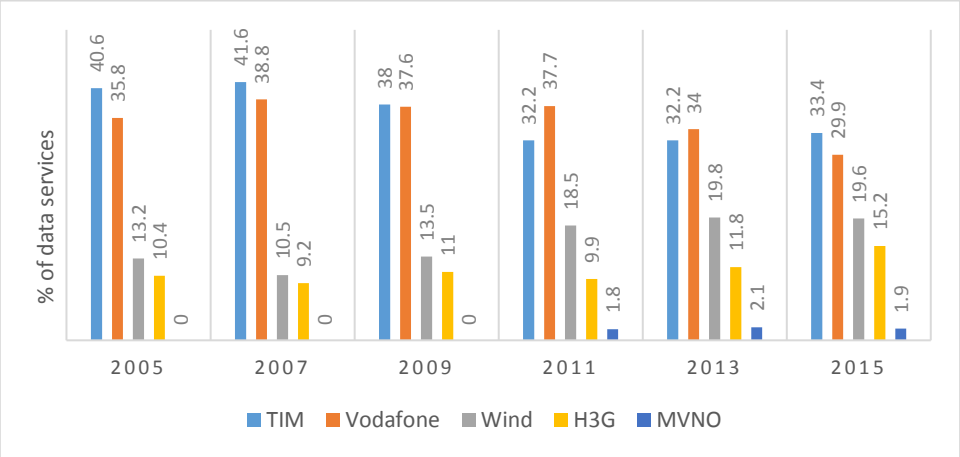


**Figure 11. Market shares of data services (%)**
Data Source: AGCOM annual reports

## Recent and future developments in NGN networks

Rapid technological developments in the telecommunications sector facilitate higher application of broadband services, leading to development of the "next generation networks" (NGNs). In this context, the European Commission, in order to satisfy consumers' demand, has set specific broadband development goals under the "Digital Agenda for Europe" (DAE). According to the European Commission (2010a), the DAE aims:

> "*to ensure that, by 2020,*
>
> *(i) all Europeans have access to much higher internet speeds of above 30 Mbps and*
>
> (ii) *(ii) 50% or more of European households subscribe to internet connections above 100 Mbps*".

Italy, as well as other member states, is required to meet the DAE targets. In this Section we will briefly analyse the current and future technical context of the NGNs and ultra-broadband services. Then we will present the broadband services' supply and demand status in Italy. Finally, the Italian government's plan for achieving the DAE targets will be discussed.



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Although the capacity deliverable through the traditional copper networks has increased significantly in the last 15 years, the distance of data transmission has remained fairly low (from 50 to, at the most, 250 metres) (Cambini et al. 2016). Fibre technology, on the other hand, not only allows higher volumes of data to be transmitted but will also cover broader ranges through long distance fibre connections. However, developing and implementing "next generation networks" (NGNs) requires large investments and since it would leave the traditional copper networks useless, it could be opposed by the incumbent. As a result, it is preferable to develop a technology which does not interfere with the incumbent's interests, on one hand, and would require lower amounts of investments, on the other hand. A mixed network structure of cable, fibre and copper such as Fibre to The Cabinet (FTTCab) or Fibre to The Node (FTTN), can be a reasonable solution. However, the cost of providing such alternatives in areas of low population density is high and therefore to be able to fully cover all the areas, government intervention becomes inevitable. A feasible substitute with fairly lower expenses in such areas can be wireless technologies and mixed schemes such as Fibre to The Antenna Site (FFTAS).

On the other hand, as is stated in AGCOM (2015):

> "*The massive investments necessary for the construction of infrastructures and the uncertainty of the income generated by such investments, make the densely populated areas much more attractive than the rest of the country.*"

Therefore, in highly populated areas where profits are fairly high and operators are active enough, the government's intervention should be mainly in the form of regulatory settings. This kind of regulation is particularly important when the two infrastructures (traditional copper networks and NGNs) operate simultaneously during the transition phase from copper to fully fibre networks. In this context, access regulation in the two infrastructures can strongly impact the incentives to invest in the fiber networks. As is shown by Bourreau et al. (2012; 2014), the access price of the copper network can influence competition and investment in the NGN networks. More precisely, since the lower access prices of the copper networks will entail lower retail prices and eventually lower profitability of costly fibre networks, the lower will be the incentives to invest in the new NGN networks. In this framework, an alternative regulatory intervention should be developed.

As is suggested by Bourreau et al. (2015), geographical remedies (i.e. a transition from country-wide uniform measures to more locally-tailored regulation (Cambini et al. 2016)) would incentivise further investments in the next generation networks.

From a policy perspective, the European Commission in its 2009/140/EC Directive ("Better Regulation Directive") forcefully calls for the adoption of new regulatory schemes aimed to



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provide a better environment for risky investments. NRAs might thus face the need to revise their market analysis, define new markets considering the competitive and geographic differences among areas and then adopt ad hoc remedies. However, with Decision 623/15/CONS, the Italian NRA decided neither to identify sub-national geographical markets, nor to geographically differentiate remedies. The evaluation of the development of competition in the different geographical areas has been postponed to the next market analysis, which shall take into account the need for a fair balance of the incentives, for both the SMP (Significant Market Power) operators and the other operators with a business interest in access services.

## Broadband supply status

The access and coverage of broadband networks in Italy is affected by the country's geographic and demographic characteristics, which have made it difficult to provide sufficient network infrastructure in all parts of the country. In this context, although both fixed and ultra-broadband coverage has increased continuously since 2011, in comparison to other European countries Italy does not rank highly in the development of NGN networks infrastructures (Figure 12). According to AGCOM (2016), although the numbers show a slight improvement: only 24.5% of the population have access to the broadband services while the measure for households is 57.7%.

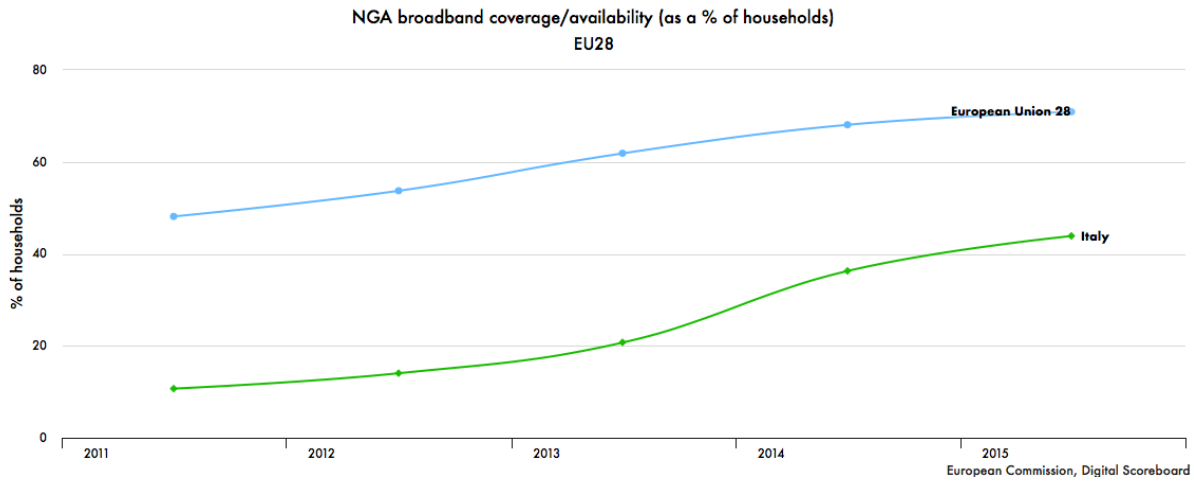


**Figure 12. NGN broadband coverage (% of households)**

Source: European Commission, Digital Scoreboard

However, to meet the European 2020 Agenda, Italy has to develop two complementary network topologies: FTTH and FTTCab. To this end, Enel and Telecom Italia are currently the leaders of the necessary developments, with Enel focusing on developing NGN networks



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using its electricity infrastructures and Telecom Italia focusing on development of FTTH networks (Cambini et. al. 2016).

## Demand in broadband networks

As for the demand side and the penetration of NGNs, Italy is far behind other EU member states. Although the country's take-up rate in mobile broadband keeps up with the European figures, this is not the case in ultra-broadband networks (Europe's Digital Progress Report: Italy 2016). Figure 13 shows the fixed broadband take-up rate in Italy compared to the other 28 member states in the European Union. As can be observed, in earlier years the subscription rate in Italy was close to EU measures. However, the difference between them became greater and in 2015 while the EU take-up rate was 32%, it was only 24% in Italy.

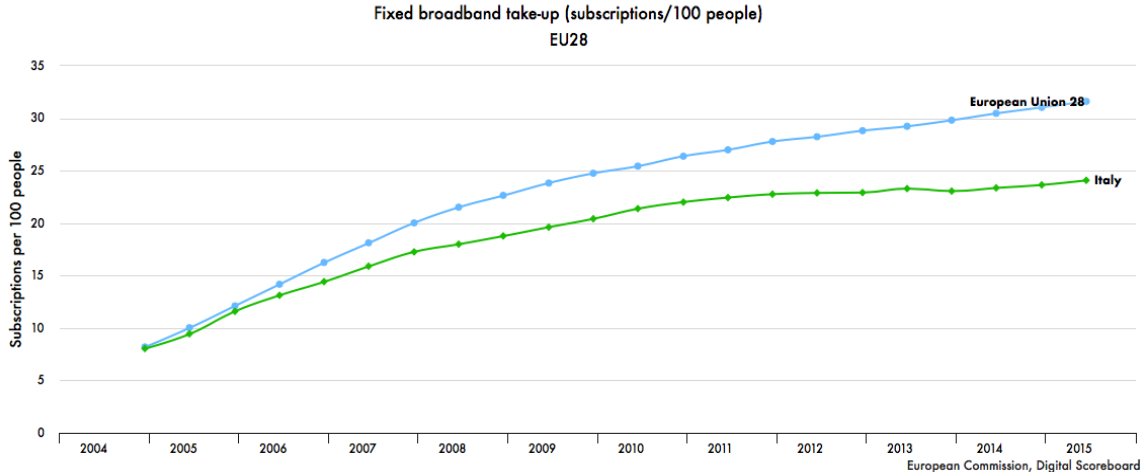


**Figure 13. Fixed broadband take-up (subscriptions/100 people)**
Source: European Commission, Digital Scoreboard

The reason for the low subscription rate in Italy, rather than lack of supply, is mostly related to the low interest in usage of ultra-broadband services (such as online services) on the part of the final users (Eurobarometer 2013). As is stated in AGCOM (2015):

> "*Regarding the propensity and the percentage of Internet use, Italy is only the twenty-seventh of the European Union countries, mainly because of the very low diffusion of IPTV and the reduced use of e-commerce*".

## The Italian Government's strategy

As was mentioned at the beginning of this chapter, to achieve the DAE targets of the ultra-broadband services' development, Italy is required to organise its actions through a development plan.



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To this aim, the Italian Government on March 2015 has provided a "Master Plan" to increase the pace of investment and development in ultra-broadband networks. A budget of 6.5 billion euros is set aside for this purpose, of which 2.2 billion has been already allocated for the first stage. The funds coming from the private sector are planned to be approximately equal. In addition, in order to organise and coordinate the activities through different phases of the program, a committee of various Ministries has been established.

In addition, according to AGCOM (2015), the Italian ultra-broadband strategy would include the following aspects:

> "*the simplification of administrative costs; the establishment of a register of existing infrastructures; the adaptation of limits on electromagnetism to those of other European countries; the introduction of tax incentives, credit at subsidized rates and grants; direct execution of public infrastructures in areas not covered by the market.*"

The "Master Plan" operates on a regional basis. Based on the current and future network infrastructures, four clusters are defined and similar territories are put together. As it is stated by Cambini et al. (2016):

> "*Two main pieces of regulation have set the boundaries and inspired most of the framework adopted in the Italian plan. First, the three objectives of the DAE, and second the Community guidelines for the application of the state aid discipline to the deployment of broadband networks.*"

In particular, if the regulatory activities (such as ULL pricing) are not strong enough to provide sufficient incentives for further investment in NGN networks, state aid would be accessible as a complementary policy to provide such incentives. It is required that, among other actions, the public policies are set in a way that would incentivise investments and define and accelerate the decision-makers' relationships.

Notably, in January 2014 AGCOM and the Italian Competition Authority (AGCM) jointly launched (Decision 1/14/CONS) an investigation which highlighted how public intervention can intersect scenarios with different levels of the impact originated by competition and regulatory measures. In particular, following the results of the investigation, a market structure with only one "pure" network operator, not vertically integrated and not supplying services to the final users, can be considered as the best scenario from both the competition and the regulation viewpoints at least in areas with limited infrastructure competition.



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# Conclusion

Following the European Commission directives regarding privatisation of the telecommunications market in Europe, AGCM and later AGCOM were established in Italy to provide a suitable legal framework. Their role is particularly important in defining fair regulatory policies in order to foster competition in the market. In this paper we have shown the evolutionary trends of the Italian telecommunications market since the beginning of the liberalisation process.

There are several results which highlight the success of the Italian government's policies in promoting competition in the market. Following these policies, the incumbent, Telecom Italia, was fully privatised by 2002. Various operators have entered the market. As a result, the market share of Telecom Italia has decreased in both fixed and mobile networks and the market concentration index has constantly followed a declining trend in the past decade. This trend shows that the telecommunications market in Italy is still moving towards a dynamic and competitive structure.

However, rapid technological development and convergence between various sectors of the telecommunications industry is resulting in demand changes and creating new challenges. Therefore, faster and more efficient networks are required to satisfy growing consumer demands. In recent years, in order to overcome these challenges, many efforts have been made to foster the development of the relevant technologies such as ultra-fast broadband connections, i.e. the so called next generation networks.

On the one hand, compared to other EU member states, Italy does not hold a strong position regarding the coverage of broadband networks. Only 24% of the population have access to broadband services, in comparison to the EU's average of 32%. Therefore, further investment in this sector is inevitable. On the other hand, Italy's position in Europe regarding the demand for broadband is not high. Recent studies show that the problem of low penetration rates in ultra-broadband networks in Italy is strongly related to a lack of interest in exploiting these services rather than lack of supply.

Therefore, in order to achieve the targets set by the European Commission's DAE, the Italian Government developed a strategic plan in 2015. The plan aims to facilitate the development of NGNs and to provide sufficient investment funds for broadband networks. However, in order to reach the DAE targets, the penetration rate needs to increase as well. In this context, it only seems logical to design policies in a way that they promote further usage of the ultra-broadband services and increase the take-up rate.



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## Notes

[i] Before the approval of the Law n. 249/1997, the Ministry of Communication was in charge of setting the regulatory and industrial policies on the whole sector.



http://doi.org/10.18080/ajtde.v4n4.72

# Spain: from monopoly to (progressive) liberalisation

## Two decades of telecommunications regulation

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**Abstract**: This paper aims at describing the evolution of the telecommunications industry in Spain. It debuts with the monopolist situation of the market in the mid 90s and then analyses the consecutive legal and regulatory reforms designed with a view to the liberalisation and introduction of perfect competition in this economic sector. The paper also considers the relationships and tensions between national Spanish and EU legislation in this area, as well as giving a critical approach on the current organisation model chosen vis-à-vis the independent regulatory authority.

**Keywords**: Telecommunications regulation, independent regulatory authorities, Spain, liberalisation, services of general economic interest.

## Introduction

The current Spanish telecommunications sector has been shaped by the radical changes in the regulatory system adopted and implemented in the course of the last two decades.

In the mid 1990s, the Spanish telecommunications market was still based on the presence of one single company (*Compañía Telefónica Nacional de España*, known as *Telefónica*), which had been granted, during the dictatorship of Primo de Rivera in the 1920s, a monopolistic status in the provision of telephony services.

A wide range of internal and external factors led to the adoption, during the last five years of the XXth century, of a series of legal provisions and political decisions which launched an unstoppable process of privatisation and liberalisation of this sector. Since then, the progressive introduction of competition has not only broken the long-standing monopoly, but also opened the market to a relatively large number of new actors. The most important outcomes, two decades later, of such evolution include a broad choice of different types of services, reasonable prices, and an overall improvement in terms of coverage and quality.

This being said, and as it will be shown in this article, the Spanish system still has a few issues to better tackle, at least in order to achieve a comparable status vis-à-vis the most developed markets within the European Union. These issues include relatively high prices, the significant position still held by the former monopolist, the need for more investment (particularly regarding new generation networks), the presence of excessive regulation in some areas, and an increasing level of market concentration.

As it will also be further shown, recent changes introduced in the structure and functions of the regulator, the *Comisión Nacional de los Mercados y la Competencia* (CNMC) have also



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affected the proper regulatory supervision of the sector, creating tensions and legal conflicts with the authorities of the European Union (EU), as well as creating spaces for possible political interference.

Last but not least, it should also be noted that telecommunications regulation is still the object of important political discussions in several areas where national regulation is intertwined with pan-European policy decisions. To mention just one example, the issue of net neutrality has become particularly incandescent in a period when the so-called *over the top services* (OTT) providers have become major players, gaining important economic benefits by using pre-existing telecommunications services and infrastructures to reach their users. Despite the fact that net neutrality was finally regulated under Regulation (EU) 2015/2120 of the European Parliament and of the Council on 25th November 2015[1], and the Guidelines provided by the Body of European Regulators for Electronic Communications (BEREC) were adopted in August 2016, national regulators still have the powers and the obligation to assess traffic management, commercial practices and agreements for all relevant services. In Spain, the recent arrival of these OTT operators (particularly *Netflix*) has generated growing tensions with other industry stakeholders that will need to be properly addressed at the regulatory level (Balderas Blanco 2016).

## The late 90s as the starting point in the liberalisation of the telecommunications sector

As mentioned, *Telefónica* was, for several decades, the sole provider of telephony services in Spain. During this time, the company managed to build a large network covering most of the country. *Telefónica* was created in 1924, on the basis of the investment made by the American company ITT which held an important share of its ownership. The company was granted a contract by the State (a so-called concession, according to Spanish Administrative Law) in order to provide the public service of telephony.

The State acquired control of almost 75% of the company's share, a few years after the end of the Civil War (1945), during the times of the dictatorship of Francisco Franco. However, in the late 190s, the company started a progressive process of privatisation by providing equity to a large number of small, individual shareholders. By 1995, the State's share in *Telefónica* had shrunk to around 20%, before the company's total privatisation in 1997.

Despite successive changes in *Telefónica*'s ownership, what truly brought a real change in the Spanish panorama of telecommunications was not the progressive privatisation of the monopolist, but the introduction of competition by means of the liberalisation process started in 1996.

Until that moment, the legal and economic position had remained the same: *Telefónica* was granted a public contract to provide telephony services through all the country, according to the parameters and conditions established by the State. This formula was confirmed by the first modern and comprehensive legal instrument adopted in Spain on this matter: the Law 31/1987 of 18 of December (*Ley de Ordenación de las Telecomunicaciones*).

The liberalisation process in Spain needs to be considered as part of a project that was launched from the offices of the European Commission in Brussels, particularly with the publication of the seminal document "Towards a Dynamic European Economy. Green Paper on the Development of the Common Market for Telecommunications Services and Equipment" (COM (87) 290, 30 June 1987)[2]. This being said, this process is also connected



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with internal Spanish economic matters, including the need to control inflation with a view to fulfilling the convergence criteria set out in the so-called Maastricht Treaty[3] in order for Spain to be allowed to adopt the euro as the new currency; as well as the need to increase the overall economic competitiveness of the country in the context of its progressive integration within the European market. However, these objectives were also in conflict with the political need to preserve the monopoly in pursuance of urgently improving service quality and above all, the universality of the telephone service (Calzada & Costas 2013).

The victory in the legislative elections of 1996 of the conservative *Partido Popular* and the appointment of José María Aznar as the new Prime Minister represented the real starting point in the liberalisation of telecommunications in Spain. Just a few months after taking office, the new Government adopted a Decree on the liberalisation of the telecommunications sector, as well as creating the first independent regulatory authority of the sector, the Commission for the Telecom Market (*Comisión del Mercado de las Telecomunicaciones*, CMT)[4]. This Decree facilitated the emergence of a first competitor in fixed telephony and was accompanied by two other laws, on telecommunications by cable and satellite, which also opened these markets to new entrants. The whole process culminated with the adoption, in 1998, of the General Law on Telecommunications (Law 11/1998, of 24 of April).

This Law represented a major step forward in the process of liberalisation of telecommunications, as it established the basic rules and common principles for the functioning of the market in Spain.

First, the Law completely dismantled the pre-existing monopolistic system, by replacing it with a model based on the freedom to provide telecommunications services, subject only to obtaining a licence or authorisation from the regulator. The Law also specifies all the requirements that are to be met in order to obtain such authorisations from the authority. From the perspective of the current stage in the process of liberalisation, those requirements may seem burdensome and excessive, but they need to be contemplated as a first step taken in an area where bureaucratisation was still very present.

Secondly, the Law considers the former monopolist as an operator that still keeps a certain *dominant* power within the market and is therefore subject to specific regulations in order to avoid it becoming an obstacle to competition. These regulations cover areas such as interconnection of networks, as well as several responsibilities regarding the provision of the so-called universal service. It has to be stressed that from the point of view of EU law, the key element is the introduction of effective competition in the market and therefore the compliance with a set of common rules, while the public or private ownership of one (or more) companies operating in such market is not seen as a relevant issue. As a matter of fact, article 345 of the Treaty on the Functioning of the European Union (TFEU) provides that the *"Treaty shall in no way prejudice the rules in Member States governing the system of property ownership"*. This being said, the retreat of public authorities from sectors where publicly owned companies cannot be used any more as policy instruments subject to special or privileged rules seems to be a logical consequence (Ruccia 2011).

Still regarding the role of the monopolist, it has already been said that *Telefónica* was fully privatised at the start of the liberalisation process. However, it has to be noted that Law 5/1995 of 23 March 1995 was approved in order for State authorities to keep some form of control over companies that were publicly owned when the Law was passed but were foreseen to move towards full privatisation. According to this Law, the State shall retain the



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power to decide about specific resolutions that such entities may take in the future, particularly regarding their ownership structure (a power also known as *the golden share*). In a decision of 13 of May 2003, the Court of Justice of the European Union (CJEU) ruled that these provisions violated the EU law by imposing measures that were disproportionate and not justified in the public interest to restrict the free movement of capital.

The third important idea that needs to be stressed regarding the Law of 1998 is the fact that the liberalisation process also affects the notion of public service. The transformation of such an important legal concept is obviously caused by the impact of EU Law in this area. The evolution of telecommunications regulation from the competence of member States to become a broad and solid EU policy was long and complex and cannot be described here. However, in the 90s, the most important legal instruments representing such important change of approach were adopted[5]. Thus, one of the consequences of the adoption and incorporation into member States' legal system of this new set of rules is the emergence of the notion of services of general economic interest (SGEI).

The notion of SGEI is complex and would require a whole paper (or perhaps a book) to be properly analysed[6]. It is however of particular importance within the Spanish context as it has played a relevant role in reshaping the old Spanish legal notion of public service, exclusively based on a monopolistic regime, to become a more modern and flexible concept (Malaret 1998).

This notion refers to a series of economic activities that have special relevance in terms of social and economic cohesion and development. SGEI is used to empower State authorities to intervene and regulate certain aspects of the provision of those services in case the application of competition rules does not suffice to fulfil certain social and public interest needs. Respect for the principle of proportionality in the enactment and application of such regulation is a very clear requirement in this area (Sauter 2008). EU Law contains a series of general provisions regarding SGEI and their essential role within European economies and societies[7]. In the specific area of telecommunications, the EU legislation already contains a series of sectors where State intervention may be needed in order to secure certain public interest requirements, particularly regarding the provision of a universal service at affordable prices. These provisions, in the Spanish case, were developed by the Law of 1998 at its subsequent regulatory framework (part III of the Law).

The adoption and implementation of the Law, as well as the establishment of the CMT as the new independent regulator of the sector, represented a very important step ahead in the telecommunications sector in Spain. By the end of the 90s, a reasonable degree of competition was introduced in the different telecommunication markets (including the unbundling of the local loop in fixed telephony), particularly in the case of mobile telephony where provision of 3G services had already started in the year 2000.

## The 2000s and the next phases of the liberalisation process

The evolution of the regulation of telecommunications in Spain after 1998 is marked by the changes in the legislation for this sector at the EU level. In 2002, a new and comprehensive *package* was adopted[8], introducing new rules regarding authorisation, access, universal service, as well as privacy in electronic communications. In order to incorporate this new reform into the Spanish legal system, the Law 32/2003, of 3 November was enacted. The most important change brought by this Law (and the EU reform) was the priority given to *ex post* regulation vis-à-vis *ex ante* intervention. This basically means that most operators do



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not need to obtain an authorisation but are just requested to "communicate" with the regulator before starting the provision of their services. The role of regulators thus evolves from controlling access to the markets, to periodically supervising their functioning in order to identify possible areas where regulatory intervention may be needed, particularly in cases where an operator with significant market power (the former dominant operator) is still present.

The changes incorporated in 2003 have also had an impact on a very important aspect of any process of liberalisation and introduction of competition, which is price regulation. The price cap system for fixed telephony was abandoned in 2006, whereas regulation of the subscription fee was kept in place until very recently in 2016. Regarding mobile telephony, termination rates have been kept under regulatory control until the present.

In 2009, a fresh series of reforms were introduced at the EU level, including a Regulation establishing a pan-European regulator with limited powers (the BEREC)[9]. As a consequence of this, the Decree 13/2012 of 30th of March was adopted, followed by a new general Law on telecommunications (Law 9/2014 of 9th of May). In this context Law 3/2013 of 4 June was also adopted, that creates a new *macro-convergent* regulatory authority with competences over all relevant regulated industry sectors: the National Commission for Markets and Competition (*Comisión Nacional de Mercados y de la Competencia*, CNMC).

The new legislative framework of 2013 aims at improving rules and provisions already established in 2003, particularly regarding *ex post* market analysis, the protection of consumers and the resolution of conflicts between operators (García Castillejo 2014). However, the most important and controversial issue refers to the establishment of a new regulator and a new distribution of powers between the Government[10] and this independent body.

The creation of CNMC, a body that merges the regulatory powers of several pre-existing regulators in diverse areas such as railway transportation, postal services, energy and audio-visual services, as well as in general competition law, has bred a macro-structure that is completely unprecedented in the Spanish environment (and quite unique in Europe, with the sole exception of a similar model in the Netherlands). It is not easy to find any research or policy statement prepared by the Government or the Parliament in order to justify the creation of such an entity. It is important to note, however, that an exhaustive private document commissioned by Telefónica and elaborated in 2012 by PricewaterhouseCoopers on regulatory organisation models and competition suggests precisely this model[11].

During the discussion of the first drafts regarding the creation of the CNMC, the European Commission raised serious concerns. In a letter sent to the Spanish authorities on 11 February 2013, Digital Agenda Commissioner Neelie Kroes warned about the opening of a possible infringement procedure against Spain (according to article 258 TFEU), as Spain's legislative decision to transfer to the Government important powers in regulatory areas rather than keeping them in the hands of an independent regulator might have contradicted the terms of the different applicable EC Directives[12]. In particular, the letter refers to access and interconnection, functional separation and the use of shared resources, among other matters.

After a series of exchanges and modifications of the legislation, the Commission decided not to further proceed in regard to this matter. This being said, the distribution of powers between the Government and the CNMC is still strongly criticised as it has become one of the least powerful regulators within the EU (García Castillejo 2014; Rallo Lombarte 2014).



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Regarding the important issue of the universal service obligation (as an essential component of the SGEI qualification), Law 3/2013 establishes a series of provisions in order to guarantee, in essence, the efficient provision of a number of telecommunications services to the entire population, at affordable prices. The most conflictive issue in this area refers to the broad intervention of the Government (and not the Regulator) regarding this matter. The Government has the power to define the elements that will be part of the universal service, as well as to designate the provider(s) that will provide them. The Regulator is left with the responsibility of calculating its costs and assessing whether specific compensations should be awarded by the rest of the service providers in order to avoid anti-competitive effects.

One measure incorporated into this law has created a conflict that was finally taken to the CJEU. This issue concerns the dismissal of the board members of the existing regulator (the CMT) in order to start a new nomination procedure for the CNMC. In a recent decision of 19 October 2016 the Court has ruled, in the first place, that EU law permits the merger of several national regulatory authorities in order to create a multisectoral regulatory body – provided that it meets the requirements of competence, independence, impartiality and transparency and that an effective right of appeal is available against its decisions. Secondly, the Court also stresses that "the dismissal of the President and a board member, members of the collegiate body running the merged NRA, before the expiry of their terms of office in the absence of any rules guaranteeing that such dismissals do not jeopardise the independence and impartiality of such members" violates EU Law, in the case of this legislation. This is a major rebuke to the political decisions taken in this area and the Spanish authorities need to respond accordingly.

## The telecommunications market in Spain in 2016

After the long evolution that has been described, the current situation of the telecommunications sector in Spain can be considered to be well-aligned with the rest of the markets within the EU, thus laying the groundwork for a future single European market covering the whole digital economy.

This being said, it should be noted that the Spanish market also features a few specific trends that deserve to be mentioned.

In general terms, it can be said that there are two elements that strongly characterise the telecommunications sector in Spain: a growing market concentration with a still significant market dominance by the former monopolist (López 2009); and the progressive tendency towards the consumption of convergent bundles of services, i.e. offers that include several services (particularly quadruple or quintuple bundles[13]).

Probably one of the key features of the current Spanish scene has been the deployment of new generation networks, which can offer broadband access for the provision of convergent services. Penetration of broadband is still slightly lower than that the EU average, but several improvements have been achieved in the last years (CNMC 2016, 15-18). In terms of technology, xDSL is still the predominant broadband technology (around 70%), whereas DOCSI and FTTH represent, almost in equal parts, the rest of the cases (19% and 17% respectively) (CNMC 2016, 17).

Regarding the uptake of broadband technologies, there are a number of specific regulatory trends. Firstly, in big and profitable urban areas competition is strictly based on infrastructure, with no possibility of shared use of access networks. Access obligations can



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only be imposed by regulation in small, non-profitable areas, with regards to the operator in a predominant market position (that is to say, the former monopolist) (CNMC 2016, 12).

The progressive deployment of broadband networks has also facilitated the emergence of OTT services, based on the use of the capabilities that these networks offer. These include video services like *Netflix,* but also other kinds of services that may pose a threat to the traditional business niche of telecommunications companies, such as video, voice and text communication services (like *Whatsapp*, *Viber* or *Skype*). It has to be noted, for example, that the 15% decrease in mobile operators' income during 2015 was partially due to the use of alternative text communication messages instead of traditional SMS (CNMC 2016, 134).

Another important regulatory issue is that of pricing. Spain still has relatively high prices compared to other EU countries, and some operators have even increased them in the last years (particularly for bundled services and for some mobile services) (CNMC 2016, 7). This tendency seems difficult to alter, considering the increasing concentration of the market.

This market concentration can be easily detected through the series of mergers and acquisitions that have recently taken place in the sector, creating a market dominated by three main companies: *Telefónica*, *Vodafone* (including here the recent purchase of the cable operator ONO) and *Orange* (particularly after buying its main competitor in the mobile market, *Jazztel*). Some other smaller companies have also engaged in this concentration process, e.g. the acquisition of *R* by the cable operator *Euskaltel*. In terms of revenue, the three largest operators dominated in 2015 with a combined share of 78.2% of the whole telecommunications market (CNMC 2016, 31). This concentration is even more evident regarding quadruple and quintuple packages, an area where the three main operators represent no less than 98% of the market (CNMC 2016, 40).

If we take a separate look at individual market segments, *Telefónica* still holds 47.1% of the fixed telephony market, whereas *Vodafone* and *Orange* represent 23% and 19.7% respectively. Only 10% of this market is left to other minor operators (CNMC 2016, 72). A similar situation can be observed in fixed broadband, where the same three main operators dominate 93% of the market, with *Telefónica* still keeping a quota of more than 40% (CNMC 2016, 15, 92). The mobile telephony market is more competitive, thanks to the presence of a fourth mobile operator, *Yoigo*, with 6.5% of lines (considering that *Telefónica* has 30.7%, *Vodafone* 25.3% and *Orange* 26.9%). It is also worth mentioning that 10.5% of the market is currently covered by the so-called "virtual operators", that is to say service providers using their competitors' network infrastructure (CNMC 2016, 153). Finally, the mobile broadband market segment shows a very similar picture, for obvious reasons (CNMC 2016, 165).

A final reflection has to be made regarding the presence and role of consumers' organisations. It needs to be first noted that in Spain there is no solid tradition or culture with regards to consumers' rights. This is an area that still needs to be developed from a legal regulatory perspective, but also from the point of view of public awareness. It should also be noted that the most prominent and active consumer organisations in Spain are not particularly focused on telecommunications matters, but rather consist of nation-wide entities covering the different economic sectors.

Relevant examples worth mentioning are Consumidores en Acción [Consumers in Action] – FACUA (www.facua.org), CEACCU (www.ceaccu.org), and Organización de Consumidores y Usuarios [Organization of Consumers and Users] – OCU (www.ocu.org). In the specific area of telecommunications and digital services in general we may consider, among others, *Asociación de Internautas* (www.internautas.org), *Asociación de Usuarios de Internet*



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(www.aui.es), and *Asociación Española de Usuarios de las Telecomunicaciones y de la Sociedad de la Información* – AUTELSI (www.autelsi.es).

## Conclusions

Spain has undergone, in the last 20 years, a very interesting and intensive process of liberalisation of telecommunications. The causes and driving forces of this process need to be identified not only in the relevant policies developed by the EU, but also in the modernisation of the Spanish economy, implemented in order to achieve a higher level of competitiveness – and to fight inflation. Liberalisation has taken place through a series of legislative changes, which have sometimes raised political controversies, as well as some tensions with Brussels. The recent introduction of a large convergent regulatory body (CNMC) is almost unique within the EU, and it still needs to demonstrate its effectiveness. On the other hand, Spain's comparatively high prices, excessive market concentration (particularly that of the still predominant former monopolist) remain the main problems to be solved in order for the liberalisation to be completed in a satisfactory manner.

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# Endnotes

[1] Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2015.310.01.0001.01.ENG&toc=OJ:L:2015:310:TOC

[2] Available at: http://aei.pitt.edu/1159/1/telecom_services_gp_COM_87_290.pdf

[3] Treaty of the European Union, adopted in Maastricht in 1992, and one of the core legal instruments of the EU Law.

[4] Royal Decrees with the force of a law (*Real Decreto-Ley*) 6/1996 of 7 of June, on the liberalisation of telecommunications.

[5] Besides other Directives adopting during that decade, the first comprehensive *telecom package* dates back to 1997 and includes the Directive 97/13/EC of the European Parliament and of the Council of 10 April 1997, on a common framework for general authorisations and individual licences in the field of telecommunications services; the Directive 97/33/EC of the European Parliament and of the Council of 30 June 1997, on interconnection in Telecommunications with regard to ensuring universal service and interoperability through application of the principles of Open Network Provision; and the Directive 97/66/EC of the European Parliament and of the Council, of 15 December 1997, concerning the processing of personal data and the protection of privacy in the telecommunications sector.

[6] The web page of the European Commission devoted to SGEI is of particular interest: http://ec.europa.eu/competition/state_aid/overview/public_services_en.html.

[7] Among others, articles 14 and 106.2 TFEU, article 36 of the Charter of Fundamental Rights of the European Union, as well as article 1 of Protocol 26 of the Treaty of Lisbon.

[8] The full package is available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3Al24216a.

[9] The full package can be consulted through the link http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3Al24216a.

[10] Apart from the Cabinet, this mainly refers to the Secretary of State for Telecommunications and Information Society, as part of the Ministry of Energy, Tourism and Digital Agenda.

[11] Available at: http://www.tudosis.es/wp-content/uploads/Microsoft-Word-Informe-para-Telefonica_Resumen-Ejecutivo_borrador1.pdf.

[12] Full text of the letter is available at: http://ep00.epimg.net/descargables/2013/02/24/bc2701232a3bdf5a7d199cb40af021e0.pdf?rel=mas.

[13] Quadruple paly refers to services offering mobile, fixed and mobile broadband, as well as fixed telephony, whereas quintuple play adds audiovisual services.



http://doi.org/10.18080/ajtde.v4n4.77

# What Influences International Differences in Broadband Prices?

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Abstract: Broadband prices differ significantly throughout the world. However discussion of factors influencing international differences receives limited attention in the academic and policy literature, which is largely concerned with broadband prices in particular countries. Focussing on landline broadband, this exploratory article helps fill a knowledge gap by discussing some methodologies for comparing broadband prices between countries, and suggesting five factors that influence broadband prices: supply, demand, governmental policy and regulation, average price level throughout the economy as a whole, and physical/infrastructural factors. In this discussion, we also examine where Australia sits in relation to global broadband prices.

Keywords: broadband, comparative prices, price factors, Penn effect, Australia

## Introduction

Broadband prices vary significantly throughout the world. In Ukraine, for example, the monthly price for an unlimited 10 Mbps landline connection is about 3.4 USD, very cheap by comparison with Australia, which is typically 54 USD (Numbeo 2016). However, in Bolivia, although average income levels are close to those in Ukraine, the monthly price for 10 Mbps is 81 USD, which is very expensive by comparison with Australia (Numbeo 2016).

Why such dramatic variations? What factors influence such significant difference in prices for basically the same service in different countries? The direct comparison of absolute prices for broadband provision, which is the typical measure used by popular broadband 'league tables' is not very informative without considering other factors that influence broadband prices. While these comparisons show significant variation between countries, they provide limited explanation of why this is so, or how such comparisons are arrived at. The published literature in this field has also paid little attention to factors that influence broadband pricing in international comparative terms, focusing instead on broadband penetration, policy and regulatory, and marketing issues.

This exploratory article helps fill a knowledge gap in this area by discussing methodologies for comparing broadband prices between countries, and identifying some factors that



http://doi.org/10.18080/ajtde.v4n4.67

influence broadband prices. In doing so, we also examine where Australia sits in relation to global broadband prices.

In this article the term "broadband price" means the approximate average cost of a landline (fixed) broadband connection in a given country. In the numerical examples we use data from OECD fixed (landline) broadband basket "Med 4" (short for Medium 4: there are six grades in each of three OECD landline broadband baskets: low, medium and high). The Med 4 basket refers to a monthly data allowance of 50 GB with a speed of 25 Mbps and above, delivered across cable or ADSL. We also we use data from Numbeo (i.e. a crowd-sourced global database of different statistics) which refers to unlimited data at 10 Mbps speed, cable or ADSL.

These sources estimate average landline broadband service in terms of data speed. When we refer to broadband prices in general without mentioning any numerical examples, we mean the average trend (e.g. broadband prices are higher or lower in country A than in country B). The data from OECD and Numbeo sources are illustrative (rather than definitive); however, they are useful in reflecting overall trends in landline broadband prices for the countries mentioned.

The structure of the article is the following: first, we provide an overview of the relevant literature on broadband price, then discuss the relationship between broadband prices and international price levels. Having observed the variations evident from this simple or unadjusted price comparison, we then examine adjusted broadband prices by introducing the concept of perceived price, seen through two indexes: the ratio of broadband price to average wage, and the ratio of broadband price to Big Mac. The article then suggests five major factors that influence differences in international broadband prices. These are supply, demand, governmental policy and regulation, average price level and physical/infrastructural factors. Although some of these factors are discussed in the literature, they are generally considered under the banner of broadband penetration, which provides a limited and indirect insight to comparative broadband prices.

## The Broadband Literature and Price

The extensive governmental and industry data on broadband includes price along with a range of other indicators (penetration, speed, demographic influences, uptake by population cohort, spatial characteristics of provision, and so on), but pays limited attention to specific factors influencing price, (see for example Organisation for Economic Cooperation and Development (OECD 2016a; 2016b), International Telecommunications Union (ITU 2015), the Federal Communications Commission (FCC 2015), Regional Telecommunications Independent Review Committee (RTIRC 2015), and Akamai (2015)). The emphasis in the



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policy literature on determinants of broadband penetration (generally measured by subscriptions) provides some useful, if indirect, insights on factors influencing price. However, the existing literature contains some inconsistencies that point to a requirement for detailed empirical research on price factors. For example, Flamm (2005, p.36) argues that "two factors often associated with broadband penetration, income and population density, unsurprisingly seem to be among the most important determinants of broadband penetration". However, the OECD (2016c) finds a relatively weak positive correlation of .35 between density and penetration. Bouckert et al. (2010), Falch (2007) and Polykalas & Vlachos (2006) identify regulatory and market settings as significant determinants of penetration. The spatial dimensions of the 'digital divide' have been a persistent concern of academic analysts and governmental bodies, and some of this literature has drawn attention to differences in broadband prices and speed between urban and rural areas (Schneir & Xiong 2016; Rogers 2016; RTIRC 2015).

Polykalas & Vlachos (2006) examine broadband competition and broadband penetration in fifteen member states of the European Union (EU) that share the same regulatory framework. These authors analyse such factors as the existence of alternative infrastructure, the level of broadband competition and the historic evolution of broadband penetration, and conclude that broadband penetration and long term growth of high quality broadband services is stimulated by competition. Drawing on UK Office of Communications data (Ofcom 2011), Curran & Poland (2011, p.34) also conclude that "high competition levels lead to high penetration ratios and particularly only the competition in the access market could guarantee a long term growth of high quality broadband services".

Falch (2007) finds that policy settings in the EU, South Korea, Japan and US have influenced national differences in broadband penetration. While factors such as the macro-economic environment and demographics are largely beyond the influence of government, Falch argues, policies on broadband infrastructure and access, and longer-term programs such as education, were also important factors in broadband penetration. Where Flamm (2005) found that level of income was a significant determinant of broadband penetration, Falch (2007) found that it was not a decisive factor in explaining national differences.

There has been long-standing academic interest in examining broadband investment strategies and pricing models from the perspective of broadband providers. McLean & Sharkey (1993) deploy game theory methods to investigate broadband prices for a regulated telecommunications supplier offering heterogeneous services on a broadband network. Falkner et al. (2000) provide an overview of pricing concepts for broadband IP networks, while Biggs & Kelly (2006) examine the relationship between pricing strategies and the growth of the broadband market within countries. Nevo et al. (2016) analyse usage-based



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pricing for residential broadband and conclude that the investment in fibre-optic networks is likely to be recoverable in some markets.

While this review is necessarily brief, it is sufficient for us to conclude that Flamm & Chaudhuri's (2007, p. 314) observation that "[p]rice, though theoretically the most interesting determinant of Internet service choice, is also the least explored and understood" still holds some truth. Price is widely acknowledged as a factor in broadband diffusion or penetration, but there have been few attempts to examine in detail the determinants of broadband price or differences between countries.

## Comparing Price

Before we analyse factors influencing broadband prices, it is useful to set the scene by comparing prices between countries. To undertake this task accurately, the basis for comparison should be consistent. This is complicated by different broadband technologies (ADSL, fibre, cable, fixed wireless, mobile wireless etc.) and different service levels (in terms of bundled services, speed and data caps). Price comparisons are available from multiple sources, ranging from standard governmental and industry bodies (OECD 2016a; ITU 2015; Akamai 2015), to the crowd-sourced global database of reported consumer prices and other statistical data Numbeo (Numbeo 2016). For the purposes of this article, we mainly refer to the data provided by the OECD, which is precise and detailed, and to Numbeo, which is the most current data source on broadband prices throughout the world.

An important context in which to view broadband prices is the wider *level of prices* of different countries. This means that the effect of the comparatively large GDP per capita (and thus the average income) in developed countries might be partially offset by the comparatively high cost of broadband access in those countries. This is referred to as the Penn effect: a rich country (compared to a poor one) appears to be wealthier than it really is (Samuelson 1994; Summers & Heston 1991).

For example, 100 USD in Bolivia or Ukraine has greater consumer purchasing power than in Australia. To adjust for the impact of relative values of different countries on GDP, the concept of *GDP per capita, ppp* (gross domestic product adjusted to purchasing power parity) is used. Generally, GDP per capita is greater than GDP per capita, ppp in wealthier countries while in middle or low-income countries the opposite tendency occurs (see Fig. 1).



http://doi.org/10.18080/ajtde.v4n4.67

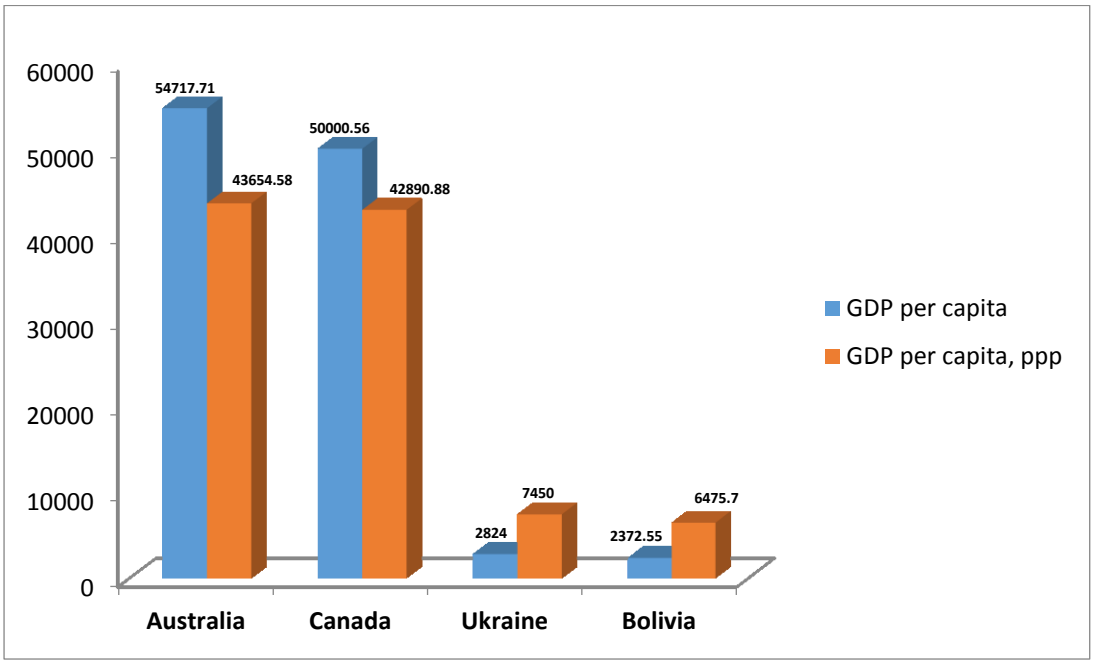


**Figure 1 GDP per capita and GDP per capita, ppp in Australia, Canada, Colombia and Ukraine (2015, US dollars)**

Source: tradingeconomics.com (http://www.tradingeconomics.com/country-list/gdp-per-capita, http://www.tradingeconomics.com/country-list/gdp-per-capita-ppp)

The cross-country broadband prices and GDP per capita statistics suggest that broadband prices throughout the world are subject to the Penn effect (see Fig. 2). As we can see, generally the wealthier is the country (in terms of GDP per capita), the higher is the price for broadband. For example, Poland, Hungary and Slovakia, which are all in the bottom-left corner of the plot, all have comparatively low GDP per capita and broadband prices, while Norway, Switzerland and Luxembourg enjoy comparatively high GDP per capita levels and broadband prices. Roughly, the countries which are above the trend line have comparatively more expensive broadband (with respect to GDP per capita level), while states below the trend line enjoy comparatively less expensive broadband. Among the former are Australia, Switzerland and USA, among the latter are Korea, Slovakia and Poland. Luxembourg is also below the trend line despite its quite high broadband price due to its strikingly high GDP per capita level.



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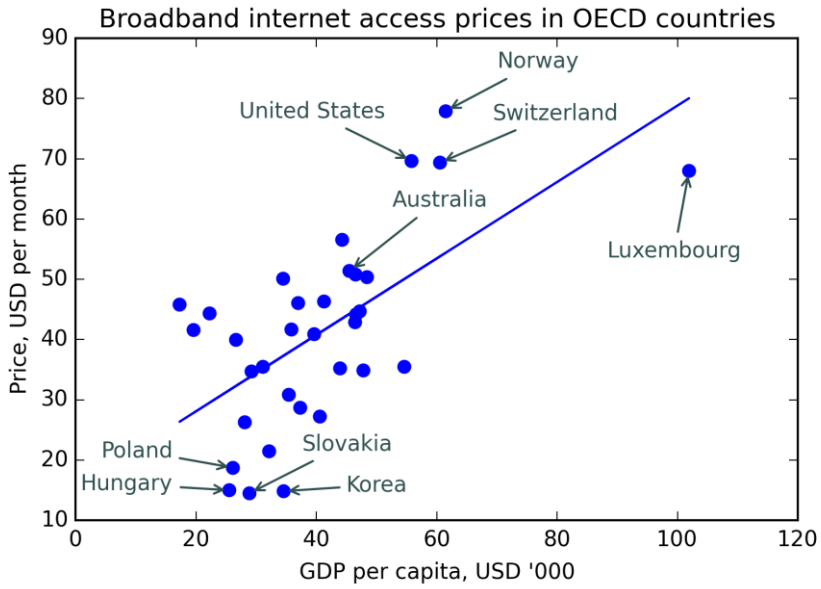


**Figure 2. Scatter plot relating GDP per capita, thousands USD to broadband prices, 2015**

Source: OECD Statistics (http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm)

The difference between GDP per capita and GDP per capita, ppp reflects the difference in price levels between countries only partially, as factors such as the level of incomes (described as the Penn effect), the peculiarities of local economies (for example, differences in the costs of labour and capital) or inflation may also significantly impact broadband prices.

To make the difference in price levels in different countries more comparable, the OECD publishes a monthly comparison of price levels based on exchange rates, evaluating the same representative basket of consumer goods in every OECD member country (OECD 2015a). To better explain the differences in price levels between different countries, in 1986 The Economist introduced its Big Mac index (The Economist 2013). The Big Mac index appears to be a good proxy for comparing price levels in OECD countries. In June 2016, correlation between the Big Mac index and OECD comparative price levels was 0.84 (calculated on data from OECD (2015a) and The Economist (2013)). Correlation between the prices of broadband provision in OECD countries and OECD comparative price levels is lower, sitting at 0.61 on the scale, possibly because the factors that determine broadband prices in OECD countries are less standard than the factors which determine the prices for burgers throughout the countries (calculated on data from OECD (2015a) and OECD (2016a)).

If we go beyond OECD states and examine the broadband prices and comparative price levels (for which we deploy ppp as a proxy) for a broader list of 124 countries (countries from the Numbeo database), we find there is an insignificantly low correlation between broadband



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prices and purchasing power parity rates. This suggests it is likely that factors determining prices for consumer goods, and prices for broadband provision, differ significantly. Thus, we might look to factors such as income level, geography and demography, infrastructure provision, regulatory and market arrangements, and perhaps other factors, as broadband price determinants.

To summarise, the broadband price in OECD countries is mostly determined by the factors akin to those that determine prices for consumer goods (but to a lesser extent than a Big Mac is). However, analysing a wider range of 124 countries (for which Numbeo data is available), we hypothesise that factors other than those influencing the price of consumer goods cause broadband prices to deviate significantly from the price of consumer goods.

## Perceived Broadband Prices

In 2015 the ITU and UNESCO established the Broadband Commission for Digital Development, to promote broadband adoption as a strategy for achieving the UN Millennium Development Goals (ITU 2015). To facilitate cross-country assessment, the Commission uses an index that compares fixed broadband price to Gross National Income (GNI) (ITU 2015). This index is useful for ranking countries according to the share of fixed broadband expenditures in the economy (or the proportion of broadband expenditure in total expenditure), but it provides limited insight to broadband affordability. To achieve this, it is more useful to compare broadband price to wages. This comparison enables us to calculate what we call the *perceived price* of broadband in different countries, or the ratio of the broadband price in each country to the corresponding average level of income:

$$\text{Perceived price} = \frac{\textit{average broadband price}}{\textit{average income rate}}$$

This formula rests on a presumption that the more people earn, the less is the subjectively perceived price for a service or commodity. In a marginal case, if someone has an infinite sum of money, they may not care about prices at all. This exercise ranks Australia ninth among the OECD 'cheapest' broadband countries (or, more precisely, among the countries with the lowest ratio of broadband price to average income rate). The first-ranked countries, that is, those with the lowest price/income ratios, are Korea, Finland and Ireland. Australia sits one rung below Japan. The countries with the highest perceived broadband prices are Portugal, Chile and Mexico. The results are set out in Table 1, with the distribution of prices shown in Figure 5.



http://doi.org/10.18080/ajtde.v4n4.67

**Table 1 Broadband price to average wage ratio ("perceived" price) for OECD countries**

| Country | Broadband price, USD | Average wage, USD | Broadband price/Average wage ratio and rank | Country | Broadband price, USD | Average wage, USD | Broadband price/Average wage ratio and rank |
|---|---|---|---|---|---|---|---|
| Korea | 14.83 | 29.979 | 0.49 (1) | Germany | 44.67 | 41.716 | 1.07 (18) |
| Finland | 27.23 | 45.353 | 0.6 (2) | New Zealand | 46.04 | 43.125 | 1.07 (19) |
| Ireland | 35.46 | 52.532 | 0.68 (3) | Canada | 56.55 | 49.59 | 1.14 (20) |
| Denmark | 44.19 | 63.674 | 0.69 (4) | United States | 69.66 | 58.714 | 1.19 (21) |
| Belgium | 35.24 | 47.537 | 0.74 (5) | Norway | 77.90 | 65.037 | 1.2 (22) |
| Austria | 51.36 | 45.115 | 0.77 (6) | Italy | 41.63 | 32.041 | 1.3 (23) |
| Switzerland | 69.32 | 88.761 | 0.78 (7) | Hungary | 14.98 | 10.66 | 1.41 (24) |
| Japan | 28.65 | 33.542 | 0.85 (8) | Poland | 18.73 | 12.257 | 1.53 (25) |
| Australia | 51.36 | 59.407 | 0.86 (9) | Spain | 50.05 | 30.476 | 1.64 (26) |
| Iceland | 50.73 | 58.127 | 0.87 (10) | Czech Republic | 21.41 | 12.773 | 1.68 (27) |
| Israel | 30.80 | 33.799 | 0.91 (11) | Estonia | 26.25 | 15.082 | 1.74 (28) |
| Sweden | 42.84 | 46.164 | 0.93 (12) | Greece | 39.91 | 19.567 | 2.04 (29) |
| United Kingdom | 46.30 | 49.677 | 0.93 (13) | Turkey | 41.54 | 16.344 | 2.54 (30) |
| Netherlands | 50.31 | 51.442 | 0.98 (14) | Slovenia | 35.46 | 13.647 | 2.6 (31) |
| France | 40.85 | 40.471 | 1.01 (15) | Portugal | 34.68 | 12.257 | 2.83 (32) |
| Luxembourg | 67.95 | 66.966 | 1.01 (16) | Chile | 44.36 | 15.523 | 2.86 (33) |
| Slovak Republic | 14.47 | 13.647 | 1.06 (17) | Mexico | 45.81 | 13.212 | 3.47 (34) |

Source: Broadband price: OECD (2016a), OECD (2015b), author calculations.

However, if we perform the same exercise with Big Mac prices (i.e. divide the Big Mac price by average income rates in corresponding countries), we find that Australia has the lowest price/income ratio, followed by the Netherlands and Sweden. This suggests that broadband prices in Australia are 'higher' than prices for hamburgers (considering the scale and the relation to the average level of prices).



http://doi.org/10.18080/ajtde.v4n4.67

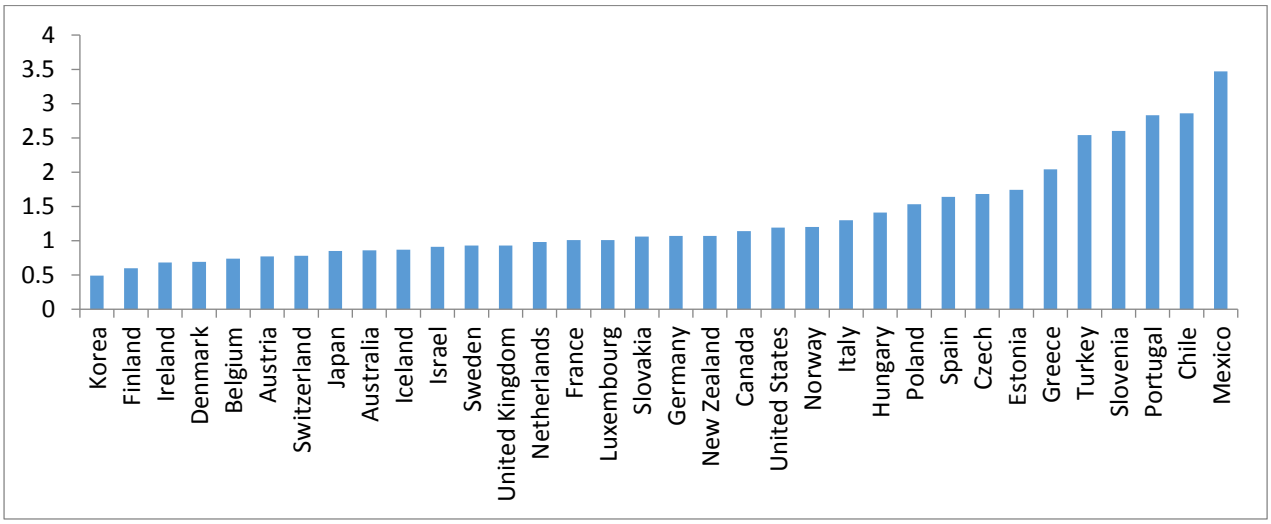


**Figure 3 Broadband price (USD)/Average annual wages (USD'000) ratio**

Source: OECD (2016b), OECD (2015b), author calculations

An alternative way to investigate comparative broadband prices is to plot where prices in each OECD country sit with regard to the average price level (for which the Big Mac index is proxy). To investigate this, we divide the broadband price by the Big Mac price in every country, choose the median value in the resulting range (which gives us Japan and a value of 9.58) and normalise all the values in the range to the value of Japan. Therefore, the value for Japan becomes equal to 1 (100%), and the values for other countries are lower or higher than 1 reflecting the degree to which broadband is more or less expensive in those countries compared to Japan as the benchmark. The results are set out in Figure 4.

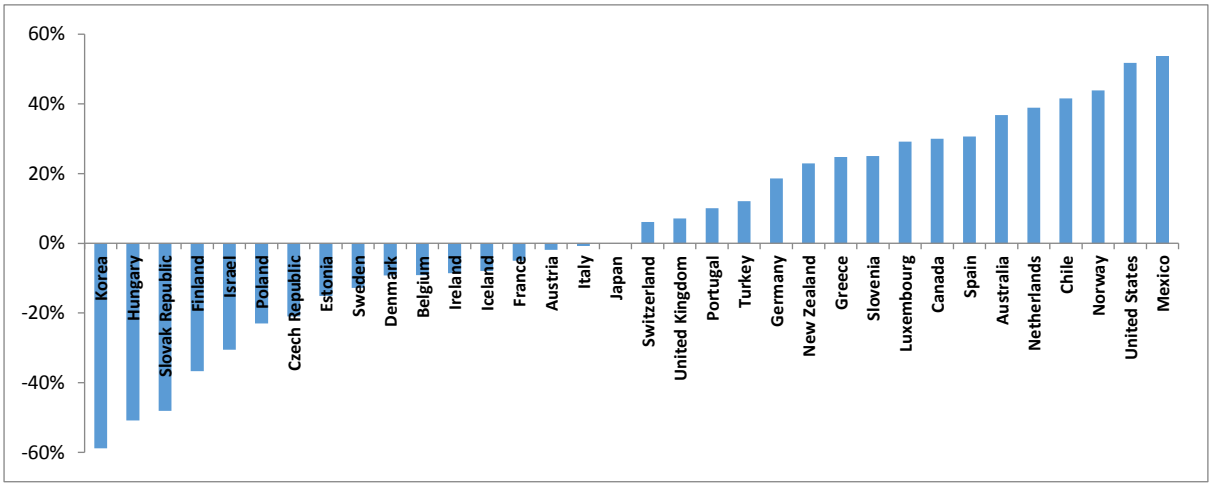


**Figure 4 Comparison of prices for landline broadband in OECD countries (% of undervaluation or overvaluation corresponding to the relative Big Mac Index)**

Source: The Economist (http://www.economist.com/content/big-mac-index), OECD (2016a), OECD (2015b), author calculations

So, the broadband price in Australia is 36.8% higher than the benchmark value of Japan. On this scale, the countries with the most undervalued broadband (OECD countries, based on



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broadband/Big Mac prices comparison) are South Korea and Hungary and the countries with the most overvalued broadband are USA and Mexico.

Among OECD countries, the most 'popular' broadband price range is about 40 USD. Australia, with a monthly average broadband price about 51.36 USD, sits in the upper-average price range (see Fig. 5)

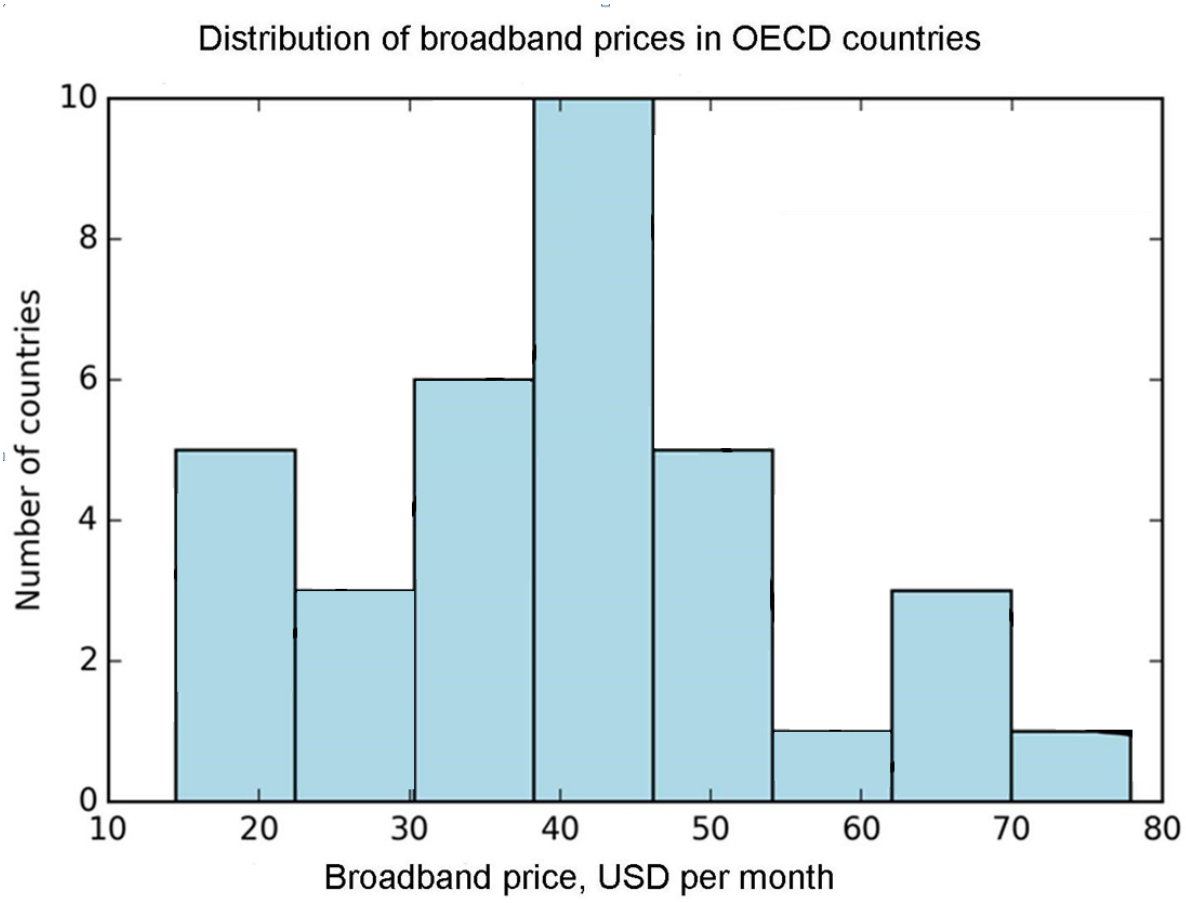


**Figure 5 Distribution of broadband prices in OECD countries**

Source: OECD Statistics (http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm), author calculations.

However, when we compare the broadband price to average annual wages (in thousands USD), we see that that Australia has comparatively cheap broadband, taking into account the average income level. The 'cheapest' broadband among the OECD countries (adjusted to average wages) is in Korea and Finland (see Fig. 3).

## Factors influencing the broadband price throughout the world

As we have seen, there are multiple methodologies for comparing broadband prices across countries, ranging from the highly aggregated (the ratio of price to national income) to the more granular and, we suggest, more meaningful to households (the ratio of price to wages).



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In this section we look behind these comparisons to examine the factors that influence broadband prices and cause such significant price differences between countries. We suggest there are five types of factors:

- supply factors (shaped by market patterns, degree of competition etc.),
- demand factors (where income levels play a crucial role),
- regulatory and policy factors,
- average price levels within countries and
- physical/infrastructural factors (topography, population density, telecommunications infrastructure).

Demand and supply factors are basic for determining the equilibrium price for most goods and services in the economy. However in the case of broadband services there are certain peculiarities. For broadband, low demand is not associated with low price (as generally happens in the market) but rather with an inflated price. This is because broadband provision incurs significant infrastructure costs, which will be distributed among few customers in a low demand scenario.

For example, Zimbabwe and Ethiopia both have very low comparative average price levels, but lack of telecommunications infrastructure means the broadband prices in those countries are among the highest in the world.

The low broadband prices in Ukraine (world's lowest in 2015, according to Numbeo) are strongly influenced by that country's infrastructure legacy. The Soviet heritage of extensive telecommunications infrastructure, installed for state security purposes, facilitated the launch of dial-up Internet access in the 1990s, and the updating to cable and fibre in later years.

This trajectory is shared with other post-Soviet countries in Eastern and Central Europe, where landline broadband services are comparatively cheap. It is interesting that sixteen of the first twenty countries with the cheapest landline broadband (according to Numbeo) are countries from the former Soviet bloc.

Other, country specific, factors also come into play. An additional reason why Ukraine is currently the cheapest country for broadband can be attributed to three devaluations of its national currency (hryvna) in 2014. While the currency was devalued by 300%, Internet providers raised their prices quite moderately (by 50-100%). This is not due to governmental price regulation (Internet broadband prices in Ukraine are unregulated), but because consumer prices for most locally produced goods and services have been raised significantly less than the national currency has devalued.



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Regulation ("state effects" in Flamm's (2005) term) may also affect supply in many cases. For example, Aron & Burnstein (2003) argue in the US context that governmental subsidies of local telephone services suppressed penetration of broadband, while legislative reclassification of broadband services could lead to changes in the broadband market framework and modify supply chains (Ford & Spiwak 2014). However, if we set broadband regulation within the wider neo-liberal settings promoted by the ITU and other supra-national institutions, we find significant convergence in policy and regulatory models (such as the "ladder of investment" favoured within the EU (Bourreau et al. 2010)), that may call us to question the influence of regulation as a factor in price differences. In Australia, though – at least on Fletcher's (2009) account – it has been the ineffectiveness of regulatory action in promoting market competition that has influenced broadband prices, rather than any more forceful or directive posture of the state.

Topography (or what Flamm (2005) calls the "terrain effect") is another physical factor that directly influences the cost of broadband supply, and accordingly its price. We began this article by comparing Ukraine and Bolivia. These countries are quite close in GDP per capita (see Fig.1), but contrast significantly in broadband prices. High broadband prices in Bolivia are triggered by physical, spatial and infrastructure factors. A landlocked and mountainous country, Bolivia is denied direct access to international communications cables, which carry almost 100% of trans-oceanic internet traffic (Starosielski 2015). Hence, Bolivia currently outlays significant revenue to rent optical fibre access from Chile, Brazil or Argentina (Vargas 2014).

In Australia, demand is fuelled by high GDP per capita and correspondingly high average income rate (59,400 USD in 2015), with the capacity to pay positively affecting prices. Telecommunications infrastructure in Australia is generally modern and extensively provided, in common with top OECD countries. However, telecommunications coverage is also quite uneven, being well developed in cities but worse in terms of price and data speed in rural areas. This causes unevenness of broadband pricing in different regions, a challenge that was met in the pre-Internet telecommunications environment through the prescription of universal service obligations (Gregory 2016; White 2016; RTIRC 2015; Hopewell 2014). Regulatory factors in Australia are shaped by a shift in telecommunications policy to market liberalism, involving a three-stage privatisation of the public monopoly (and currently biggest national operator) Telstra, starting from the early 1990s. This made the company more effective in terms of profit maximisation, but many customers in remote regions felt left behind as on-line services developed. The failure of private operators to provide broadband infrastructure throughout the country led to the re-emergence of a government monopoly in the form of NBN Co.



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Recent years have seen a process of consolidation and oligopolisation amongst Australian broadband providers. This has been dictated by the market circumstances presented by a comparatively low density of population (3.06 people per sq. km): only providers with a large customer base can achieve scale economies and profitability. Taking the other factors into account, broadband appears to be cheaper in more populated areas. Population density, one of the physical and spatial factors, is inversely related to the price of landline broadband. The correlation between population density and the price of landline broadband in OECD countries is -0.31, calculated on open (World Bank 2015) data for density of population (people per sq. km of land area) and OECD data for broadband prices. Although the correlation is low, the density of population is only one factor among other factors, so its influence on broadband price is expectedly moderate. It is interesting, though, that Australia and Canada, which are quite close in terms of GDP per capita ratio, density of population and telecommunication market patterns, have also quite close absolute values for broadband prices compared to the average level of prices. The role and significance of every factor influencing international differences in broadband prices can be only measured by econometric modeling, which would require a separate and more detailed study.

## Concluding remarks

Despite the prolific literature focusing on broadband penetration, regulation, marketing and the digital divide, there is a gap in our understanding of the factors that influence the significant differences in broadband prices throughout the world. In this brief study, we have undertaken two tasks. First, we have suggested some datasets and methodologies that contextualise and clarify inter-country price differences. Second, we have suggested five groups of factors that influence price differences: physical and infrastructural factors, regulation, the average level of prices, demand and supply factors. Of these factors, infrastructure is crucial: a lack of essential broadband infrastructure stifles the effect of other factors.

The role of the different factors in shaping broadband prices throughout the world calls for further analysis. An extended study of the effects of different factors could usefully incorporate regression analysis that would estimate the relationship between factors mentioned in this article and broadband prices in a sample of countries. A significant challenge posed for such an analysis would be choosing proxies or estimations for qualitative categories as “regulatory factors”, “infrastructure” or “topography”.

As to Australia’s comparative position, we have argued, the broadband price in Australia is influenced by demand (demography) and physical and infrastructure (topography and telecommunications infrastructure) factors, in addition to the terms under which market



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liberalisation was introduced. However, evaluation of the broadband price to Big Mac price ratios suggests that it is overvalued in Australia by 36.8%, compared to the benchmark value of Japan. Some analysts warn about the lack of entry-level wholesale (NBN) pricing, and inflated profit margins of ISP retailers, as checks on broadband adoption for low-income Australians (de Ridder & James 2013; Morsillo 2012). Notwithstanding the importance of understanding that broadband consumers are not uniform, viewed at country level the average price for landline broadband is still moderate, taking the Australian average level of income into account.

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http://doi.org/10.18080/ajtde.v4n4.67

# Reciprocity of Government Restructuring/Policy Changes and the Convergent Environment in South Korea

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## Abstract:

This paper takes the approach that industry developments, the structure of governmental decision-making bodies, and policy responses are interdependent and mutually shaped. How ministries and regulatory bodies are designed and put together affects both their policy outlooks and managerial capabilities, in turn affecting their policy output. Governments have also consciously restructured ministries and regulators in order to promote specific policy orientations, or in response to changes in the industry. This three-way interaction is critically important to the responses of governments to the emerging broadband ecosystem. The paper examines four different restructurings in the Korean government, and argues that the identification of a governmental agency as a nodal agency was the result of a new policy orientation, and the response to a change in the industrial environment. Though no two countries are totally similar in terms of their industrial and political environments or policy needs, the paper is based on the premise that the example of South Korea has useful lessons for other countries, as a leading indicator of changes in government regulatory structures in response to convergence and the emergence of the broadband ecosystem.

Keywords: Korean telecommunications, broadband ecosystem, telecommunication policy and regulation, government restructuring

## Introduction

Whereas broadcasting, telecommunications and information technology were once distinct sectors with their own industry characteristics and legal frameworks, technological convergence has resulted in the merger of these sectors into one "broadband ecosystem." Governments everywhere are confronting the need to effectively regulate this broadband ecosystem, which does not easily fit into the traditional models of regulation.



http://doi.org/10.18080/ajtde.v4n4.74

This paper takes the approach that policy responses to environmental challenges are at least partially dependent on the structure of governmental decision-making bodies. How ministries and regulatory bodies are designed and put together affect both their policy outlooks and managerial capabilities, in turn affecting their policy output. It is thus important to study the structure of governmental decision-making bodies as they respond to technological convergence. But simultaneously, governments have also consciously restructured ministries and regulators to promote specific policy orientations, or in response to changes in the industry. This three-way interaction is thus critically important to the responses of governments to the emerging broadband ecosystem.

As governments search for operational models of regulation in this new environment, South Korea offers a leading example. Due to the faster deployment of information infrastructures and technologies in South Korea since the 1980s, the country has also confronted the opportunities and challenges of technological convergence sooner than most nations. The government's policy responses too have been held up as an example in the literature. Accordingly, this paper uses the case study of South Korea to analyse the transformation of government decision-making structures under the challenges of the emergence of the broadband ecosystem.

Specifically, the paper will examine four different restructurings in the Korean government:

- the 1995 establishment of the Ministry of Information and Communication;
- the 2004 reforms that established the Ministry of Science and Technology as the lead ICT agency;
- the 2008 restructuring that among other things established the Korean Communication Commission; and
- the most recent 2013 reforms that created the Ministry of Science, ICT and Future Planning.

The paper argues that in each case, the identification of a governmental agency as a nodal agency was the result of a new policy orientation, and the response to an environmental change.

Though there is an extensive literature on Korean telecommunications, relatively few have examined government restructuring as a critical input into policy formation (see for example, Business Monitor International [BMI], 2014; Jung, Na, & Yoon, 2013; Larson & Park, 2014; Menon, 2011; Shin & Venkatesh, 2008; Wu, 2004). Of these, Larson and Park (2014) come closest to the purposes of this paper. However, they too examine the consequences of government restructuring on the telecommunications industry, and pay relatively less attention to the reverse relationship, namely the impact of industry changes on the structure



http://doi.org/10.18080/ajtde.v4n4.74

of regulatory organisations. By examining the two-way relationship between the emergence of the broadband ecosystem and government restructuring, this paper will contribute to the literature.

The paper concludes with lessons for other countries from the South Korean example. Though no two countries are totally similar in terms of their industrial and political environments or policy needs, the paper is based on the premise that the example of South Korea has useful lessons for other countries, as a leading indicator of changes in government regulatory structures in response to convergence and the emergence of the broadband ecosystem.

## Literature Review

As a nation that consistently tops the global rankings for broadband and information infrastructure deployment (OECD, 2016), South Korea's telecommunications industry has come in for extensive scrutiny by scholars interested in deriving useful lessons for other countries and regions (Frieden, 2005; Kim & Park, 2013; Larson & Park, 2014; Menon, 2011; Shin, 2007; Shin & Kweon, 2011), as well as by think tanks and government departments.

Several factors have been identified that have contributed to Korea's leadership in information and communication technologies:

- the tendency of Koreans to be early adopters of new technologies (Kim & Park, 2013);
- the pro-active role adopted by the Korean government toward the diffusion of broadband (Rhee, 2016; Larson & Park, 2014; Shin, 2007; Shin & Kweon, 2011);
- the close connections and cooperation between industry and government (Larson & Park, 2014; Oh & Larson, 2011) and;
- the creation of partnerships between global technology leaders and local private sector firms, with the active encouragement of the government (Jho, 2007).

This literature review concentrates on the role of government in fostering the development of the Korean broadband infrastructure, either through adopting proactive and investment-friendly telecommunications policies, or by coordinating ICT deployment through directing the efforts of chaebols, the Korean business conglomerates.

The role of the government in fostering industrial development has been studied extensively, since Chalmers Johnson's (1982) seminal work discussed the role of Japan's Ministry of International Trade and Industry in jump-starting that country's miraculous post-World War II recovery. Key to the success of this model was the efforts of government to obtain willing (not-coercive) cooperation from the private sector. Johnson identifies these "market-conforming methods" (Johnson, 1982: 318):



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- the creation of government-controlled financial institutions,
- the design of investment-favourable tax policies,
- robust planning processes,
- creation of numerous consultative bodies between government and industry,
- reliance on public-private partnerships and public corporations,
- the use of "investment budgeting" separate from the general account budget,
- sponsorship of research and development, etc.

Most of these market conforming methods have also been used by Korea in the telecommunications sector at one time or the other.

However, not all of these market-oriented approaches were in use during any one time in the evolution of the Korean telecommunications industry. On that basis, a number of phases have been identified in the evolution of the Korean telecommunications sector. In general, Larson and Park (2014) argue that a "developmental state" that existed until the early 1980s transitioned into what they label the "network state," beginning from that period. They critique other scholars who argue for continuity between the two periods, arguing instead that the developmental state declined and transitioned into the network state, as a result of "technology development, including the shift to digital mobile networks capable of broadband access, the pressure of ongoing international trade negotiations, and a shifting balance of power between the state and chaebol industries" (Larson & Park, 2014: 5). Larson and Park thus suggest that the public-private cooperation manifest in Japan persists today in Korea even though technology inevitably shaped the regulatory environment with vastly increased power of chaebol groups.

Menon (2011) examined the Broadband convergence Network (BcN) program of the Korean government, and arrived at the similar conclusion, stating that the government's proactive role succeeded in establishing a converged national broadband network, combining the capabilities of broadcasting, telecommunications and information infrastructures. Through analysis of key documents and interviews with various decision-makers and managers in the Korean telecommunications industry, Menon found that the Korean government implemented a well-conceived three-phase plan that among other things established interconnection and net neutrality standards, created a national R&D testbed through the National Grid Project, and coordinated interactions among stakeholders. By providing an open access alternative to the non-converged legacy networks, the BcN has the potential to change the relationship between various industry actors such as content providers, data carriers and backbone providers. Menon thus points to the role of government action in altering the industry structure in Korea.



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Along the same lines as Menon (2011), Shin and Kweon (2011) study a number of broadband infrastructure policies in Korea since 1999: the Cyber Korea Initiative (1999-2002), the e-Korea Vision (2002-06), the IT839 Strategy (2004-06), the Ubiquitous IT839 Strategy (2006-07), and the still ongoing Cyber Infrastructure initiative (2007-present). All initiatives were based on a significant role for government, in coordinating the actions of stakeholders, providing financial support, generating demand through government purchases of services, implementing favourable tax policies, and otherwise subsidising major manufacturers and service providers. This dominant role for government has created a "patron-client relationship" (Shin & Kweon, 2011: 381) between government and industry, with government using broadband policy to encourage electronics and high-technology manufacturing. "(B)roadband has been developed with a tendency toward technology push-to-market rather than market-pull" (p. 381), with the attendant risk of a misallocation of resources. To summarise, Menon (2011) and Shin & Kweon (2011) highlight the potential of government action to alter the environment for private sector actors through proactive policy initiatives and targeted investments.

Shin and Venkatesh (2008) use actor-network theory to examine how stakeholders' varying interests are reflected in the formation of convergence policy in Korea. An actor-network is "a heterogeneous network of aligned interests, including people, organisations and standards" (Shin & Venkatesh, 2008: 25). The formation of a "technical artefact" like a national broadband network is the result of interactions within the actor-network, based on the complex interactions, power dynamics, persuasive strategies and alliances between the various actors. In the Korean case, Shin and Venkatesh identify the principal state and non-state actors involved in convergence policy, including ministries and regulatory agencies, and private sector actors such as content producers, equipment manufacturers, telecommunications providers and broadcasters. In the view of Shin and Ventakesh (and in actor-network theory in general), policy is the outcome of a structure of interaction, or a particular configuration or institutional arrangement of a decision-making system within with various actors seek to align their interests. Decisions are thus the outcomes of the structure of the regulatory system, and in turn, "the realisation of the potential of technological innovation depends upon social and economic decisions" (Shin & Venkatesh, 2008: 36). However, Shin and Venkatesh also admit the possibility that "convergence challenges existing institutional arrangements" (p. 37). The causal effects run both ways between institutional arrangements, and technological change.

Shin and Venkatesh's (2008) approach is congruent to the conceptualisation of complex, large-scale technology projects as socio-technical systems (STS) (Borgman, 2000; Sawyer, Allen, & Lee, 2003; Shin & Jung, 2012). According to Shin and Jung (2012), "(a) technological



http://doi.org/10.18080/ajtde.v4n4.74

ecosystem, which is a set of technologies, standards, conventions, best practices and social communities, can be defined as an adaptive, open socio-technical system with properties of sustainability, public good and scalability" (p. 580). As in the actor-network, a socio-technical system too is based on complex interactions between social and technical factors, and mediated by the conflicting interests and negotiated relationships of various stakeholders. At the same time, socio-technical systems also challenge and change existing patterns of interactions within social communities. "ICTs and the social and contextual settings in which they are embedded in a relationship of reciprocal shaping" (Shin & Jung, 2012: 580)

In the next section, we synthesise from these various strands of research a tri-cornered model of "reciprocal shaping" involving regulatory structures, policy outcomes and technological change.

## Model

In the previous section, the literature on the role of the Korean government in the superlative growth and performance of the telecommunications industry was presented. The literature clearly demonstrates that the Korean government's proactive, programmatic and far-sighted actions helped the growth of the Korean telecommunications and broadband sectors. However, the literature also showed that government decision-making structures themselves were not immune from the influence of the technological and business environment of the telecommunications industry. In addition, policies are the outcome of a specific institutional configuration, while governmental decisions themselves can reshape the institutional environment: for example, by creating new deliberative forums or regulatory bodies, or transferring jurisdiction over an issue from one governmental entity to the other. Finally, policy decisions themselves affect industry structure. To adapt a phrase used by Shin and Jung (2012), these three elements – namely regulatory structures, industry changes, and policy – may be said to be in "reciprocal shaping," within the overall context of a telecommunications system. The main argument of this paper is that none of the three can be said to be independent causes, and the others to be the effects.



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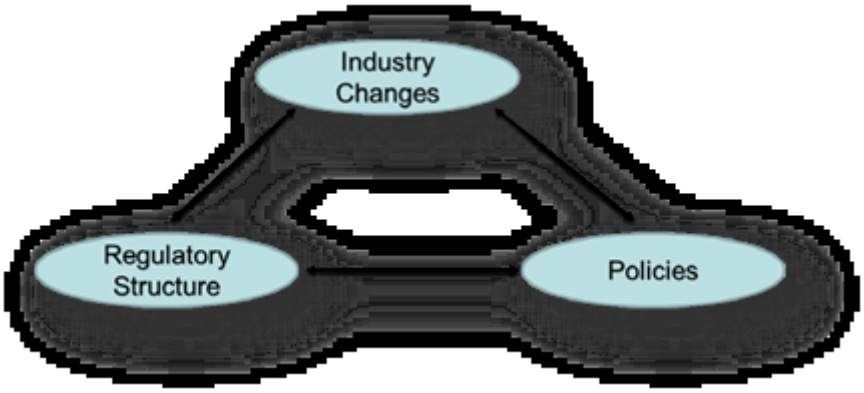


**Figure 1: Modelling the influence of government on the telecommunications industry**

To set the stage for the case study to follow in the next section, we present working definitions of the three terms in the above Figure 1.

***Regulatory structure*** – The concept of a regulatory structure is based on the theory of institutionalism most effectively articulated by Douglass North (1990, 1991). They involve "the humanly devised constraints that structure political, economic and social interaction" (North, 1991: 97), consisting of both "informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights)" (p. 97). Building on the seminal work of North (1990) on the influence of political institutions on economic development, Levy and Spiller (1996: 4) outline five elements of a nation's overall institutional endowments that affect regulatory governance of utilities: legislative and executive institutions, judicial institutions, the customs and informal norms that constrain actions of individuals or institutions, the character of contending social interests and the balance between them, and administrative capabilities.

A working definition of regulatory structure, that incorporates North's institutionalist orientation but provides more specifics is that the decision-making structure "encompasses issues relating to the number of decision-makers, the basis of selecting them, the roles accorded to stakeholders, and the regulatory and appeals processes" (Smith, 1997: online).

In general, the participants in the regulatory structure may include legislative and policy-making bodies, regulators and overseers, and operators. In the early years of telecommunications, many of these functions were combined within publicly-owned telephone and telegraph providers (PTTs), some of which were also ministries within government. After deregulation, the policy-making and oversight roles were separated, and the operators were made into public or private corporations. Further reforms sometimes separated the legislative and policy-making functions (reserved for national legislatures or ministries) and the regulatory function (delegated to specialised sectoral regulatory bodies). The powers of the regulatory bodies might also be different: in some countries, regulatory



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bodies have multi-sectoral jurisdiction, for example combining broadcasting, telecommunications and information services, while in other countries, separate agencies oversee these industries.

In the case study to follow, the evolution of the Korean regulatory structure will be traced with special attention paid to the identity of key regulatory agencies, the types of stakeholders involved in telecommunications and broadband policy making, and the formal and informal rules and conventions governing their interactions.

***Industry changes*** – According to authors such as Larson and Park (2014) changes in the telecommunications environment, and specifically changes in technology and convergence, inevitably lead to changes in the regulatory environment. At the same time, Menon (2011) and Shin and Kweon (2011) have also argued that proactive actions by the government in creating a national information infrastructure have resulted in changes to industry structure and organisation. In many countries, technological convergence and the consequent cross-media entry has made obsolete the previous silo-models of regulation. It is therefore reasonable to expect "reciprocal shaping" between industry changes and regulatory structures. Industry changes may include the emergence of new technologies, vertical and horizontal integration, multi-platform competition, convergence and cross-platform competition.

***Decisions*** – Regulatory systems, through negotiations involving various stakeholders, periodically arrive at decisions: some decisions address substantive issues related to specific industrial sectors, while others address procedural issues related to the processes by which the regulatory system arrives at decisions. While policies related to interconnection or access pricing are examples of the former, the creation of new regulatory agencies or the transfer of jurisdiction over an industrial sector from one agency to the other are examples of the latter. Decisions may also be differentiated based on their breadth and applicability. While some decisions are narrowly tailored to a specific issue (for example, e911), others have much broader applicability spanning multiple sectors of the economy (competition policy, industrial policy or merger guidelines). Finally, decisions also have two aspects – the specific provisions in the regulation itself, and the general ideological or philosophical motivations behind the policy. The latter is not immediately apparent, and has to be surmised from the pronouncements of decision-makers, or from the tone and tenor of the debates surrounding major policy decisions. It is the general motivation that sets the context for the specific provisions, and the general motivation is conditioned by the regulatory structure.

In this paper, only a subset of the decisions taken by the Korean regulatory system will be considered. Day-to-day policy making, with its focus on specific issues and problems, will not be extensively discussed since they have little relevance to the objectives of the paper, namely



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the long-term responses of the Korean telecommunications system to the challenge of convergence and broadband. The decisions discussed in detail include legislation or policy decisions with broad and long-term applicability, and procedural changes such as the creation or merger of regulatory agencies.

In Section 4 below, the critical markers of the regulatory system, industry changes and decisions identified in this section will be observed for the Korean telecommunication system from the 1990s to the present.

## Chronology of developments in Korean telecom, 1990s-present

In this section, we discuss the major changes in the industrial environment, changes in regulatory structure, and changes in policies, from the 1990s to the present. As stated in the introduction and in Section 3: Model, our objective is to demonstrate the "reciprocal shaping" between these three in each period of Korean telecommunications history. We show, based on the evidence in the following sections, that there were four periods into which these historical developments could be divided, each with a dominant trend or characteristic:

- Period 1 (1995-2004, state-owned oligopoly);
- Period 2 (2004-2008, inter-platform competition);
- Period 3 (2008-2013, mergers and consolidation), and
- Period 4 (2013-present, ubiquitous networking).

To set the context, a summary of the key industry characteristics during each period is provided below (Table 1).

**Table 1: Change of Internet and mobile phone users over periods**

| | | | | Broadband households | Internet users | Mobile phone subscribers | Smartphone subscribers |
|---|---|---|---|---|---|---|---|
| Period 1 | State-owned oligopoly | (1995-2004) | 1995 | 1.38 (1998) | 37 | 164 | - |
| | | | 2000 | 387 | 1,904 | 2,632 | - |
| Period 2 | Inter-platform competition | (2004-2008) | 2005 | 1,219 | 3,301 | 3,834 | 22.5 (2008) |
| Period 3 | Mergers and consolidation | (2008-2013) | 2010 | 1,722 | 3,701 | 5,077 | 721 |
| | | | 2013 | 1,874 | 4,008 | 5,468 | 3,752 |
| Period 4 | Ubiquitous networking | (2013-present) | 2014 | 1,942* | 4,112** | 5,800*** | 4,167 |

*98.5% of total households ** 83.6% of the population ***108.9% of the population
Source: NIA (2015)



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The three subsections below discuss major changes in the industrial environment, changes in regulatory structure, and changes in policies, in that order. Thereafter Section 5 discusses the main thesis of this paper: the "reciprocal shaping" of these elements within each period.

## Changes in industry

The growth of the mobile and broadband infrastructure has been a core agenda for the government and industry in the 1990s and the 2000s. While the government has been proactively intervening in ICT and telecommunication development since the 1980s by employing well-educated technocrats and investing massively in think tanks, the real seeds of the current ICT environment Korea were sown in the 1990s. Both the mobile and broadband infrastructure are expanded in a solid manner (Larson & Park, 2014; Jung et al., 2013). In the early 1990s, Korea broke new ground in the world's mobile communications market by commercialising CDMA-based digital mobile technology for the first time in the world. In the later 1990s, the world's fastest Internet service was available in Korea thanks to a high-speed Internet infrastructure constructed nationwide. The information networks undergirding the Korean economy underwent a dramatic transformation in the late 1990s.

Though growth was not as dramatic or explosive as in the 1990s, progress continued in the 2000s. In particular, the development and use of information services improved significantly both in quality and quantity. While the 1990s were spent in building a foundation for information service use, the 2000s saw dramatic expansion in information services. The service-related achievements in the 2000s can be largely categorised into four areas:

- E-government development (early 2000s);
- ubiquitous strategy mainly represented by IT839 and u-Korea (2004 and 2006, respectively);
- convergence, which emerged as a pet project of the Lee Myung-Bak administration in 2008 (NIA, 2010); and
- creative economy, which emphasises ICT advancement and entrepreneurship by the most recent Park Geun-hye administration.

### Growth of broadband

Broadband Internet services were launched in Korea in July 1998 by the cable provider Thrunet, based on cable modem technology. A year later, in April 1999, Hanaro Telecom too entered the broadband market by offering the world's first Asymmetric Digital Subscriber Line (ADSL) service. Hanaro started as a competitive fixed-line telephony provider but ran into several obstacles in extending its market share against the incumbent, KT. There was no number portability at the time and high switching costs discouraged users from changing to



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another provider. Users going back to KT from Hanaro were forced to pay large reconnection fees. Facing tough competition in fixed lines, Hanaro changed its focus from fixed-line telephony to broadband. This strategic change was particularly successful given KT's reluctance to deploy ADSL due to its high investment in Integrated Services Digital Networks (ISDNs) then. However, when the advantage of the ADSL service became apparent due to speeds 60 times faster than ISDN, KT quickly responded and began offering its own service in June 1999 (Kim, Jeon, & Bae, 2008; ITU, 2005).

From 2000 to 2005, broadband services in Korea were largely based on ADSL, but the trend shifted toward very high bit-rate digital subscriber lines (VDSL) when the subscription market for ADSL service became saturated (Lau et al., 2005). VDSL technology can reach transmission speeds of 52 Mbps. Broadband service in Korea is typically fast enough for two-way streaming of a high-resolution HDTV image onto a computer screen (Shin & Kweon, 2011). In the Korean broadband market, xDSL is readily available to 98.5% of Korean households with a fixed telephone line (NIA, 2015). More than 50% of Korean homes subscribed to cable television, which provides them with another broadband option through hybrid fibre coaxial (HFC) or cable modem (ITU, 2010). Additionally, apartment LANs (Local Area Networks) created new platforms for broadband, since more than 50% of the Korean population lives in an apartment building.

South Korea has consistently been the global leader in broadband deployment since 1999. In the last ten years, the Korean government has pursued several strategies for its broadband infrastructure. The Broadband Convergence Network (BcN) is Korea's high-speed Internet infrastructure project and is envisioned as a robust high-speed conduit through which broadband services, applications, and content will flow. This project was started in 2004 by a consortium that included the now-defunct Ministry of Information and Communication, and private sector telecommunication and cable firms such as KT, Hanaro, and others. The BcN was launched as a three-phase project. The first phase extended from 2004 through 2005, the second from 2006 through 2007, and the third from 2008 through 2010. The objectives of the BcN are three-fold: media convergence; ubiquitous connectivity or access; and coordination among the network stakeholders (Menon, 2011).

Korea completed its government-led BcN project in 2010, six years after it commenced in 2004. The number of BcN subscribers using a connection faster than 50Mbps now exceeds 14.82 million, overachieving the original goal of 12 million by more than 20%. The BcN project has enabled practically all cities, towns and rural communities to use 50-100Mbps Fibre-To-The-Home (FTTH) and HFC-based broadband Internet services. For small farming and fishing villages with fewer than 50 households, for which access to broadband Internet service was not commercially practical, the farming and fishing village broadband subscriber network



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promotion project has been available since 2010. The FTTH-based broadband networks were implemented for about 38% of villages (5,002 of 13,217) by December 2012. Also, the Giga Internet project, launched in 2009, will be ten times faster than BcN, offering speeds between 100Mbps and 1Gbps. Aiming at more than 90% of Giga coverage across the country by 2017, Korea is now developing and demonstrating technologies for enhancing next-generation subscriber networks, such as Giga Wi-Fi, 10GE-PON and the RF Overlay-based Giga Internet (KISA, 2013; NIA, 2014).

A total of 77 commercial Internet services, including Kornet (KT), Boranet (LG U+), B-Net (SK Broadband), LG U+ and Dreammax (Dreamline), receive IP addresses from KISA, and provide services such as leased lines and high-speed connectivity for institutions and individuals (KISDI, 2015). Kornet, short for 'KORea-telecom-interNET," is a high-speed information network operated by KT that has from June 1994 until now installed 2.5G-10Gbps high-speed networks in 90 or so locations across the country, and built 20 or so international lines including the 140Gbps line connecting with the US. Boranet is the Internet communication network of LG U+. It launched a service to lease Internet lines for enterprises in October 1994, and then extended the service to home users. It also provides high-speed Internet customers with triple play service, i.e. voice, Internet and broadcasting. B-Net is owned by SK Broadband. It launched commercial service in April 1999, introduced Korea's first IPTV service (Btv) in July 2006, and then released the first TPS product in Korea (B Set) in January 2007. Currently 130 or so nodes are accommodating subscriber traffic around the country, and B-Net is connected to numerous foreign and Korean service providers to provide high-quality Internet service (KISA, 2013).

According to the 'statistics on wired and wireless communication service subscribers' by the MSIP, the number of wireless Internet subscribers in Korea was 59.41 million in 2015, which was up 17% over 2010 (50.77 million). With increasing smartphone penetration, the number of wireless Internet users has also been increasing. Moreover, according to 'broadband Internet subscribers' data, as of December 2015, the number of domestic broadband Internet subscribers was 19.98 million, with KT having the largest number of subscribers (approx. 8.31 million, 44.0%), followed by SK Broadband (approx. 4.39 million, 24.1%), System operator (approx. 2.96 million, 16.2%), and LG U+ (approx. 2.74 million, 15.0%) (KISDI, 2015).

## Platform competition

Early platform competition between KT's DSL broadband and Thrunet and Hanaro's cable broadband networks contributed significantly to the growth of broadband markets in Korea (Fransman, 2006). However, although Local Loop Unbundling (LLU) was only introduced in 2002, Thrunet and Hanaro have benefited from the separation of ownership, operation, and



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programming functions in the Korean cable business (Wu, 2004). Platform competition in the Korean market led to rapidly decreasing prices of broadband, which furthered broadband adoption. Lower prices were also the result of competition with KT, which was enjoyed a cost advantage as the incumbent and therefore could afford to lower prices with less concern about cost (Chung, 2006). When LLU was introduced in 2002, the MIC forced KT not only to provide all kinds of LLU to competitors, but also to do so at prices below costs. Two reasons motivated the MIC to do this: to discourage competition in facilities construction which might result in too much capacity and to intensify competition in rural areas where cable system coverage was low (Chung, 2006).

The standard broadband technologies in Korea are DSL and cable modems. Newer technologies in use include very high bit-rate digital subscriber lines (VDSL), and optical fibre connections in both telephone and cable plants. Fibre-to-the-premises and fibre-to-the-curb schemes have recently become more common. Korea is among the leading countries in the list of fibre-based broadband internet service subscribers (OECD, 2016).

Wireless broadband (Wi-Bro) is a portable wireless broadband internet technology developed by the Korean mobile industry that was adapted as the world standard in 2008. Users can freely access high-speed internet cheaply, at any place and anytime, even while driving at speeds up to 70–80 miles/hour. Its speed is fast enough to download dozens of MP3 files a minute. The technology also offers a high quality of service, allowing Wi-Bro to stream video content and other loss-sensitive data reliably. Services are becoming the centrepiece of the broadband ecosystem (Shin & Kweon, 2011).

## Converged services

While the 2012 output of broadcasting services and telecommunications services showed a similar level of production as in 2011, converged services grew at a rate of 11.5% in 2011-12. Converged services showed strong long-term growth as well, at compound annual growth rates of 16.3% during 2008-2012, and were expected to surpass the production scale of the broadcasting services shortly (KCC, 2012).

IPTV, exemplifying the convergence of broadcasting and telecommunications, had about 6.31 million subscribers in 2012, having grown at a CAGR of 169% during the years 2008-2012. As the number of subscribers exceeded 7 million in May 2013, IPTV has become a cash cow for the industry. Furthermore, IPTV expanded the range of consumer experience beyond what is available on broadcast and cable TV, by adding new features such as Video on Demand (VoD) and multi-angle viewing (KCC, 2012). Currently Korean IPTV accounts for 6.7% of the global IPTV market (KISA, 2013).



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Government policy has also supported the growth of services. The government's so-called Future Strategy for IT Korea, which coordinates the ICT policy directives of the Ministry of Knowledge and Economics and of the KCC, identifies a set of industries that will benefit the most from technological convergence, emphasising the role of the software industry as a vehicle for industrial competitiveness. The policy priority also includes the security and speed of Internet service. The shift of emphasis from network infrastructure to the applications of ICT is likely to bring important changes in the regulatory regime of the network industry and requires a comprehensive assessment of the source and impact of technological convergence (Jung, Na, & Yoon, 2013).

## Changes in regulatory structure

During the 1990s and the 2000s, the main regulatory agencies were the Ministry of Information and Communication (MIC), the Korean Broadcasting Commission (KBC), the Ministry of Culture and Tourism (MCT), and the Ministry of Commerce, Industry and Energy (MCIE). Each is associated with industries – telecommunication, broadcasting, cultural industries, and equipment manufacturers (Shin & Venkatesh, 2008). The MIC governed telecom markets under the authority granted to it by the Framework Act on Telecommunication, 1983. The Act has undergone numerous subsequent amendments via ministerial and presidential decrees. In addition to telecommunications policy, The MIC was also in charge of allocating broadcast channels and managing the broadcast spectrum, which overlapped with KBC's jurisdiction.

Convergence required a re-evaluation of the fundamental basis of regulation across broadcasting and telecommunications. As soon as the Lee Myung-Bak administration took power in 2008, the KBC and the MIC were integrated to form a new unified regulatory agency, the Korean Communication Commission (KCC). Previously, there were continuous organisational conflicts between the KBC and the MIC regarding which government organisation would have jurisdiction over regulatory and developmental policies for the broadcasting and telecommunications industries (Rhee, 2016). The two agencies had repeatedly clashed over the regulation of converged services, as much as involved industries did. The existing MIC was abolished despite opposition from telecommunications business firms, and was divided into other government organisations. The KCC replaced the existing quasi-independent regulatory agency, the Korean Telecommunications Commission (KTC) and the KBC, as well as took over the regulatory policy role of the MIC (Korea ET News, 17 January 2008, cited in Rhee, 2016)

The purposes of the KCC, as the regulator of broadcasting and telecommunications, were to respond to the exigencies of convergence proactively; guarantee freedom of broadcasting and



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protect the public interest; ensure balanced growth between broadcasting and telecommunications so as to strengthen the international competitiveness of both local industries; protect the rights and interests of the public; and enhance public welfare through maintaining the KCC's independence (KCC, 2012). A number of laws apply to the operation of the KCC, including its founding *Act on the Establishment and Operation of the Korea Communications Commission*, the *Framework Act on the Development of Broadcasting and Communications*, the *Broadcasting Act* and the *Korea Educational Broadcasting System Act*, the *Telecommunications Business Act* and the *Act on Promotion of Information and Communications Network Utilisation and Information Protection*, and the *Radio Waves Act*.

In Korea, the privatisation of incumbent telecommunications operator Korea Telecom began in 1993 and concluded in 2002. Simultaneously, the government also reorganised the ownership structures of the cable industry. When cable operations began in 1995, state-owned incumbent telecommunications operator Korea Telecom also owned one of the two largest cable network operators. The owner of the other large cable network was Powercomm, also a government-owned company which operated the communications network for KEPCO, the Korean Electric Power Corporation. But the government kept separate the ownership, operation, and programming functions. KT and Powercomm owned the networks, but were not permitted to provide services over them. Other companies, not permitted to own the underlying infrastructure, provided video and, later on, Internet services, over the cable network. The earliest providers of broadband service in Korea — Thrunet and Hanaro — leased cable network from Powercomm.

After the privatisation of KT, the structural separation rules were relaxed and Korea Telecom's cable network was sold to cable service providers (Lee, 2002). Due to the presidential election and consequent reorganisation of the government in 2013, the government agencies responsible for overseeing and helping to manage the ICT industry were changed from the KCC, the Ministry of Public Administration and Security (MOPAS) and the Ministry of Knowledge and Economy (MKE) to the KCC, the Ministry of Science, ICT and Future Planning (MSIP), and the Ministry of Security and Public Administration (MSPA). Even though the Korean government established a unified independent regulatory agency, the KCC, the tasks and accountabilities were assigned to multiple parties leading to state-led regulatory governance, again failing to achieve market-led regulatory governance (Rhee, 2016).

## Changes in policies

While Korean efforts to build broadband infrastructure began in the late 1990s, the effort to develop an overarching ground for informatisation and advanced ICTs started much earlier. A legislative basis for Korea's drive to create an information society was laid by the Basic Act



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on Informatisation Promotion (BAIP) of 1995. This paved the way for dynamic growth in the information technology sector. In line with the provisions of the Act, a master plan was drawn up for the construction of the Korean Information Infrastructure (KII) (NCA, 1996).

*Korea Information Infrastructure (KII)* – The Korea Information Infrastructure (KII) project may be the most prominent example worldwide for governmental activities in furthering broadband deployment. Since the mid-1990s, Korean policy has been to build a "knowledge-based society" based on a high-speed telecommunications infrastructure.

The "*Framework Act on Informatisation Promotion"* was passed in 1995 to drive the KII project (Picot & Wernick, 2007). The main objective of the Korea Information Infrastructure-Government (KII-G) project was to construct a backbone network. From 1995 to 2000, a nationwide backbone and ATM switched networks were constructed. An optical transmission network comprising a 155 Mbps – 40 Gbps backbone network was established in 144 cities, with the goal of eventually upgrading this to Tera-bps (Lee & Chan-Olmsted, 2004). Facility-based service providers were given funding at preferential rates to build up infrastructure in rural areas and small cities (Choudrie & Lee, 2004). Another form of provision was the granting of public money in the form of prepayment for public services.

In 1996, the objectives of the KII project were revised as follows. First, the project's focus shifted from the "network" to the "infrastructure." Second, based on analysis of the outcomes and problems from the implementation during the first year, the Master Plan was placed on a more substantial footing. In order to help the public and industry gain a better understanding of the project, it was reorganised into separate sectors involving construction of the information superhighway, technology development, application services, pilot project and international cooperation. To attract private capital to the KII, some areas of the project were opened to private participation, and the scope of public tenders was expanded. Priority were given to consortia of small and medium enterprises seeking to participate in the project (NCA, 1996).

Between July 1998 and April 1999, a number of laws were enacted or revised to create a new environment for the nation's informatisation, including laws to promote deployment of the public sector informatisation, and accelerate the informatisation of the private sector. Laws were passed on digital signatures and e-commerce, and to require the appointment of Chief Information Officers (CIOs) for each branch of the central and local governments, who would coordinate the implementation state informatisation projects.

The KII-G was accompanied by the Korea Information Infrastructure-Public (KII-P) and the Korea Information Infrastructure-Testbed (KII-T). KII-P is intended for home and business and aims to offer users interactive broadband multimedia information services, while KII-T is



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utilised by research institutes and universities and jointly invested in by the government and private carriers.

***Cyber Korea 21*** – In late 1999, in the backdrop of the Asian Economic Crisis, Korea implemented the Cyber Korea 21 Initiative as the blueprint for a twenty-first information society (Shin & Kweon, 2011). The main objectives of the project were manifold: to increase the GDP share of knowledge-based industries to the level of OECD member countries, to create an advanced knowledge-based society in Korea by 2002; to reform government, business corporations and the general public through expedited application of the information technology; and last but not least, to overcome the then economic turmoil by expediting the overall restructuring of society, while promoting investment to create sufficient new jobs.

Many of these objectives were not new, since the Cyber Korea 21 plan was a revision of the "Master Plan Informatisation Promotion" that was first formulated in June 1996. An innovative aspect of the Cyber Korea 21 plan however was the government's promotional policies to encourage demand for Internet use among the population. These programs target groups that are not usually involved in Internet and include IT literacy and particularly Internet literacy programs (Lee, O'Keefe, & Yun, 2003). The most prominent example within this context is the "ten million people Internet Education" project started in June 2000 (Picot & Wernick, 2007).

***e-Korea Vision 2006*** – After the unsuccessful Cyber Korea 21 initiative, e-Korea Vision 2006 was launched in April 2002 to continue the efforts of shaping the nation's future IT direction. Realising the weakness of the previous plan, e-Korea Vision significantly improved upon Cyber Korea 21. Since March 2001, guidelines were established through the participation of experts and research institutions, as well as the consultation of relevant ministries. The vision focused on promoting national informatisation, advancing the information infrastructure, and strengthening international cooperation. Strategies included building ICT capacity, advancing e-commerce, investing in the public sector, transforming the legal system, ensuring safety and reliability, and promoting the IT industry (Shin & Kweon, 2011).

According to the e-Korea Vision plan, all households in Korea regardless of income, age, or region, should have access to a super high-speed internet line transmitting at least 1 Mbps. With the advent of fast, universal online access, the program was designed to increase the number of people participating in lifelong learning to the average level of the OECD member states.

Despite the ambitious goal, the strategies for the project were not able to keep pace with changes in the social and cultural environment of IT applications. Both Cyber Korea 21 and e-Korea Vision were deemed as means to boost the economy, and infrastructure was viewed as



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a simple tool for such an industrial policy goal. The e-Korea Vision program was halted when the Ministry of Information and Communication (MIC) launched a new broadband project, IT839, in 2004.

***IT839 Strategy*** – Korea had become more aggressive in the planning and designing of IT, telecom, and internet projects by the mid-2000s. In February 2004, the MIC announced a new program called the IT839 Strategy, which was initiated to give new momentum to the economy after broadband (KCC, 2010). It was the first full-fledged NII project for Korea, since it laid out a roadmap for both the development of a technological infrastructure and for building an information capability. The government came to the realisation that infrastructure would be ineffective without proper applications. In light of this, IT839 called for greater attention to be paid toward developing digital content and services. It is dubbed 839 because within its three pillars, there are eight IT services, three infrastructures, and nine new growth engines. IT839 was designed to allow a myriad of current IT services and products to be consolidated and simplified into eight new services, each having strategic and practical value. The underlying tenet of the IT839 project was to generate investment in major industrial sectors by deploying new infrastructure and applications, in turn helping to develop important new growth engines.

Compared to previous projects, which served as little more than technical roadmaps, IT839 had a more comprehensive view, focusing on interconnectivity among infrastructure, services, and applications. Previous focus has been on simple IT investment, with a strategy centred on the outcomes and benefits of individual projects.

However, IT839 showed a strong inclination towards industrial policy. The program focused on industrial policies targeting specific economic sectors, based on private sector investment and production, with government playing a decisive role. For example, researchers commonly discuss which role of KII could be better regarding market integration or market segregation. This tradition continued with the IT839 project, creating similar problems of over-supply.

***Ubiquitous-IT839 Strategy*** – In 2006, the IT839 Strategy was partially revised as the ubiquitous- IT839 (u-IT839) Strategy. For instance, internet phone service was excluded, while other services were newly added. U-IT839 referred to an IT and communications environment where people could enjoy access anytime to high-speed networks and enhanced information services, regardless of location, through a ubiquitous computing network. With u-IT839, Korea hoped to become the world's first country to create a genuine ubiquitous information society. However, as with all previous projects, questions remained. Two examples of such questions include whether the resulting infrastructure and applications came out of the contextual relationship with market and society, as opposed to co-evolving



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with ever-changing contexts, and how IT839 would bring change to the lifestyles of Korean citizens. Unfortunately, at this time, the answers are still missing in the blueprint.

***Cyber-Infrastructure*** – Toward the end of the decade, Korea began to invest in cyberinfrastructure (CI) as part of a strategy to enhance broadband (Shin & Kweon, 2011). With the Park administration, the emphasis in government policy changed to the formation of a 'job-oriented creative economy': increasing growth potential and creating good jobs through convergence between industries and new and advanced technologies; creating the ecosystem for a creative economy, reinforcing growth engines for job creation, making Small and Medium Enterprises (SMEs) key players in the creative economy, development of science and technology through ingenuity and innovation, establishment of a disciplined market economic order, and operating the economy to support growth.

## Industry changes, regulatory structure and policies

In this section, we return to the main objective of the paper, which was to study the stages in the evolution of the Korean telecommunications system, in terms of the industry changes, regulatory structures and policies that characterised each period. The central argument is that changes in industry, regulatory structure and policies "reciprocally shape" and affect each other in each period. As long as these three elements are compatible and in balance, the system is stable and continues, but if one of them changes, all three parts will soon become stressed, and a new system comes into place. We illustrate this with the data presented in Section 4.

As shown in Table 1 above, four general periods in the Korean telecommunications system can be identified, the transition points between which are incidentally marked by a change in the regulatory system. We discuss each of these periods in turn. The key points in each period are summarised in Table 2 below.

### Period 1 (1995 - 2004)

In 1995, the Korean telecommunication system was dominated by an oligopoly of mostly state-owned telecommunications operators. The Public Switched Telecommunications Network (PSTN) was dominated by KT, Hanaro Telecom and LG Dacom. KT and Powercomm, another state-owned telecom operator, were the largest cable system operators; however, these were banned from offering services to customers, resulting in companies such as Hanaro and Thrunet becoming the largest cable-based content and service providers. The regulator and policy-maker were a government ministry, the MIC. Although the Korean Telecommunications Commission (KTC) as a quasi-independent regulatory agency existed since 1996, it was guided and controlled by the ministry. Thus, the MIC continued to retain



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centralised regulatory authority and discretion in business licensing as well as merger approval (Rhee, 2016).

The policies during this period were mostly aimed at infrastructure deployment. The closed oligopoly system, and the government ownership of carriers, enabled the government to implement a number of separate schemes to increase network penetration: the Korea Information Infrastructure plan, and the Cyber Korea 21 plan were both implemented during this period, and were illustrative of this emphasis on network deployment and demand stimulation. Demonstrating the reciprocal nature of policy and environment, the lack of convergence and inter-platform competition at the beginning of this period helped the government to implement its infrastructure deployment plans, since the state-owned carriers had greater investible surpluses. In fact, it might be argued that it was only the lack of competition (an industry condition) that permitted specific policies, such as infrastructure investment, even in low-population density parts of the country where the immediate returns on investments were not expected to be positive.

But by the end of the period, the compatibility and balance between industry conditions, regulatory structure and policies had been eroded. The privatisation of KT, initiated during the Asian Economic Crisis, deprived the government of a vital instrument of its infrastructure deployment plans. Moreover, technological platforms of access such as DSL, cable modem, Ethernet-LANs (for apartments), Broadband Wireless Local Loop (BWLL), FTTH, Satellite, Wireless LAN, Power Line Communication (PLC), High Speed Downlink Packet Access (HSDPA), WiBro, and Long Term Evolution (LTE) had proliferated, competing away the investible surpluses from all carriers. An additional factor was the very success of infrastructure growth: with Internet users exceeding 30 million (or 70% of the national population) and Korea achieving no. 1 status in per capita broadband penetration in the 2001 OECD rankings, the rationale for infrastructure deployment as a government policy goal was no longer as important or pressing.

It is significant that there was a subtle change of emphasis in the broadband plans announced by the government in the latter part of this period. The e-Korea Vision 2006 document (2002), the BcN pilot project (2002), and the Broadband IT Korea Vision 2007 plan (2003) were all formulated in the latter part of this period. All three moved away from network deployment as a sole policy goal, additionally emphasising the development of ICT capabilities, informatisation of public and private entities, and competitiveness. In a clear instance of "reciprocal shaping," the successful implementation of a policy (namely network investments), resulted in a change in the industrial environment (widespread broadband availability), leading to a recalibration of policy objectives towards ICT capabilities and informatisation.



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## Period 2 (2004 - 2008)

The critical marker of this period was the proliferation and enormous growth in access technologies, such as BWLL, FTTH, Satellite, Wireless LAN, PLC, HSDPA, WiBro, and LTE. IP-based services too grew enormously, with nine facilities-based service providers given a license for VoIP services in 2005-2006. It is also indicative of this period that WiBro, a home-grown wireless broadband standard received IEEE certification in 2005, making a Korean innovation the global standard in a key growth area for broadband deployment.

It is therefore unsurprising that the lead agency for ICT policy during this period was the Ministry of Science and Technology. The key policy documents produced during this period, such as the "IT839 Strategy" and the "u-IT839 Strategy" focused on developing digital content and services, and the synergistic development of infrastructures, services and applications.

**Table 2 Periods in Korean Telecommunications**

| | Industry structure | Regulatory structure | Major/typical policy document | What caused crisis/transition to next period? |
|---|---|---|---|---|
| Period 1 (1995 – 2004) | - In the beginning of period, oligopoly in PSTN; cross- ownership of telecom and cable by KT and Hanaro<br>- by the end of the period, privatisation of KT; divestiture of cable properties of KT and Hanaro; enormous growth in broadband; emergence of commercial ISPs, mobile broadband and Mobile Virtual Network Operators (MVNOs) | Ministry of Info & Communication (MIC) (founded in 1994) | 1995 - National Information Super Highway master plan<br>- Enactment of Framework Act on Informatisation Promotion<br>1999 -Development of "Cyber Korea 21"<br>2002 - Development of "e-Korea Vision 2006"<br>- Start of BcN pilot project<br>2003 - Development of "Broadband IT Korea Vision 2007" | Achievement of targeted goals for network penetration; privatisation of carriers; emergence of platform competition |
| Period 2 (2004 – 2008) | - Interplatform competition<br>- Multiplying broadband platforms: DSL, Cable Modem, Ethernet-LAN, BWLL, FTTH, Satellite, Wireless LAN, PLC, HSDPA, WiBro, LTE | Ministry of Info & Communication (MIC)/ Ministry of Science and Technology | 2004 -Development of "IT839 Strategy"<br>-Prepare BcN implementation plan<br>2006 -Development of "u-Korea basic plan"<br>-Development of "u-IT839 Strategy" | - Convergence of broadcasting and telecom; establishment of KCC |
| Period 3 (2008 – 2013) | - Major M&As result in triangular competition between KT, SK, LG<br>- Phenomenal growth in services (LTE mobile phones, VoIP, value added services and content, MIM, mVoIP) | Korean Comm. Commission/ Ministry of Science, ICT and Future Planning | 2008 -Establishment of the Korean Communications Commission<br>2011 -Giga Internet commercialisation plan<br>-10 Gbps by 2020 | - with industry consolidation, reduction of access services to commodity business; shift of emphasis to services |



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| | | | | | |
|---|---|---|---|---|---|
| Period 4 (2013-onwards) | - MIM, mVoIP, SMS fast expanding<br>- Exponential growth of value added content services: Online gaming, online advertising, etc.<br>-The importance of content and IP platforms increasing | Korean Comm. Commission/ Ministry of Science, ICT and Future Planning | 2013 | - Creative economy: The Park Geun-hye Administration's blueprint for creative economy | - According to the Park Geun-hye administration's main vision, the Ministry of Science, ICT and Future Planning was established in 2013 for facilitating the collaboration of science technology and Information and Communication Technologies (ICT). |

Source: NIA (2015), KISA (2013), KISDI (2012)

However, this period was also marked by rising technological convergence, and increasing tension between the MIC and the KBC, respectively the regulators for telecommunications and broadcasting, over jurisdictional issues. The two agencies repeatedly clashed over the regulation of converged services, as much as involved industries did. Convergence required a re-evaluation of the fundamental basis of regulation across broadcasting and telecommunications. Therefore, by 2008, a new regulator had been established the KCC, with jurisdiction over both telecommunications and broadcasting. The creation of the KCC marked the transition to a new period in Korean telecommunications.

However, before it could address the primary task that motivated its formation, the KCC was called on to resolve political conflicts within legacy technologies. The ruling party, the Lee Myung Bak administration, passed a controversial media bill despite opposition from non-governmental organisations and other political parties, and relaxed traditional restrictions on newspaper–broadcasting cross-ownership. As a result, KCC granted licenses to the four major conservative newspapers. The ruling party restructured the existing left-oriented structure of terrestrial broadcasting established under previous governments – the Kim Dae Jung and the Ro Moo Hyun regime and established a right-oriented broadcasting structure that could coincide with government policies (Rhee, 2016).

## Period 3 (2008 - 2013)

The major industry development during this period was a wave of mergers and acquisition activity between the main players in the telecommunications and broadband sector. SK Telecom and Hanaro Telecom merged in 2008, KT and KTF, SK Broadband and SK Network, and LG Telecom, LG Dacom and LG Powercomm in 2009. Due to these mergers, the formerly fragmented broadband industry was consolidated into triangular competition between KT, SK, and LG. Changed in the government's merger approval policy permitted these mergers to go forward (Rhee, 2016), another instance where policy choices shaped industry developments.

Increasing competitive pressures due to convergence and interplatform competition may have been instrumental in inducing these mergers, as well as the realisation that access services had



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been reduced to a commodity business. Indicative of this was the fact that prices for data transport fell remarkably in Korea during this period: price per 1 Mbps of data was only 27% of the OECD average. Profits were instead migrating to value-added services and content. Indeed a dominant characteristic of the industry during this period was the phenomenal growth in value added services and content markets. Services such as Naver, Daum, NCSoft, Gmarket, KakaoTalk, etc. increased 47-fold in the 15 years since 1996, becoming leading engine for network growth. Mobile Instant Messaging (MIM) emerged with the increasing penetration of smartphones: for example, KakaoTalk. Mobile Voice over Internet Protocol (mVoIP) services too emerged, such as VoiceTalk (Kakao), Mypeople (Daum), Line (NHN), Viber, Tango, etc.

The policies announced during this period were generally platform-independent. Policies such as the Mid- Long- Term Broadcasting Communication Network Development Plan, the Mobile Internet Promotion Plan (Phases 1 & 2), and the Cloud Computing Promotion Plan, and the launching of integrated Korea Internet & Security Agency all aimed at the promotion of services and applications, preserving neutrality between platforms. Two explanations for this emphasis on platform-neutrality may be put forward: first, the convergence of technologies leads to platform-neutral regulations (namely, industry developments shaping policy); and second, the establishment of a converged regulator, the KCC, with jurisdiction over both broadcasting and telecommunications led to platform-neutral policies (regulatory structure shaping policy).[1] Interestingly, the formation of the KCC itself was a result of industry developments: the emergence of new technologies and the resulting competition leading to the demand for a new regulatory system (industry developments shaping regulatory structure). The framing of platform-independent policies, was thus the result of the "reciprocal shaping" of industry developments and regulatory structures, which provides further evidence for the main thesis of this paper.

## Period 4 (2013 - date)

With ubiquitous networking and the prerequisites for an information society established, Korea in this period has embarked on the planning stage for a "creative economy." Currently, Korea is witnessing exponential growth in value added content services, online gaming and online advertising. Government programs intend to capitalise on these trends to unleash the innovative capacity of SMEs utilising new and advanced information technologies. The KCC focused on broadcasting policy rather than telecommunications policy under the Lee Myung Bak administration (2008–2012). It was criticised as being passive and being ineffective in regulating and developing telecommunications market. Aptly, the Ministry of Science, ICT and Future Planning was created and mandated to deal with both developmental and regulatory policies as a successor to the former MIC under the new Park Geun-Hye administration



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(Rhee, 2016). Thus, a duopoly system between a government ministry and the KCC was created in the area of the information and telecommunications industry. A most recent study (Shin, 2016), however, suggests the MSIP has a considerable influence on existing telecommunication services by licensing common carriers and ISPs, and the KCC plays as "an acting agency of the MSIP."

## Conclusions and lessons

This paper was based on the premise that the industrial environment (specifically the technological and business changes), regulatory structures and policies reciprocally shape each other in a telecommunications system. Policy responses to environmental challenges are at least partially dependent on the structure of governmental decision-making bodies, the identities and relative powers of stakeholders, and the formal rules and informal conventions governing their interactions. How ministries and regulatory bodies are designed and put together affect both their policy outlooks and managerial capabilities, in turn affecting their policy output. In turn, policies have the ability to shape firm behaviour and therefore industry structure: for example, mergers and acquisitions guidelines, competition rules and interconnection all have the ability to shape industry structure. To complete the cycle, regulatory structure themselves are conditioned on and reflective of changes in industry – for example, technological convergence and the resulting blurring of lines between industries creates pressure for the creation of multi-sector regulatory bodies. This "reciprocal shaping" is thus critically important to the responses of governments to the emerging broadband ecosystem. Indeed, the information in the preceding section demonstrates that in the Korean case, these three factors did influence each other, as expected by the model.

Koreans' affinity for new technologies created more rapid diffusion of many telecoms, causing the Korean government to confront challenges earlier than other countries. But government has also been more pro-active, and anticipatory of changes in the industry. Industrial policy orientation promotes an anticipatory "planning" model of policy-making, rather than a "reactive mode" more common in the US. As one seeks to anticipate the contours of the emerging broadband ecosystem in the United States, it is thus instructive to observe similar changes in Korea.

A study of Korea's responses to convergence and the emergence of the broadband ecosystem reveals the following lessons. First, the Korean government has always regarded its approach to broadband as a part of industrial policy, recognising the potential of broadband to spur economic activity and promote innovation and knowledge development. Second, proactive government policies on the rollout of broadband infrastructures have the potential to speed up penetration, and achieve performance targets in a shorter period of time. Third, the Korean



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experience also demonstrates, however, that increasing penetration is not sufficient by itself, but a host of other measures including demand stimulation and service development may be necessary to realise the full advantages of broadband. Fourth, another requirement is for enabling legislation in related areas such as digital signatures, privacy protection, and consumer rights. The Korean government, after the initial emphasis on network growth in Period 1, shifted to the promotion of services and applications.

Finally, the Korean government also proved willing to make the necessary course corrections when initiatives or decision processes proved inadequate to the tasks at hand. A key example is the reconstitution of the KBC and the MIC, regulators with authority over broadcasting and telecommunications respectively, into a single regulatory body the KCC, with multisector jurisdiction. Since convergence is obliterating the differences between the previous regulatory and operational "silos," it makes more sense to have a unified regulator for the convergent marketplace.

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## Endnotes

[1] We thank an anonymous reviewer for pointing out the former possibility.

# Towards Customer Leadership

## Building a Sales Force in Telecom Australia in the 1980's

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**Abstract:** Today Australia's telecommunications market is strongly contested. Competitors with highly skilled, experienced and focused marketing teams battle for market position, market share and profit growth.

This has not always been so.

Telecom Australia was established in 1975 as the government-owned national telecommunications carrier. Protected by regulated monopolies for network services and customer premises equipment, Telecom held perhaps 90% of the market. The predominantly engineering culture believed that it only needed a nominal marketing department and no sales force.

In 1981 the monopolies were threatened. Telecom decided that it needed a sales force – quickly.

This is a brief story of the building of that sales force over the first five years.

In a government-owned business steeped in the public service culture, strongly influenced by the public service unions, and under a Labor Government it was a grinding task.

After five years the "subscribers" were more widely addressed and treated as "customers" and the sales force was operational. It was to be at least another six years before the sales force made the customers the focus of the business, and the skills, experience, management and culture of the force could match serious competitors in a de-regulated market.

**Keywords**: telecommunications; Telecom; sales,

## Introduction

The Australian Telecommunications Commission (Telecom) was established in June, 1975, as a statutory authority owned by the Commonwealth Government. It was required to "best meet the social, industrial and commercial needs of the Australian people for telecommunications services" and **'make those services available throughout Australia for all people who reasonably required those services'** including the special needs for telecommunications of those who resided or carried on business outside the cities."

The Act introduced the concept of a “Universal Service” – the provision of a baseline telephone service to every resident in the nation to a minimum quality of service at affordable nationwide rates. This meant that rates charged for the telephone service would be the same for customers in urban, rural and outback areas, even though the telephone service outside the cities and major towns operated at a loss. To finance the cross-subsidy arrangement, regulated monopolies enjoyed by the Post Master General's Department (PMG) – building and operating the national telecommunications network and the sale, rental and maintenance of certain customer premises equipment – were continued for Telecom. More transparent forms of funding the cross-subsidy were overlooked, the main aim appearing to be to reassure Telecom's management, staff and unions so as to achieve a smooth transition from the PMG to Telecom.

The new Telecom was a massive business. It was the largest capital enterprise in the country, with assets almost double those of Australia’s biggest private company, BHP. In the first year revenue was $1.4 billion, profit was $152 million and there were over 87,000 employees.

## Disclosure

This is not an academic paper; it is a brief history which will be a curiosity to today's marketing and sales professionals.

The paper is supported by a number of records of the period, including business plans, business cases, and trading statements, as listed under "References". The records are incomplete but are sufficient to support the points made. A number of these records no longer exist or are not easily accessible, such as those in the archives of the Australian Telecommunications Commission and Telstra.

Opinions and judgments are mine unless otherwise stated. Assessments of Telecom are expressed using standard private sector criteria including growth, market share, customer service and profit, rather than using public service criteria.

## The Establishment of Telecom in 1975

In 1974 the Vernon Royal Commission of Inquiry into the Australian Post Office (the PMG) recommended to the Whitlam Labor Government that the PMG be split into two businesses, the Australian Telecommunications Commission (Telecom Australia) and the Australian Postal Commission (Australia Post). The two businesses were to be operated on "commercial business principles", with personnel and other employment policies, including industrial relations, suited to the new businesses and independent of the Public Service Board.

The new Telecom was designed and implemented in 1975 by senior managers transferring from the PMG. A number of key recommendations of the Vernon Report were not



http://doi.org/10.18080/ajtde.v4n4.69

implemented: for example, the new district organisation was based on state boundaries rather than on commercial principles; the one senior manager appointed from the private sector had little commercial experience; and the personnel and other employment policies, processes, and culture of the public service were retained.

From 1975 until 1989, except for a brief period, there was only one senior manager in Telecom who had a significant commercial, private sector experience.

The resulting business was minimally commercial in organisation, skills, focus, priorities and processes. Telecom, with its monopolies, union constraints and public sector legacy, preferred change on its own terms with minimal risk; it was familiar with managed technical change but not commercial change.

This background is crucial to understanding Telecom's reaction to the introduction of a sales force.

## Telecom in 1982

In 1982 Telecom's Annual Report stated that top management was pleased with its progress in the first six years.

The business was booming; the annual growth rate from 1975 ranged from 8 to 13%, 12% in the last year to $3.08 billion. Telephone services had increased from 3.7 million to 5.3 million. 80% of homes in Australia now had phones, up from 62% in 1975.

In 1975 the public network primarily carried voice traffic with a low volume of data traffic, but by 1982 a major data market began to emerge. Government and business networks were growing in size and complexity. Since 1975 Telecom's Datel modem services had "rocketed" from 9,000 to 56,000, but many more new digital connections were in operation. A new mobile telephone service had been launched in 1981 and two new data services – the Digital Data Service (DDS) and AUSTPAC – would be launched later in 1982. The use of facsimile machines was growing, approaching 500,000 in operation.

There had been some improvement in the quality of customer service. Access charges and local and long distance call rates for the telephone service had been held constant for six years, but there were increases during the last year for all but the longer distance calls. Productivity improvements had maintained staff numbers roughly constant at 88,000.

In an internal information paper – “Management of Telecom Australia in the Early 1980’s” – the Deputy Chief General Manager (DCGM) in late 1980 assessed that "Telecom needs to shift its production orientation towards a market orientation and to do this implies an increase of marketing expertise and marketing personnel, [some will be] trained and experienced internal managers but external recruitment will also be necessary”.



http://doi.org/10.18080/ajtde.v4n4.69

Apparently, it had taken five years for Telecom's management to appreciate what the Vernon Commission recommended: that Telecom should adopt a marketing and commercial approach, supported by recruiting from outside the relevant management skills and experience. To date Telecom had employed none of these people and minimal such internal training was done.

By 1981 there was mounting pressure for competition in Australia's telecommunications market and a strong prospect that Telecom could lose some or all of its monopolies. A strong marketing team and powerful sales force could be needed soon.

## The Mounting Pressure for Competition

Despite the confidence in Telecom's 1982 Annual Report there were strong calls from a number of sources for de-regulation of the Australian telecommunications market. The main pressures were from customers, potential service providers and changes in technology. Briefly these included:

- since 1975 the network monopoly was being eroded by governments. An increasing number of government organisations – health, education, railways, power, gas, police and emergency services – were permitted to operate telecommunications networks for their own use, provided they did not carry traffic for others or for the public at large,
- large business customers, notably those in the media, telecommunications and computer industries, were demanding an extensive easing of Telecom's network monopolies so that they could offer public services to customers through own carriage, (Telecom) leased lines and "value added" services, including the emerging videotex type of services.
- since 1975 the number, size and complexity of private networks using Telecom's leased lines and the public network had more than trebled, increasing the potential rewards to business of network de-regulation.
- although Telecom was planning to launch new digital and packet switched networks during 1982, large business customers believed the timetable for the introduction and deployment of these and other emerging services was too slow.
- many large business customers were impatient with the limited capabilities of the Datel services introduced in 1969 and highly critical of Telecom's introduction of the Common Data Network (CUDN), a technical and commercial failure, which Telecom closed down in 1977.



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- a number of large businesses formed the Australian Equipment Suppliers Association in 1979 which demanded a public data network with private sector involvement. In 1980 Business Telecommunications Services (BTS) was launched, a consortium of 12 diverse and large businesses including BHP, IBM and AMP, ostensibly as a research group, but with the real intention of providing advanced telecommunications services for Australian business.
- trends in network traffic were lowering the cost of entry for competitors to attack as much as 70% of Telecom's revenue from public network services. Traffic was becoming more concentrated on the 'east coast spine' - the links between the three largest metropolitan centres, Sydney, Melbourne and Brisbane, and with Canberra. Most overseas traffic travelled through a handful of undersea cables, concentrating at the main terminations in Sydney and Melbourne.
- emerging technologies, particularly digitisation, optic fibre and computer controlled exchanges, offered a wider range of services and significantly lowered capital and operating costs. In the USA, both AT&T and GTE began deploying optic fibre from the late 1970s while Telecom was still planning for this in Australia towards the mid-1980s.
- many in the government, commerce and industry were incensed at the immense, unprecedented disruption to the public network during 1978 caused by the Australian Telecommunications Employees Association (ATEA), and the extraordinary vulnerability of the network to industrial action. The action was aggressive and massively damaging, causing some areas of the network to approach collapse within one week with the crisis quickly spreading across the nation.
- a high proportion of customers, particularly large business customers, regarded Telecom's provision and restoring of services as slow. The most common complaints were Telecom's "lack of responsiveness" to user concerns and an "unwillingness to concede that users had real problems".
- the position of Telecom as both service provider and regulator for the "permitted attachment" policy was under increasing criticism. This policy, managed by Telecom, required that anyone wanting to attach a line or equipment to the network could only do so with Telecom's permission. Telecom also made by-laws which set standards for any equipment or services to be attached to its network. This limited and delayed the range of equipment available to the market at a time



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when the capabilities of telephones, small business systems and PABX's were rapidly expanding.

- the private sector was pressing for an independent regulator and the removal of Telecom's monopoly in customer premises
- videotext services were being introduced in France (Minitel) and the UK (Prestel) during 1980. Telecom's proposal to introduce a national service – which implied a monopoly – was strongly opposed by the private sector.
- around the world there was a widespread trend for de-regulation of national telecommunications. The Uruguay Round of the General Agreement on Tariffs and Trade (GATT) negotiations, which included trade in services, added to the pressure for liberalisation of national telecommunications services.

In short, in the six years since Telecom was formed, not only had the market changed radically, but technology and other factors, including industrial action, seemed to make the relaxation of Telecom's network and permitted attachments monopolies almost inevitable.

## The Davidson Inquiry

In 1981 the Fraser Coalition Government commissioned an inquiry into "Telecommunications Services in Australia" – the Davidson Inquiry – to determine the desired level of involvement of the private sector in the delivery of existing and proposed telecommunications services, including "value added" services.

The following year Davidson recommended far-reaching reforms in Australia's telecommunications market. The four most important were: introducing network competition; the interconnection of private networks with the public network; quantifying and funding the cross subsidy of the country customers by metropolitan customers; and introducing full competition for the marketing and maintenance in the terminal and value added services markets. An independent regulator would approve attachments to the network.

The Davidson report raised Telecom's worst fears. Telecom had minimal commercial capability and no sales capability. Competition, depending on the form and timetable, foreshadowed a rapid decline in market share. Deregulation of the telecommunications market in the USA indicated that Telecom could conceivably lose well over 30% of its market share within a decade – a revenue loss of over $3 billion in year 10.

In March, 1983, the incoming Hawke Labor Government shelved almost all of Davidson's recommendations except for some relaxation of the regulation in the marketing, connection



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and maintenance of terminals such as telephones, small business systems, PABX's, and modems. This at least provided some time for Telecom to become more competitive.

## Telecom's Move towards Marketing

While the Davidson Inquiry was in progress Telecom created a new Commercial Services Department to strengthen marketing in the business, and appointed Greg Crew as the General Manager.

Crew was one of several engineering graduates recruited through the PMG's cadetship program, introduced to the business through the Research Laboratories, developed experience in the Engineering stream, and became considered as a candidate for higher management; others included Laurie Mackechnie and Mel Ward.

Crew saw the need for a stronger commercial function in Telecom, particularly if Davidson recommended partial or widespread de-regulation. Crew had noted the strong business strategy, planning, product management, marketing, sales and management concepts introduced in Telecom's directory publishing business and the resulting commercial success. He extended product management across the customer premises equipment range and obtained corporate approval to develop a national sales force.

## The Rationale for a Sales Force

With no sales capability and the possibility of de-regulation, there were at least four compelling pressures for a sales force:

- While the monopolies continued, the sales force would provide higher, more reliable revenue growth. This was relevant because Telecom appeared likely to miss its revenue targets for the next two years - 1981/83 - by at least $40 million each year due to a change in economic conditions. A sales force would at least ease, if not avoid this.
- The sales force was profitable on an incremental basis in a monopoly market; in 1983/84, the first full year of operation, the sales force was estimated to generate almost $600 million in additional revenue for a marginal cost of about $550 million.
- Very crude estimates of the "business at risk" or "avoided revenue loss" in a competitive market were up to $400 million in the first year rising to perhaps $1 billion in year five, depending on the nature, extent and timing of de-regulation.



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- Revenue from customer premises equipment sales, installation and maintenance would likely be lost first, followed by revenue from long distance and international calls, and private networks.
- The sales force in operation would accelerate Telecom towards a "real" rather than token customer focus and service culture, and press for faster, more focused product and service innovation.

It didn't matter which rationale was used; as long as the modelling assumptions were reasonable a sales force could be economically justified. The only issues to be decided were the quality, scale and timing of the deployment of the sales force. The quality of people and scale of the sales force affected both revenue and operating costs, and the timing was determined by practical implementation factors.

## Establishing Credibility through AT&T

At that time a characteristic of Telecom's top managers was that they were sceptical about major proposals from the lower ranks for non-engineering projects, and strongly suspicious about any proposal with which they had no experience – such as a sales force – unless it was supported by a credible consultant.

Consultants operating in Australia were unsatisfactory; the top end were too theoretical and had little direct experience with the task, and others who might be more practical lacked credibility in doing the job and gaining acceptance in Telecom.

The obvious choice was a telecommunication business in the USA which had experience in tackling deregulation and the emerging competition. AT&T was by far the most credible candidate. At this time AT&T was negotiating with the U.S. government about an anti-trust action which would result in a major increase in competition in the US telecommunications market. At the same time AT&T was strengthening its marketing and sales forces in preparation for that inevitable, more intense competition. The new market structure in the USA was launched in January, 1984.

AT&T International was selected as the consultant, not only because it would provide the best outcome, but because the involvement of AT&T provided the best prospect of acceptance by Telecom for implementation. AT&T was the acknowledged leader in telecommunications operations, research and manufacturing in the world's telecommunications community. It was successful in the most competitive market in the world in customer premises equipment, network equipment, long-distance carriage and data networks. AT&T's assets were eight times those of Telecom. AT&T had unmatchable credibility, and most of the executives in Telecom conceded this.



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When AT&T inevitably found that Telecom's customer service or any other area of performance was unsatisfactory and made a recommendation, Telecom's "engineering cult" was in no position to reject it either factually, philosophically or culturally.

AT&T was engaged to work with a small, new Telecom sales team to produce a business strategy and related implementation plan. In addition, at no cost, AT&T would provide access to all sales documentation, processes, systems and software relating to the AT&T sales forces operating in the USA. This minimised the need to re-invent these materials in Australia and reduced the time needed to establish Telecom's sales force.

Two AT&T International consultants and four Telecom people worked on the study:

- to assess the performance of Telecom's customer contact, sales support and order-processing staff to satisfy, throughout Australia, customer enquiries and needs for telecommunications and services,
- to recommend a national development strategy and program to improve customer service and sales performance as required.

The functions of customer contact, order processing and customer service were included, not only because of their relevance to sales, but also to satisfy Telecom's predisposition to service rather than "distasteful" sales.

## The AT&T "National Customer Service and Sales Operations Review"

The sales team report was titled the "National Customer Service & Sales Operations Review", under the brand of AT&T International, and was AT&T International's uncensored opinion.

There were no surprises, with the report stating the obvious in a way that could not be dismissed:

> "Telecom faced a step function change in the market when competition begins. To meet customer needs and hold sales against competitors, Telecom must have a competitive, nationwide sales force."

In both Headquarters and the States the team found "a passive service culture" and, apart from a small number of poorly focussed, untrained and unsupported account managers in NSW, no significant sales capability.

Any senior marketing manager in the private sector private sector would have been amused at the obvious nature of the conclusions of the report, but to Telecom's engineering and process-dominated management they were a new and unwelcome message. Briefly some of the conclusions were that, in a competitive market:



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- major new competitors will enter the telecommunications market, likely including IBM;
- the initial attack by competitors will be on large and medium customers in metropolitan areas,
- business customers will be pursued by sales persons from private enterprise and will be less inclined as a matter of course to approach Telecom for products and services,
- private enterprise sales persons will be "professional" in their approach and in many cases will be offering "industry specific" solutions to communications problems,
- Telecom's installed base of business systems and telephones will be under severe attack, and control over changeover rates will be lost,
- private enterprise phone shops will appear in prime locations,
- residential products will be available in department stores, supermarkets and specialty shops,
- customer (and private sector) participation in installation and maintenance will increase dramatically,
- price competition will occur and a wider choice of payment options will be available.

All of this will be accelerated by an increasing rate of technological change and consequently shorter product life cycles.

The key recommendations followed, all familiar to the private sector:

- Telecom's top management must commit to a corporate sales philosophy which changes the organisation from a passive service provider to an active selling enterprise, and strongly communicate this throughout the business;
- product management is currently weak and must be strengthened, particularly in business planning and "bottom up" budgeting and control;
- the sales structure across customer sectors in Headquarters, the States and the Districts is almost non-existent and must be created quickly;
- sales management and selling skills are almost non-existent across the customer sectors and in Headquarters, the States and the Districts;



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- "industry specific" sales plans must be developed for the top industries as a basis for deciding approaches to customers and allocation of accounts management resources;
- account management must be radically improved with a strong account planning and review process;
- a business sales force must be developed for business customers under the key and major customer threshold;
- a retail network must be developed to sell to the residential market, including radically improving the current Telecom shop fronts and introducing telesales persons. Too many of the existing shop fronts are poorly located and all are ineffective as sales outlets;
- an attractive sales career path must be developed to allow superior performers to progress up the sales force;
- initially, at least 20% of appointees to all sales positions must be from outside Telecom. (The "20%" was a compromise from 50% to reduce the shock);
- qualification, selection, recruitment, probation and evaluation processes must be developed to obtain the required capabilities, and develop and reward sales people;
- employment and reward systems must be developed to retain the superior performers and reward based on merit;
- sales support people and systems are needed to allow front line sale people to spend the bulk of their time with their customers, to deliver sales promises to customers, and strengthen planning, management and review of the sales force;
- a range of support measures including sales management and support systems to budget, manage and control the sales effort across the nation;
- a national training capability.

Full organisation charts were proposed for both Headquarters and the States. Detailed recommendations were made about how each of the main components of the national sales force should be developed. Interfaces between the new sales systems and Telecom's computer systems were listed with descriptions of how the sales systems would link and operate. A detailed time table was laid out for implementation.



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## The Reaction of Telecom's Management

Spurred by rumours of the outcome of the Davidson Inquiry, there was a strong consensus within the top management for an active and effective sales force **in principle**.

The Managing Director commented that he "fully supported the program and the Telecom Commission would likely wish to go faster". He warned that a "visible expression of corporate support cannot be given prior to the publication of the Davidson Inquiry Report", and that management "must not allow the sales force to appear a 'Cinderella'; "it's good for everyone in Telecom and depends on everyone to succeed". The third top manager in Telecom, the Deputy Chief General Manager, "fully supported the project . . . the sales career structure and some reasonable outside recruitment, but outside advertising must be sensible. Development actions (should be taken) with minimal external visibility".

The two departments crucial for implementation – Personnel and Industrial Relations – were also positive. The General Manager (Personnel) "didn't see any problems and his department will do what needs to be done". The General Manager (Industrial Relations) "doesn't expect sales incentive pay to be a significant problem . . . and didn't expect public service policies to be a major issue".

With the Managing Director, the Deputy Chief General Manager and the two enabling departments expressing support, it was assumed that the implementation timetable was reasonable; within two years the sales force structure and related infrastructure, and 50% of the people in the field should be operating, and within five years the completed sales force would be fully operational.

The Davidson Report was issued several months later increasing the urgency for the sales force.

In the last half of 1983 two events almost terminated the sales force project. In mid-1983, the new Hawke Labor Government rejected most of Davidson's recommendations which removed the pressure for change, and Greg Crew, the advocate for the program, left Telecom. The project continued but, with the bureaucracy and the unions reverting to "business as usual", progress was slower and much more difficult to achieve.

## AT&T Supporting Documentation & Software

A key factor in the AT&T consultancy was the provision of AT&T's sales force documentation used in the USA. This was provided free before implementation began so that adaption could commence immediately.

This included force structures; planning and management; job descriptions; selection processes; training approaches and courses; performance appraisal processes; pay and



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conditions of employment; budgeting and control; practices and procedures; and measurement and reporting. Also included was software for processes such as sales force performance management, budgeting, reporting and training. The documentation and software discs and manuals filled a number of four-drawer filing cabinets, and adaptation to Telecom and Australian conditions began immediately.

Some examples of the AT&T sales force documentation provided were:

- Volume 1: Bell Marketing System – business management systems, account planning, market action plan guidelines.
- Volume 2: Bell Marketing System – business, staff guidelines and support
- 1982 Banking Market Action Plan
- 1981 Metal Fabrication Industry Market Action Plan
- AT&T 1979 Staffing Ratios for the Bell Marketing System
- AT&T Business Case for Establishing a Centralised Marketing Training Centre
- Account Executives Basic Selling Skills Course
- AT&T Selection of Sales Persons by Means of an Assessment Centre
- The Phone Store Implementation Package
- New York Telephone Service Order Processing System and Customer Data Base.

The quality and amount of information supplied greatly exceeded expectations.

An additional benefit was that AT&T's lead consultant would continue for implementation. Dick Brandt was an excellent example of the type of sales person for whom Telecom should aim. He was in his mid-thirties, positive, discrete and customer-sensitive, thoroughly trained, highly motivated and results-oriented. When Telecom people at senior levels in Headquarters and the States met him they were impressed. He was a role model for the new Telecom sales person.

## Implementation

The aim was to have the sales force implemented and fully operational by June, 1987. (See the planning assumptions later)

An AT&T team worked with an expanded Telecom team to assist in a number of areas. For example:

- selection of new sales people until Telecom selection teams were trained;
- establishment of the new sales training centres and training of Telecom and external trainers until the local people could take over;



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- training in the development of “industry specific” sales plans suitable for the Australian market, using the AT&T plans as models, until the new account managers were competent;
- development of sales management processes suitable for the new Telecom sales force, including a budgeting and control system and payment and incentives systems until the Telecom team could take over;
- a phone shop business case and an implementation plan;
- assisting Telecom's systems people to develop marketing and sales computer systems until sufficient Telecom people were competent;

Some of the actions were to be operating by June, 1983. For example:

- the national selection and training centres in place and operational;
- perhaps 50% of the account managers and 30% field sales staff in place, trained and selling;
- “first order” industry sales plans in place and operational for six industry groups;
- the phone shop business case completed and approved;
- a national sales tracking system operational;
- a comprehensive national sales systems development program operational.

## The Customer Base

As with all sales forces, Telecom's was designed around the customer base, and this was segmented by revenue as shown in Table 1 below. Telecom's systems could allocate revenue to services but a broad allocation of costs to each service was only done at the end of each year.

Marketing, sales and customer service resources were allocated on the basis of estimated profit contribution and other commercial criteria such as revenue growth and the complexity of the customer's network. The Telecom public service tradition of dealing with “subscribers” moved towards serving "customers". Also changed was Telecom's egalitarian view that all customers were "equal"; the new paradigm was that some customers were much more important than others, both for generating profits and defending against competitors.

The billing records were accurate for billing but relatively crude for this type of business analysis.



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**Table 1: Telecom Australia - Revenue Profile of Telecom's Business Customers - 1980/81**
**(Billed revenue)**

| Type of Customer | Revenue Range ($millions) | Number of Business Customers in this range | | Total Billed Revenue ($ millions) | | % |
|---|---|---|---|---|---|---|
| **Key Customers** | 10+ | 7 | | 109 | | |
| (Over $2m p.a.) | 7 - 10 | 3 | | 28 | | |
| | 6 - 8 | 7 | | 51 | | |
| | 4 - 6 | 19 | | 91 | | |
| | 2 - 4 | 58 | | 155 | | |
| **Sub Total** | | | **94** | | **435** | **25** |
| **Major Customers** | 1.5 - 2.0 | 38 | | 64 | | |
| ($0.1m - $2m p.a.) | 1.0 - 1.5 | 67 | | 46 | | |
| | 0.5 - 1.0 | 227 | | 156 | | |
| | 0.2 - 0.5 | 449 | | 142 | | |
| | 0.1 - 0.2 | 347 | | 50 | | |
| **Sub Total** | | | **1,088** | | **494** | **29** |
| **Other Business Customers** (Less than $0.1 m p.a.) | 0.0 0.1 | | 500,000 | | 802 | 46 |
| **TOTAL** | | | **500,000** | | **1730** | **100** |

Key customers were the largest in terms of revenue and presented some interesting issues. For example, consider a bank which was a nationally significant key customer with offices and branches in every state and a number of subsidiaries and associated businesses in Australia, such as the ANZ bank:

- the Bank headquarters in Melbourne was billed as one customer, as was each of the main state offices. At that time the hundreds of branches were all separately billed,
- the Bank had subsidiaries which were also in the banking business, and minority shareholdings in other finance businesses that operated separately from the bank.

In each case – the Bank's central headquarters, state headquarters, branches, subsidiaries or affiliates – a decision had to be made as to whether to consolidate the revenue from these businesses into Telecom's business plan for the Bank. The key factor was whether the Bank wished then, or might decide in the future, to adopt a comprehensive, coordinated strategy for its telecommunications needs. Even if the Bank did not, there may have been value in Telecom being able to offer alternative strategic approaches to better meet the customer's current and future business requirements.



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A related issue was the number of large businesses in Australia which were branch offices or subsidiaries of owners located offshore, such as Ford, Siemens, Alcatel, Cadburys and Barclays Bank. For these Telecom needed to know whether the telecommunications requirements in Australia were decided by the offshore parent or independently in Australia.

## Planning Assumptions for the Sales Force

In mid-1982, before the Davidson Report was published, the gossip was that strong competition would be recommended (and it was). The key planning assumptions were about the nature and timing of the arrival of competition and the product and service range to be sold, as follows:

### Planning Assumption 1

In three years, by about 1985, an independent industry authority would be established to regulate the market including networks, the universal service arrangements, customer premises equipment, value added services and related trade practices.

During this time there would be consultation with the industry, enacting legislation, and establishing the regulatory regime and the new framework which would note developments in the USA and the UK.

### Planning Assumption 2.

In five years, by about 1987, two years after the regulator was established, one landline competitor would be licensed with no universal service obligation to operate anywhere in Australia and the right to interconnect with the Telecom network under reasonable (to the competitor) rules.

The competitor would first attack the landline business market in Sydney and Melbourne in the CBD's and the business clusters in the suburbs. In 1988 Brisbane, the Gold Coast and Canberra would follow.

### Planning Assumption 3.

In five years, by about 1987, there would be one mobile competitor licensed to operate anywhere in Australia with the right to interconnect with the Telecom network under reasonable (to the competitor) rules. This assumed that Australia would follow the duopoly regulatory model for cellular mobile markets adopted in the Nordic countries in 1982 and the USA in 1983.



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The competitor's strategy would be similar to that used for the landline but would be paralleled by a thrust at small and medium business customers and residential customers in the same areas.

### Planning Assumption 4.

In four years, by about 1986, there would be open competition for customer premises equipment, regulated by the new independent authority.

Any extension of Telecom's product range beyond the traditional customer premises equipment – for example, towards office equipment – would be considered from the feedback from the account managers and field sales people as they established relationships with the business customers.

### Planning Assumption 5.

In four years, by about 1986, there would be open competition in value added services with transport on the licensed carriers under favourable (to the service providers) terms.

Telecom's investment in the deployment of videotex and related information services would continue as planned with refinement as feedback from the account managers became available.

### Planning Assumption 6.

In 1987 competitors would attack the residential market for the highly profitable long distance and international calls, but the nature of the attack was unclear. An effective defence needed to be developed over the next year.

Most of these assumptions were broadly correct in substance (except for the number of mobile operators) but wildly inaccurate in timing.

Although the incoming Hawke government rejected Davidson's recommendation for strong competition in 1983, the assumptions were left unchanged for implementing the sales force.

Based on these assumptions the plan was to have 50% of the sales force operating in three years (1985) and be at full strength, and close to being competitive against an "AT&T strength" sales force, in five years (1987).

So that the sales force could better understand the customers' future needs it was decided to provide some training in products which were not currently in Telecom's product and service range. These included word processors, office systems such as computer terminals and information systems.



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## The Future Product and Service Range and Market Priorities

The sales force was designed and deployed to sell a range of products and services against competitors to meet revenue and profit growth while containing the inevitable loss of market share. About 90% of Telecom's revenue in 1982 was protected by monopolies.

At that time telecommunications was estimated to be the largest of the "information age" markets – see Table 2.

**Table: 2: Estimated Computers "Information Age" & Related Markets in Australia - 1981/82**
Source: International Data Corporation, USA, 1982.

| | $ billions (est) | Growth (est.) % |
|---|---|---|
| **Market** | | |
| Telecommunications | 3.5 | 12-15 |
| Computers & Office Equipment | 1.0 | 20+ |
| Media (TV, Cable TV etc) | 2.2 | 20+ |
| Information Services | 0.1 | 100+ |
| | | |
| **Main Players** | | |
| Telecom | 3.1 | |
| Others - News Corp | 1.3 | |
| Media: | 1.0 | |
| PBL (0.3); Consolidated Press (0.4); Herald & Weekly Times (0.3) | | |
| IBM | 0.3 | |

The office equipment market was estimated to be the fastest growing after information services, the latter from a very small base – see Table 3 below.

**Table 3: Estimated Growth in Office Systems in the USA - 1980/86**
Source: International Data Corporation, USA, 1982.

| | US Shipments | | |
|---|---|---|---|
| | $ millions | | Growth |
| | 1980 | 1986 | (% pa) |
| Business & Professional Desktop Computers | 925 | 12,500 | 54 |
| Word Processors | 1140 | 4640 | 26 |
| Electronic Typewriters | 240 | 1080 | 28 |
| PBX's | 925 | 1815 | 12 |
| Copiers | 3165 | 3310 | -2 |
| Medium Speed non-impact Printers | 130 | 765 | 35 |
| Facsimile | 190 | 400 | 13 |



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Tables 2 and 3 only partly illustrate the product and service range issue. Readers with a wealth of knowledge about these markets and services today might keep in mind that these thoughts were wrestled with in 1982.

In 1982 Telecom had no clear understanding of the product and service range needed in, say, five to ten years' time and was ill-prepared and reluctant to address the subject. For example, in five years' time in a competitive market would Telecom's traditional customer premises range – telephones, key systems, PABX's – be sufficient to strongly defend and grow the network against competitors? To better defend and grow the network should Telecom extend the range into computer terminals, other office equipment, local area networks, mainframe computer hubs and facilities management, and information generation and distribution? How strongly would equipment vendors such as IBM, Wang and others extend beyond equipment sales to enter the networks market against Telecom?

Another concern was that forecasts of many new services – such as mobile services, electronic point of sales, electronic funds transfer, electronic mail (email), videotext services and information services – were largely speculative, and it was not clear how best to enter and secure these new markets against competition while generating early profits. For example, France had demonstrated that the investment of billions could quickly deploy Minitel and its services, stimulating an early and rapidly growing demand for a large range of new services, but how could this be done without a huge subsidy in Australia?

Media, computing and information vendors were already demanding entry into the telecommunications market. Public Broadcasting Limited (PBL), owned by the Packer family, had approached the Government on several occasions to be permitted to build a private network. PBL had also offered to buy all or part of the directory business from Telecom as a first step into the information business. Others, including IBM, had also approached the Government to be allowed to build private networks.

As indicated in Planning Assumptions 4 and 5, decisions about the customer premises equipment and value added services range would continue as planned with refinement as feedback became available from the account managers.

## Market Positioning

A market positioning statement attempts to explain in a few words to the market, the customers and the sales force the business Telecom is offering. Table 4 below shows some statements which were used at the time by some of the network services operators and equipment vendors to position in the telecommunications and adjacent markets.



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**Table 4: Some Market Positioning Statements - 1982**

| | | |
|---|---|---|
| Office Equipment Vendors | Wang, IBM, Xerox | "information, communications and computing" |
| AT&T | | "Services which combine computers and communications technology" |
| Non Communications Businesses | BHP | "The Big Australian" |
| | BP | "The Quiet Achiever" |
| | Toyota | "Now You're Really Moving" |
| Computers | Digital | "So Easy to Work With" |
| Communications | Mitel | "Building Better Communications" |
| | STC | "Winning the Information Revolution" |
| | IBM | "Information, Communications & Computing" |
| | Wang | "Communications & Computing" |

Telecom did not have a positioning statement and, after the danger of Davidson had passed, refused to consider one. The AT&T statement was adopted informally until one was decided.

## The New Sales Force Structure

Figure 1 outlines the structure which aligned sales and service resources to the customer base.

Table 5 provides a very approximate build-up of numbers.

The numbers of account managers, sales representatives and other classes of sales persons initially decided were exploratory and subject to experience gained over time. A particular worry was that the effort needed to embed the account managers into the telecommunications strategy of the largest customers might be underestimated.



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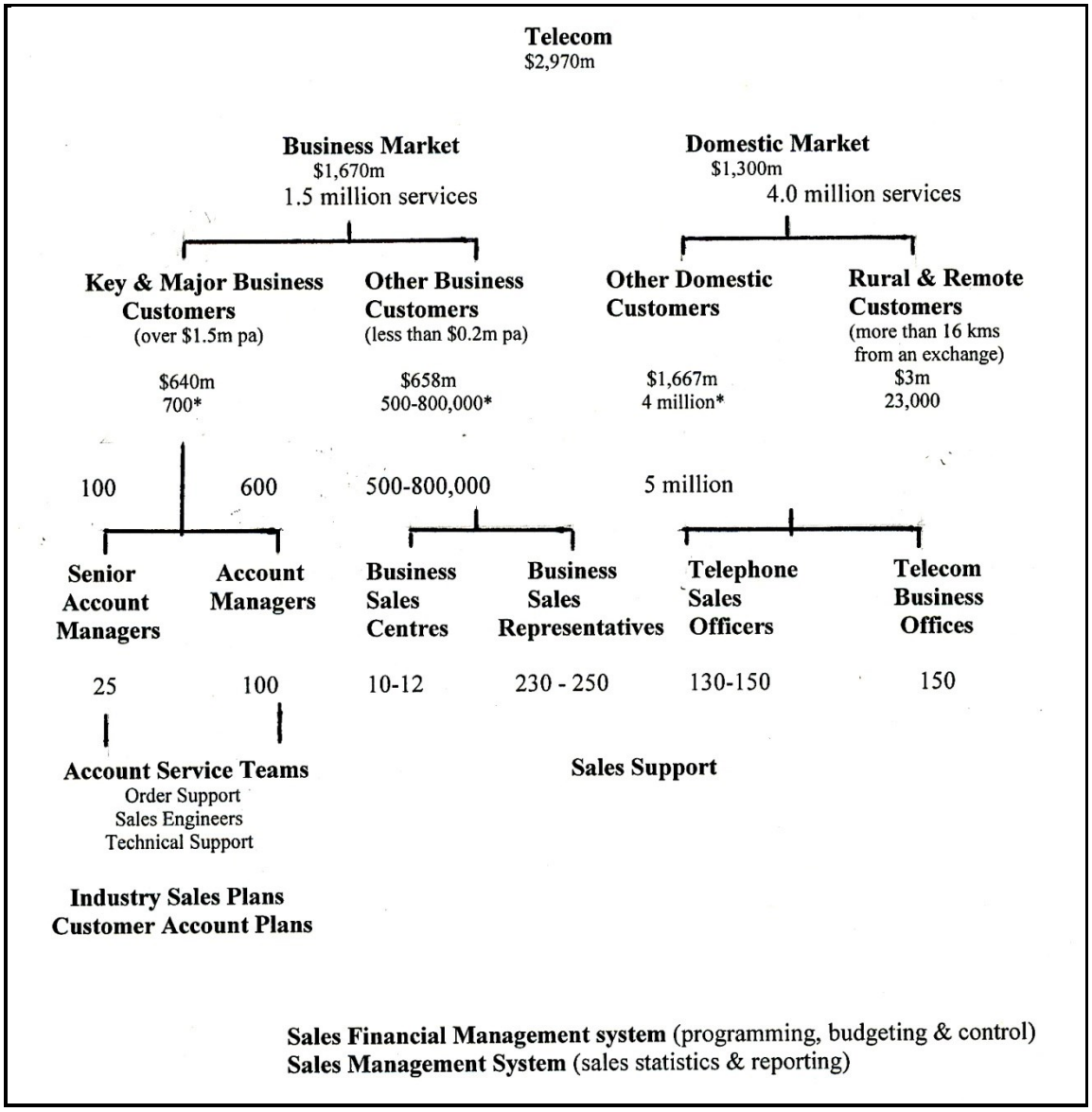


**Figure 1: Telecom's Sales Force Deployment over the Customer Base - 1981/82**
* Customers within 16 kilometres of a Telecom Exchange

**Table 5: Indicative Business Sales Force Buildup**

| **Year ending 30 June** | **1983** | **1985** | **1987** |
|---|---|---|---|
| Account management | | | |
| Account managers | 60 | 100 | 125 |
| Sales engineers | 25 | 40 | 50 |
| Field Sales Force | | | |
| Business sales representative | 100 | 150 | 150 |
| Sales engineers | 100 | 150 | 150 |
| Telephone sales officers | 100 | 150 | 150 |



http://doi.org/10.18080/ajtde.v4n4.69

Broadly, the top 100 customers were labelled “Key” and were to be initially serviced by 25 senior account managers. The next 600 customers were labelled “Major”, serviced by 100 account managers. The Key and Major customers were supported by account service teams comprising the account manager and, depending on the need, consultants, sales and technical engineers and back office sales order and service processing people.

The 500-800,000 "other" business customers were serviced by 230-250 field sales representatives and telemarketing sales people, also supported by technical and back office service teams.

The Business Sales Centres in the capital cities and large regional cities would be used for presentations, product and service launches, customer entertainment and customer training, mainly for the business sector but also for community events.

About 130-150 telemarketing people would actively sell to the residential market, which was also supported by the (about 150) Telecom Business Offices in the capital cities and large regional cities and towns. These were in addition to the existing officers currently handling new service connections and cancellations and fault repairs.

Two new management systems would be introduced to administer the sales force nationally. A Sales Financial System covered matters such as costing and budgeting and control of revenues and costs. A Sales Management System controlled customer classification (Key, Major or Other), deployed the sales people to Key or Major customers or geographic areas, resource allocation, set sales standards and budgets, tracked performance against standards and budgets, and paid on results.

The numbers shown in Table 5 for the sales force and the timetable for recruitment, selection, training and deployment were highly speculative and flexible. They depended on several factors including the experience gained in meeting customer expectations, the timing of deregulation and achieving a sensible agreement with the unions. Early deregulation would shorten the timetable and impractical union demands would extend the timetable.

## Key and Major Business Customers

The largest business customers were the first priority. They had the highest growth potential, were the most profitable, the most vulnerable to competition, the first users of the new emerging technologies, the most demanding in improving service, and would provide sales with a higher return on investment.

As mentioned, for the first few years **Key customers** were arbitrarily defined as those with revenue exceeding $1.5million, and **Major customers** as those over $200,000.



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Table 6 shows the top 20 Key Customers. Table 7 shows how heavily the headquarters of the top business customers were clustered in Sydney, Melbourne and Canberra, and why the attack from competition would begin in those cities in the CBD's and business clusters in the suburbs.

**Table 6: Telecom's Top 20 Customers – 1983**

| Top Ten | | Next Ten | |
|---|---|---|---|
| | Revenue ($m) | | Revenue ($m) |
| Department of Defence | 24 | Department of Aviation | 8 |
| Westpac | 18 | Dept. of Employment & Industrial Relations | 7 |
| Dept. Public Works - NSW | 16 | Police - NSW | 5 |
| Department of Social Security | 15 | Australia Post | 5 |
| ABC | 14 | BHP | 5 |
| National Bank | 13 | Dept. of Transport & Construction | 5 |
| ANZ | 12 | Myer | 5 |
| Commonwealth Bank | 10 | TNT Transport | 5 |
| Overseas Telecomms Commission | 10 | TAA | 4 |
| Ansett Airlines | 10 | Public Works - Queensland | 3 |
| Total Top Ten | 139 | Total Next Ten | 54 |

Large businesses which were authorised to build, own and operate their own networks such as the State Departments of Education and Health and the State owned utilities (power, railways, water, gas and emergency services) are not included as their revenue was less than those in the top twenty.

Crucial statistics relating to the business market were:

- In 1981/82 Telecom's business market was 44% of total revenue and the top 600 customers - the Key and Major customers - contributed about 21%;
- It was roughly estimated that the business market contributed over 90% of Telecom's gross profit and the top customers about 50%;
- In 1983/84 Telecom's revenue growth from key customers exceeded 30% compared with 15% for all customers.

**Table 7: Location of the Headquarters of Telecom's Top 100 Business Customers - 1982/83**

| | Top 100 Business Customers | |
|---|---|---|
| | Number | % of Revenue |
| Sydney | 50 | 45 |
| Melbourne | 26 | 28 |
| Canberra | 20 | 25 |
| Brisbane | 4 | 2 |
| Total | 100 | 100 |



http://doi.org/10.18080/ajtde.v4n4.69

The largest business customers were assigned a priority depending primarily on revenue but also on strategic issues such as vulnerability to competitors, early adopters of important new services and technologies, and political pressures (e.g. the Australian Tax Office).

Typical characteristics of Key business customers were:

- National operations;
- Very high levels of investment in and a higher dependency on communications and computer technology for business operations;
- At the leading edge in applying computer and communications systems and technology. The investment was in large private networks (often including AUSSAT when available), office automation, manufacturing process automation and value added services. Fewer than the top 100 customers accounted for 30% of data and private lines usage;
- A diminishing reliance on Telecom as a primary source of advice on information technology requirements. For example, during 1984, more than 10 Federal Government departments invited submissions on office automation and related equipment. Most sourced advice from private sector consultants and office automation or computer suppliers, with Telecom usually being overlooked or approached as an afterthought;
- The most demanding for delivery and service;
- The highest growth potential and –even after discounting prices due to competition – the most profitable.

Apart from their contribution to growth and profits, Key customers were absolutely critical to Telecom as they were the opinion formers, influencers and leaders in the telecommunications industry, and were more likely to consider moving to a competitor for a better deal.

These customers would be handled by the highly trained Senior Account Managers with impressive personal presentation, superior marketing and selling skills, a reasonable technical understanding, and strong self-management, all necessary to deal at the top and policy levels.

The largest accounts had an account team comprising a senior account manager, perhaps two account managers (based in each of Sydney and Melbourne), and if needed sales engineers and sales support people. A larger team would be needed for a bank which was planning to deploy a new nationwide EFTPOS network and the team would likely include a packet switching engineer.



http://doi.org/10.18080/ajtde.v4n4.69

Dedicated sales support people were needed for some key customers to handle large volumes of transactions. For example, the banks were continually changing branch locations and upgrading capabilities which required changes in services such as telephone and data access. In addition, at that time the major banks were deploying electronic funds transfer at point of sale (EFTPOS) capabilities – credit and debit card payment systems – which required support from Telecom. Finally, if a bank location, including a branch, experienced a problem with a Telecom service, it could contact a "fast track" number to obtain prompt service.

Initially the top business customers were structured into twelve industry groups for account management organisation and the development of industry plans:

| | |
|---|---|
| Federal Government | Electronic Equipment and Security |
| State Government | Light Manufacturing |
| Finance (including the banks) | Heavy Manufacturing |
| Distribution | Energy and Resources |
| Media, Publishing, Recreation Hotels | Hospitals and Advanced Education |
| Transport, Insurance | Legal and Accounting |

Industry-specific plans were developed for each of the twelve industries, and account managers prepared their account sales plans within the appropriate industry plan.

Product managers at Headquarters would use the industry plans to plan and budget product sales and new product deployment by industry and for each large account.

**For the first time in Telecom -- product development and investment in and construction of the network would be driven by the customers.** As feedback was received from the sales force, particularly the account managers, product and network development and investment would be refined.

The account managers' first priority was to embed Telecom in the network strategy of the top customers and ensure that the product and service range, particularly for network services, would anticipate the demand. In the first year the customers targeted were the most important with headquarters in the CBD's in the Sydney, Melbourne, Canberra and Brisbane, broadly in that order, then spreading out to the business clusters in those cities. In the second year the next most important customers on those areas were targeted as well as extending to the Gold Coast, Perth, and Adelaide. Other major business centres such as Newcastle, Wollongong and Geelong were covered in the following years.

**Major customers** had some similarities with Key customers and those with lower revenue tended to have more local business operations, and were usually less dependent on



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computers and communications. These customers were to be served by less senior account managers, each within the appropriate industry business plan.

## Other Business Customers

Other business customers were a huge variety of businesses ranging from regional to local, and from stock exchange listed to single proprietor/operator. These were important to Telecom's success, particularly in the metropolitan and urban areas. These customers tended to be more demanding for emerging services, expected a more responsive standard of service, incurred a lower cost of sales and service, and were more vulnerable to competitors.

Large (other) business customers were to be managed by a business sales representative deployed in a geographic area, and smaller customers were to be managed by a telephone sales person. Sales calls, either in person or by phone, were programmed so that higher revenue customers were contacted more frequently and to support new product and service launches and sales budgets.

If a larger customer needed technical support, the sales person could call on a sales engineer for assistance.

## Residential Customers

In a similar way to the smaller business customers, but on a far smaller scale, higher revenue residential customers were serviced on a geographic basis by telephone sales people. As usual, all residential customers could still seek service over the telephone for new service connections, faults, bill queries and bill payments, and they could also approach a Telecom Sales Office or Telecom Shop.

## Customer Perceptions of Telecom

In all of their dealings with their customers, Telecom's Sales people needed to be aware of the views held by customers of Telecom.

Table 8 reports that customers ranked Telecom's quality of service behind banks, butcher shops and service stations, and only ahead of department stores and cheap supermarkets – a stunning critique.



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**Table 8: Are We Being Served? - Customer Ratings of Service - November, 1983**
(Ogilvy & Mather Advertising Agency)

| | Excellent | Average to Good | Poor to Terrible | Don't Know /Don't Use | Total (%) |
|---|---|---|---|---|---|
| Banks | 59 | 23 | 16 | 4 | 100 |
| Butcher Shops | 58 | 16 | 6 | 21 | |
| Restaurants | 49 | 24 | 5 | 22 | 100 |
| Australia Post | 42 | 28 | 19 | 11 | 100 |
| Tradesmen | 36 | 22 | 22 | 20 | 100 |
| Service Stations | 33 | 35 | 25 | 7 | 100 |
| Telecom | 31 | 31 | 26 | 10 | 100 |
| Major Department Stores | 26 | 36 | 31 | 7 | 100 |
| Cheap Supermarkets | 22 | 33 | 25 | 21 | 100 |

Apart from studies commissioned by Telecom, research companies and periodicals at the time reported a range of perceptions that the business community held of Telecom and other businesses. A study published in the USA in 1982 reported that potential competitors, such as IBM, Wang and AT&T, were highly ranked in the USA by their peers, customers and competitors on a range of attributes. At that time they would likely have been similarly ranked in Australia with Telecom lower on the scale.

Tables 9 & 10 report that customer perceptions of Telecom were mixed and, on the whole, unacceptable for a competitive market. It was intolerable that over a third of business customers said that service repairs took too long, and almost one fifth complained about the quality of lines. It was alarming that Telecom's most profitable and fastest growing customers, Key and Major, judged that Telecom was not dynamic and innovative, and didn't sell its services and products well.

**Table 9: Business Customers' Views of Telecom - NSW & Victoria - June, 1982**
**(SRG Australia Pty Ltd, June, 1982)**

| What is the single problem business customers have with Telecom? | % |
|---|---|
| Service (fault repair/maintenance) takes too long | 37 |
| Quality of Lines | 18 |
| Bureaucratic Attitude | 7 |
| Installation Wait | 4 |
| Other Problems | 15 |
| No Problems | 19 |
| Total | 100 |



http://doi.org/10.18080/ajtde.v4n4.69

**Table 10: Key & Major Customers Ratings of Telecom - February, 1983**
**(REARK Market Research)**

| | High Level of Agreement | High Level of Disagreement |
|---|---|---|
| Provision of Products & Services | | |
| Provides good value for money | X | |
| Is quick to deal with complaints | X | |
| Corporate Stance | | |
| Is dynamic | | X |
| Is innovative | | X |
| Can be trusted in dealings with customers | X | |
| Is friendly | | X |
| Integration with Society | | |
| Contributes to Australia's welfare | X | |
| Contributes to Australia's progress | X | |
| Promotion & Advertising | | |
| Keeps the public well informed | | X |
| Sells its services & products well | | X |
| Self-Respect & Self-Assessment | | |
| Is proud of its achievements | X | |
| Believes in the quality of its service | X | |
| Concerned to make a profit | X | |
| Attitudes to Development | | |
| Looks to the future | X | |
| Keeps abreast of what is going on overseas | X | |

The new sales force was expected to be a crucial agent in changing those negative customer perceptions, and was fully briefed on the market and customer perceptions of Telecom during training and regularly afterwards.

## Business Sales Centres

A Business Sales Centre (BSC) was a venue for the account managers and the business sales force to market to business customers. It could be used for sales presentations, product and service demonstrations, sales promotions, customer entertainment, media briefings and announcements, and training of customers' and Telecom staff.

A centre consisted of offices and conference rooms, a demonstration area, hospitality facilities and advanced audio-visual aids.

The experience of AT&T and the Bell companies with BSC's in the USA was impressive. In the first year of operation in three BSC's in the mid-West, 75% of customers visiting the centre purchased new or additional equipment and services. New revenue of about $1 million per month was generated from each centre. 74% of customers invited to the centre attended.



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The centres were to be located in the business concentrations of Australia. Because the Key and Major business customers were strongly clustered in Sydney and Melbourne as were other large customers, two centres were to be established in each of Sydney and Melbourne and others would quickly follow in Canberra and Brisbane. With the confidence gained in these centres, the refined model was be deployed to the other capital and regional cities as financially viable. By 1987 12 centres were operating and it was clear that more were needed.

## Telecom Sales Offices

A small number of existing pilot shops were planned to expand to a retail network of 150 Telecom Business Offices (TBO) to sell to the residential market.

The first priority was to locate TBO's in the large retail shopping malls in the capital cities and then the malls in the main rural cities. AT&T had assessed that many of the existing shop fronts were poorly located and all were ineffective as sales outlets, so these were either to be radically upgraded or relocated to sites of higher potential. The employees were trained in sales as well as service

Due to the priority placed on the business market, particularly the Key and Major customers and a number of other factors, the number of shop fronts of the new standard was less than 100 in 1987.

## Recruitment and Selection

Recruitment, selection, training and deployment of the sales force was an enormous task.

AT&T provided job descriptions and requirements for each of the categories of sales people and a carefully designed, documented and tested process for recruitment, selection, training and qualification. This was edited to take into account local factors including the Australian telecommunications market, Telecom's range of products and services, and Telecom's business support systems such as those for order processing and billing.

Taking into account Telecom's public service culture, the intention was to recruit more than 50% of the account managers and 40% of the business sales representatives from outside Telecom. This was unacceptable to the unions and only 20% were initially allowed to be employed from the private sector, provided that inside people had the opportunity to fill the remainder. In the first year or so the actual recruitment from outside was less than 10%.

The high cost of training new people and the opportunity cost of employing people unsuited to sales compelled a rigorous selection process. The estimated cost of training an account manager to the required level of expertise and motivation was of the order of $50,000 (about $150,000 in 2016 dollars), including salary during training, and even for a support person



http://doi.org/10.18080/ajtde.v4n4.69

could reach $10,000 (about $30,000 in 2016 dollars). As most of the new sales people would be recruited from inside, it was even more important to eliminate unsuitable applicants.

The recruitment process relied on the fact that successful sales people have identifiable qualities that contribute to their achievement. Among these are confidence, self-motivation and organisation, empathy and a genuine interest in people. Superior sales people are strongly output and goal oriented. In addition, there are technical factors such as mastery of selling skills, product and service knowledge and customer and industry knowledge. The depth and range of skills required varied across the sales force with the highest needed in account managers and the lowest in support staff.

The **recruitment process** for assessing applicants was adapted from that used by AT&T, and consisted of three stages.

- Stage 1 was an initial interview,
- Stage 2 was a simple "paper & pencil" test of language, mathematics, logic and aptitudes.
- Stage 3 was an assessment centre where candidates took part in a series of interviews and role plays of sales situations, mainly to test personal presentation and inter-personal skills.

In the first year the pass rates for internal applicants for account management and the business sales force were very low; for the business sales force only one in eight were accepted and far fewer for account managers. Most were rejected due to inadequate customer orientation, service culture or personal motivation. The unions were dismayed that so many of their members could not qualify, but could hardly object about objectivity.

The acceptance rates for technical and support staff were higher; for support staff the pass rate approached 40% in the first year and rose in the following years.

The **training program** was also based on the adaption of the AT&T model, and AT&T provided fully designed and documented courses and curricula for each sales category. The courses covered the expected range of subjects as outlined below:

- Telecom philosophy, objectives and policies
- Market structure and expected competition
- Selling skills at a number of graduated levels
- Product and service knowledge from basic to advanced – products & services, prices and pricing structures, applications.



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- Industry knowledge and industry sales plans
- Business processes - orders, invoicing, installation, service restoration, credit.
- Customer knowledge
- Sales management
- Sales processes - customer records, customer management, budgeting reporting
- Self-management and motivation
- Remuneration and conditions of employment

At least 50% of the training was through computer-assisted learning, a relatively new process at the time in Australia. AT&T provided the software to adapt these computer courses to the local situation. Limitations in the training development software resulted in each hour of course time requiring over 20 hours of development time.

The planning of the numbers to be recruited, selected and trained over the first five years was very difficult. The numbers could vary greatly, the main variables being the numbers qualifying through the selection process and at each level of training, the numbers failing to reach the required standard after deployment in the field, and the numbers leaving for positions elsewhere. Table 11 is a very early "order of scale" attempt to estimate the selection and training load and provide some idea of the issue. There is no information of the actual numbers involved such as those entering the selection process, selected, recruited from outside, trained, and leaving through unsatisfactory performance or to other employers.

As can be seen, the projection depended on the pass rates and wastage rates which were high in the first two years and fell in the following years. For example, the Table assumes that, for the first wave of account managers, 90% of applicants, mostly expected to be from within Telecom, would fail the selection process. Thus, some 1250 applicants were required to be assessed. The failure rate was roughly correct but Telecom, with pressure from the unions, lowered the standard for many of the first appointments. With competition expected, perhaps in five years, wastage of more than 25% for account managers might occur. More “second wave” recruits would be from the private sector and they might achieve a higher pass rate during selection. This scenario requires a training volume for account managers approaching 200 over five years.

Overall, the Selection Centre initial in-take might process 10,000 applicants for the first wave of the sales force and the Training Centre process some 1,000 sales people.



http://doi.org/10.18080/ajtde.v4n4.69

**Table 11: Rough Estimates of Sales Force Numbers to be Recruited & Trained in the First Wave**

Source: Sales force project team working papers

| First Wave of the Sales Force | | | | |
|---|---|---|---|---|
| | Number Required | Assumed Pass Rate (%) | Applicants Required | Assumed Wastage over 5 years (%) |
| Account managers | 125 | 10 | 1250 | 25 |
| Business Sales Representatives | 250 | 10 | 2500 | 60 |
| Sales Engineers | 75 | 40 | 300 | 20 |
| Telephone Sales Persons | 150 | 30 | 4500 | 50 |
| Support Staff | 400 | 40 | 1600 | 40 |
| Total | 950 | | 9850 | |

The staff turnover was particularly difficult to estimate. With high internal recruitment for account managers and business sales representatives, serious culling of unsatisfactory performers in the field in the first five years might be expected. Table 12 assumes a failure rate of 25% for account managers and 60% for business sales people. This was resisted by the public service rules and the unions. A significant number, probably the better performers, might leave for more attractive employment as they grow their skills, gain confidence and achieve a record of success.

Over 50% of the training was delivered in Sydney and Melbourne; the rest was done by flying visits of a week or so to other capital cities and by computer-based learning. People completing a training course were tested, and if passed, were certified for appointment and deployment in the sales force.

As more people were recruited from the private sector, many with previous sales or technical experience, a “fast track” was introduced in the training program to take their skill level and previous experience into account.

## Sales Force Motivation

Most sales forces work best within a clearly stated framework of values reinforced by management behaviour and a motivation program. Apart from salaries based on results, sales force motivation programs were relatively uncommon in the late 1970’s, and unknown in the public service and Telecom in the early 1980’s.

The aim was that in five years the sales people would have a deep and unparalleled understanding of the market, the industry, the customers and Telecom's products and services. They would have superior selling and self-management skills, hopefully be acknowledged as among the best in the industry, and would live the values of customer



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service and financial performance which were reinforced daily by the management, the remuneration plan and an incentive program.

The framework of sales values was quantified in measures of customer service standards and sales budgets. Because Telecom was a public service business, only a modest motivation program was offered; initially the top 10% of account managers and sales representatives and their life partners qualified for an all-expenses paid week at an attractive holiday destination such as the Gold Coast and Hamilton Island.

## Remuneration & Conditions of Employment

The remuneration, conditions of employment and related culture and policies required for the sales force were hugely different from those of Telecom and the public service.

The Telecom negotiating team had little encouragement from management and experienced outright opposition from the unions.

The Deputy Chief General Manager (DCGM) was vague and equivocal:

> "..personnel policies should be suitable for a leading government business undertaking and should generally be comparable with those in the private sector especially the private telecommunications sector taking all conditions of service into account." . . . "You will need to approach discussions with the unions on the basis that there is **no firm commitment in advance by top management** to remuneration policies/flexible classifications, transport expenses etc."

With a Labor Government in office the Telecom unions were strongly obstructive. The timing was four years after the ATEA technology dispute in 1978 and one year after the ATEA wages dispute in 1982, both "won" by the ATEA.

The main unions vigorously objected to the proposed sales force philosophy, arrangements and conditions of employment. Their main argument was that the sales force principles struck at the heart of public sector employment, and this was a first step in a wider attack by Telecom on the public service and Telecom's conditions of employment. For example, in the words of the author:

## Security of Tenure

- In Telecom (and the public service) the appointed officer "owned" a position in a specific organisation and geographic location. The officer had a high degree of security, almost regardless of performance, with maintenance of income and conditions if a re-organisation eliminated the position.



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- Sales people's continued tenure depended on performance.
- Against strong union opposition, the new sales structure had a "pool" of sales positions established for the number of sales people needed, with no person "owning" a particular position. The pool also allowed sensible re-assignment and redeployment of sales staff with changes in the market.
- Sales people whose performance was unsatisfactory, after reasonable further coaching and training, were returned to the traditional Telecom employment structure at their previous pay and conditions.

## Salary Levels

- Salary levels in Telecom were consistent with those of the public service. Lower positions were reasonably generously paid compared to similar jobs in the private sector, but salaries were uncompetitive for senior sales and management positions.
- Sales force salary levels needed to be consistent with the market to attract and retain the quality of people needed to be competitive in the industry.
- In the new sales structure salary levels for senior sales and management positions were higher than allowed by traditional Telecom policies but still short of being competitive with the private sector. The hope was that with time this gap could be reduced or closed.

## Performance Assessment

- In Telecom the performance of officers was almost never assessed. Sales people's performance is continually under assessment.
- The unions finally accepted continuing performance appraisal, against targets and budgets at least monthly and more comprehensively annually, provided it was limited to the sales force and not regarded as a precedent for elsewhere in Telecom.
- Also accepted were annual performance reviews.
- As previously noted, sales people whose performance was unsatisfactory were returned to the traditional Telecom employment structure at their previous pay and conditions.



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## Payment related to Performance

- Most positions in Telecom below senior management had a defined salary range. Employees in these positions usually received annual salary increments automatically within the range without any review of performance.
- The sales force salary contained a base and a variable component, the amount of the latter depending on results. The size of the variable component differed for the account managers and the field sales force.
- The union finally agreed to payment for performance with a limit in the first year of the bonus component to 20%, and provided the process was limited to the sales force and not regarded as a precedent for elsewhere in Telecom.
- This was probably a good outcome as most of the new sales managers were inexperienced in performance appraisal, and it would take a year or so for adequate experience to be accumulated.

## Qualifications

- Most positions in Telecom had an education qualification requirement, but minimal training was provided after appointment. The classification of Telecom positions in the range roughly comparable with the bulk of the sales force required the HSC certificate or equivalent as a qualification.
- The qualification proposed for the sales force was passing the adapted AT&T selection and certification process. The union eventually agreed that this was an appropriate qualification for the sales force.

## Right of Application

- In Telecom new and vacant positions were usually advertised in the Government Gazette as open to all who wished to apply.
- A compromise for the sales force was that this approach would be used for the first wave of sales force recruitment, and, depending on the outcome, outside advertising would be used for the second wave. As previously noted, over 80% of Telecom's clerical staff entering the first stages of the selection process failed. The only major concession was to allow the few existing relatively untrained and inexperienced account managers to stay in the sales force subject to training and performance.



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## Higher Duties

- Positions of supervisor or manager usually had "delegations", powers that attached to the position that the officer exercised during the course of duty. When the officer was absent a lower grade officer could be appointed to "act" in the position to exercise the delegations. The temporary officer was said to be performing "higher duties" and was paid the salary of the position for the period "acted". Higher duties significantly increased employment costs.
- With very few exceptions, there were no higher duties available in the sales force.

## Vehicles

- Except for designated senior management positions, vehicles were not included in Telecom's conditions of employment.
- Most of the account managers and field sales people required a vehicle for work and a Telecom provided vehicle was included in the conditions of employment.

## Sales Incentive

- In 1985 an incentive and recognition program was introduced which rewarded the top 50 sales performing people and their life's partners with a holiday/tour, initially within Australia and later overseas, for one week. This type of program had been operating with the Yellow Pages sales force since 1980, and both programs were believed to be unique in the public service in Australia.
- The unions' position was that the sales force would be approved with all the attractive aspects – such as training and vehicles – but within public service conditions of employment. A strong counter pressure within Telecom was that many employees saw the sales force as a very desirable new career path, even with the "strange" new conditions. This, plus the persistence of the Telecom sales team, resulted overall in a remarkably successful outcome, although some compromises were necessary. The industrial framework for Telecom's new sales force was unique within Australia's public service. New arrangements which were an anathema to the culture and the unions were now operational.

# Implementation

In 1982, under the threat from Davidson's recommendations to deregulate, the top management was enthusiastic for a sales force to be deployed. A year later, after the Labor



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Government rejected the Davidson Inquiry's recommendations, the enthusiasm and support almost vanished. When the senior manager who initiated and supported the project, Greg Crew, left Telecom in 1983, implementation became gruelling and fell behind schedule.

By mid-1984 most of the account managers and business sales people were working with customers in the field, but the deployment of the new Business Sales Centres and shop fronts was lagging.

Some of the controversial issues – mainly human resources and industrial relations – were not fully resolved: for example, the employment package for the top account managers was still too low; recruitment of a larger number of sales staff from the private sector was behind schedule; increasing the component of salary at risk (the bonus) from 20% - was delayed even though the sales management were now more reliable assessors of performance; and larger numbers of non-performing sales people needed to be returned to Telecom.

An interestingly perverse situation emerged in the State administrations where the public service ethos began to encroach into the sales force. The accounting systems, while still crude, were beginning to improve, and appeared to report "public service creep" - inflation of overhead. For every dollar spent on a sales person in the field the State Headquarters (for account managers) and the District Offices (for the business sales representatives) spent more than $4 for support, and rising. The main reason for this was the lag in developing the intended management control systems – transaction processing, costing, budgeting and control systems – and lax cost control.

In 1987 Telecom adopted a new "customer" segmented organisation – corporate, business, residential and country customers – and the sales force was broken up across the new customer divisions. The low level of commercial (and no sales) management skills and experience in the management of the new customer businesses and the spreading of the sales expertise in selection, training, systems and other areas slowed the development of the sales force.

## Summary

**The design** of the new Telecom sales force was the equal of the most advanced telecommunications businesses in North America in the early 1980s, including the two leaders, AT&T and GT&E.

**Implementation** was seriously compromised by a low level of management support, the prevailing public service conditions of employment and related practices, the unions' resistance to common private sector sales force practices, and the public service processes and culture.



http://doi.org/10.18080/ajtde.v4n4.69

**The outcome** was that in 1987, the target year for the sales force to be fully operational, the sales force structure was essentially in place except for the numbers of Business Sales Centres and Telecom shop fronts. The feedback from customers, particularly the Key and Major customers, was vastly improved.

However, there were serious gaps. The author's assessment is that only 50% of the sales management and sales people had the required skills, experience, discipline and motivation to match likely serious competitors in a deregulated industry; the remuneration and conditions of employment were still limited by public service constraints; and the sales management systems were still inadequate. Crucially, the feedback from the sales force about the market was not yet the strong driver of Telecom's investment in product and service development as intended.

In 1987 the Telecom sales force was a pioneer in the public service and the public service businesses entities in Australia; it sharply focused the business on the customer and moved towards the customer directly influencing and eventually driving the Telecom's investment in product and service development and delivery.

At the end of 1991, the sales strength passed to the new Telstra almost made the customers the focus of the business. The skills, experience, management and culture of the sales force approached matching serious competitors in the new de-regulated market.

Arguably the sales force achieved the largest cultural change in Telecom's 16 years by moving the customer towards the centre of the business, including Telecom's "Change Process" in the period 1988-91 which eliminated the state administrations and introduced the customer divisions.

Telecom's sales force owed its existence to the leadership, innovation, persistence and courage of Dick Brandt and his team from AT&T, and the original 1981 Telecom sales team, including Rob Palmer, Rod Maddock, Frank Barrott and John Dempster.

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http://doi.org/10.18080/ajtde.v4n4.69

# A review of New Zealand Telecommunications: Legislation, Regulations and Recommendations

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## Abstract

The telecommunications industry is growing and changing at a very high pace. To keep up with this high pace and fast-changing technologies, countries need strong legislation and an efficient regulatory system to promote fair competition in industry. In this paper a review of existing telecommunications legislation and regulations in New Zealand is conducted. The paper highlights the existing legislation in the country and discusses the organizations responsible for regulating the underlying laws. Finally, recommendations for changes to the existing legislation and regulations in New Zealand are provided which are based on the current and on-going demand for telecommunication services.

## Introduction

Telecommunications is a rapidly growing field and is becoming an essential part of the socio-economic development of any country in the world. With the technological advances, more and more applied areas of telecommunications are gaining prominence hence developing an on-going demand for telecommunications services. To cater for this high demand for services the telecommunications industry has started to become dense with a variety of telecommunications services and service providers.

With this remarkable increase of telecommunications services and service providers, thoughtful actions need to be taken to ensure that transparent, fair, legal and affordable provision of these services is available to the public and/or end-users. In New Zealand (NZ) various government bodies as well as agencies are responsible to provide these service goals.



http://doi.org/10.18080/ajtde.v4n4.70

The Ministry of Business, Innovation and Employment (MBIE) (NZ MBIE, n.d.), the Commerce Commission, NZ (NZ Commerce Commission, n.d.) and the Telecommunications Carrier Forum (TCF), NZ (NZ Telecommunications Forum, n.d.) play key roles in the legislation, regulation and provision of telecommunications services for NZ.

In this paper efforts are made to bring together the information regarding legislation and regulations of the telecommunications sector in NZ. In particular this paper attempts to address the following open questions as far as NZ telecommunications review is concerned.

- What legislation and regulation exists?
- Is there a government communications department?
- Is the major telco wholly, partially or not government owned?
- Is there an independent or government telecommunications regulator?
- Is there an independent competition regulator?
- Is there an independent consumer protection organisation?
- Is there a universal service obligation?
- How has the telecommunications market evolved over the past 40 years?
- Is the market open and competitive or what is it like?
- Is the telecommunications market self-regulating?

This paper is organised as follows. An insight into the history of the development of the legislation and regulations related to the telecommunications sector in NZ is provided. Current issues related to legislation and regulations in the telecommunications industry are discussed. The legislation and regulations affecting the telecommunications market competition are also discussed. Recommendations for changes to the current legislation and regulations are presented, and a brief conclusion ends the paper.

## History of the development of legislation and regulations

In NZ all the legislation's drafting and publishing is handled by "The NZ Parliamentary Counsel Office/Te Tari Tohutohu Pāremata (PCO) NZ Legislation" (NZ Legislation, n.d.). The first ever legislation for the telecommunications sector, published by this office was in 1987 (Telecommunications (Residual Provisions) Act, 1987) which introduced telecommunications provision for residual purposes. The process of legislation of telecommunications then continues with various reprints; the latest one is a bill (Telecommunications Act, 2001) passed on property access and other matters related to telecommunications to reduce the overall compliance costs. A list of all the related NZ legislation is provided in Appendix A (NZ Legislation, n.d.).



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The national telecommunications network of NZ was commenced in 1862 with the construction of the first telegraph line connecting Littleton and Christchurch (The Encyclopaedia of NZ, n.d.). The setup of the first communication cable connecting NZ's North and South islands was in 1866 (NZ History, n.d.). In 1878 the NZ government installed the very first telephone line between Dunedin and Milton. This setup soon became very popular because of its ease of use and efficiency as compared with the existing telegraph technology. The NZ government then started working on telephone networks and exchanges. All the rights for these were kept with the government exclusively. In 1881 NZ's first exchange was opened in Christchurch (The Encyclopaedia of NZ, n.d.) which was then followed by Auckland and other major cities.

The first radio communication in NZ was established in 1902, and the NZ government put legislation in place for the use of radio communications under the Wireless Telegraphy Act 1903 (Wireless Telegraphy Act, 1903) to protect the government investments in wired communications and also to avoid interferences. This new mode of communication was fully embraced by NZ. From 1921 to 1980s the government's Post and Telegraph Office (P&T) was responsible for issuing licences for the use of radio communications. In 1945 the responsibilities of the P&T increased and the department became responsible for handling all the telecommunications services both internal and external to the country.

As the industry continued to grow rapidly a need for the division of NZ's P&T functions was identified. On 1st April, 1987 the P&T was functionally divided into three businesses, all state-owned. The Department of Trade and Industry (now known as the Commerce Commission) (NZ Commerce Commission, n.d.) was then made responsible for handling regulations regarding radio spectrum management. Later in 1987 the NZ government passed a *Telecommunications (Residual Provisions) Act* (Telecommunications (Residual Provisions) Act, 1987) to regulate telecommunications activities in the country.

In 1989 and the early 1990s NZ started to realise the benefits of new wireless technologies for communications. The NZ government passed the *Radio-Communications Act 1989* (Radiocommunications Act, 1989) to regulate the operations of communications in the country. In the same year the government passed the *Broadcasting Act 1989* (Broadcasting Act, 1989) to regulate the broadcasting of various channels and avoid interferences (as broadcasting also used radio waves).

To overcome the monopoly of the Telecom Corporation Ltd, in 1990 the Ministry of Commerce (NZ Commerce Commission, n.d.) first welcomed private companies to submit their applications to serve as network operators in NZ. At this point Civic Enterprises Limited, NZ played a leading role and secured the first licence to serve in NZ as a Telecommunication Network Operator. The government issued legislation



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(Telecommunications Network Operator (Civic Enterprises Limited) Order, 1989) to recognise Civil Enterprise Limited as a network operator in NZ for the purpose of Telecommunications (Residual Provision) Act 1987 (Telecommunications (Residual Provisions) Act, 1987). This was then followed by a number of companies who obtained their network operator licenses. Table 1 shows the legislation instruments issued for various companies to serve as network operators in NZ for the purpose of the Telecommunications (Residual Provision) Act 1987 (Telecommunications (Residual Provisions) Act, 1987).

**Table 1: NZ's Legislation Instruments for the purpose of Telecommunications (Residual Provision) Act 1987**

| | |
|---|---|
| 1 | Telecommunications Network Operators Order 1990 (Telecommunications Network Operators Order, 1990) |
| 2 | Telecommunications Network Operators Order 1992 (Telecommunications Network Operators Order 1992) |
| 3 | Telecommunications Network Operator (Trans Power NZ Limited) Order 1992 (Telecommunications Network Operator (Trans Power NZ Limited) Order, 1992) |
| 4 | Telecommunications Network Operator (Transpower NZ Limited) Order 1992 (Telecommunications Network Operator (Transpower NZ Limited) Order, 1992) |
| 5 | Telecommunications Network Operators Order 1993 (Telecommunications Network Operators Order, 1993) |
| 6 | Telecommunications Network Operators Order 1995 (Telecommunications Network Operators Order, 1995) |
| 7 | Telecommunications Network Operators Order (No 2) 1995 (Telecommunications Network Operators Order (No 2), 1995) |
| 8 | Telecommunications Network Operator (Integrity Television Limited) Order 1996 (Telecommunications Network Operator (Integrity Television Limited) Order, 1996) |
| 9 | Telecommunications Network Operators Order 1996 (Telecommunications Network Operators Order, 1996) |
| 10 | Telecommunications Network Operators Order (No 2) 1996 (Telecommunications Network Operators Order (No 2), 1996) |
| 11 | Telecommunications Network Operators Order (No 3) 1996 (Telecommunications Network Operators Order (No 3), 1996) |
| 12 | Telecommunications Network Operators Order 1997 (Telecommunications Network Operators Order, 1997) |
| 13 | Telecommunications Network Operator (University of Canterbury) Order 1998 (Telecommunications Network Operator (University of Canterbury) Order, 1998) |
| 14 | Telecommunications Network Operator (Vodafone NZ Limited) Order 1999 (Telecommunications Network Operator (Vodafone NZ Limited) Order, 1999) |
| 15 | Telecommunications Network Operators Order 2000 (Telecommunications Network Operators Order, 2000) |
| 16 | Telecommunications Network Operator (Powerco Limited) Order 2001 (Telecommunications Network Operator (Powerco Limited) Order, 2001) |
| 17 | Telecommunications (Northpower Limited) Network Operator Declaration (Telecommunications (Northpower Limited) Network Operator, Declaration, 2008) |
| 18 | Telecommunications (Datalight Limited) Network Operator Declaration (Telecommunications (Datalight Limited) Network Operator Declaration, 2008) |
| 19 | Telecommunications (Hamilton Fibre Network Limited and Velocity Networks Limited) Network Operator Declaration (Telecommunications (Hamilton Fibre Network Limited and Velocity Networks Limited) Network Operator Declaration, 2008) |
| 20 | Telecommunications (Unison Networks Limited) Network Operator Declaration (Telecommunications (Unison Networks Limited) Network Operator Declaration, 2009) |



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| | |
|---|---|
| 21 | Telecommunications (WASP NZ Limited) Network Operator Declaration (Telecommunications (WASP NZ Limited) Network Operator Declaration, 2009) |
| 22 | Telecommunications (Araneo Limited) Network Operator Declaration (Telecommunications (Araneo Limited) Network Operator Declaration, 2010) |
| 23 | Telecommunications (Christchurch International Airport Limited) Network Operator Declaration (Telecommunications (Christchurch International Airport Limited) Network Operator Declaration, 2010) |
| 24 | Telecommunications (Vivid Networks Limited) Network Operator Declaration (Telecommunications (Vivid Networks Limited) Network Operator Declaration, 2010) |
| 25 | Telecommunications (Enable Networks Limited) Network Operator Declaration (Telecommunications (Enable Networks Limited) Network Operator Declaration, 2011) |
| 26 | Telecommunications (Pacific Fibre Limited) Network Operator Declaration (Telecommunications (Pacific Fibre Limited) Network Operator Declaration, 2011) |
| 27 | Telecommunications (Snap Internet Limited) Network Operator Declaration (Telecommunications (Snap Internet Limited) Network Operator Declaration, 2011) |
| 28 | Telecommunications (Ultrafast Broadband Limited) Network Operator Declaration (Telecommunications (Ultrafast Broadband Limited) Network Operator Declaration, 2011) |
| 29 | Telecommunications (UltraFast Fibre Limited) Network Operator Declaration (Telecommunications (UltraFast Fibre Limited) Network Operator Declaration, 2011) |
| 30 | Telecommunications (Unison Fibre Limited) Network Operator Declaration (Telecommunications (Unison Fibre Limited) Network Operator Declaration, 2011) |

The next major step taken by the government of NZ was the approval of the Telecommunications Act 2001 (Telecommunications Act, 2001). The goal was to regulate the "supply of Telecommunications services". It allowed private companies to access the existing telecommunications network to sell their telecommunications services to the public.

The telecommunications industry kept on growing, and that growth led to the operational separation of Telecom and local loop unbundling in 2006. Telecom was then committed to provide broadband (high speed network) to the whole country by laying an optical fibre infrastructure. In 2010 Ultra Fibre Broadband came into play and was embraced by Telecom. In 2011 a structural separation of Telecom took place, and the company separated into a retail (Spark) and a wholesale (Chorus) operator (Telecommunications (TSO, Broadband, and Other Matters), Amendment Act 2011). The purpose was to efficiently deal with the growing demand from customers.



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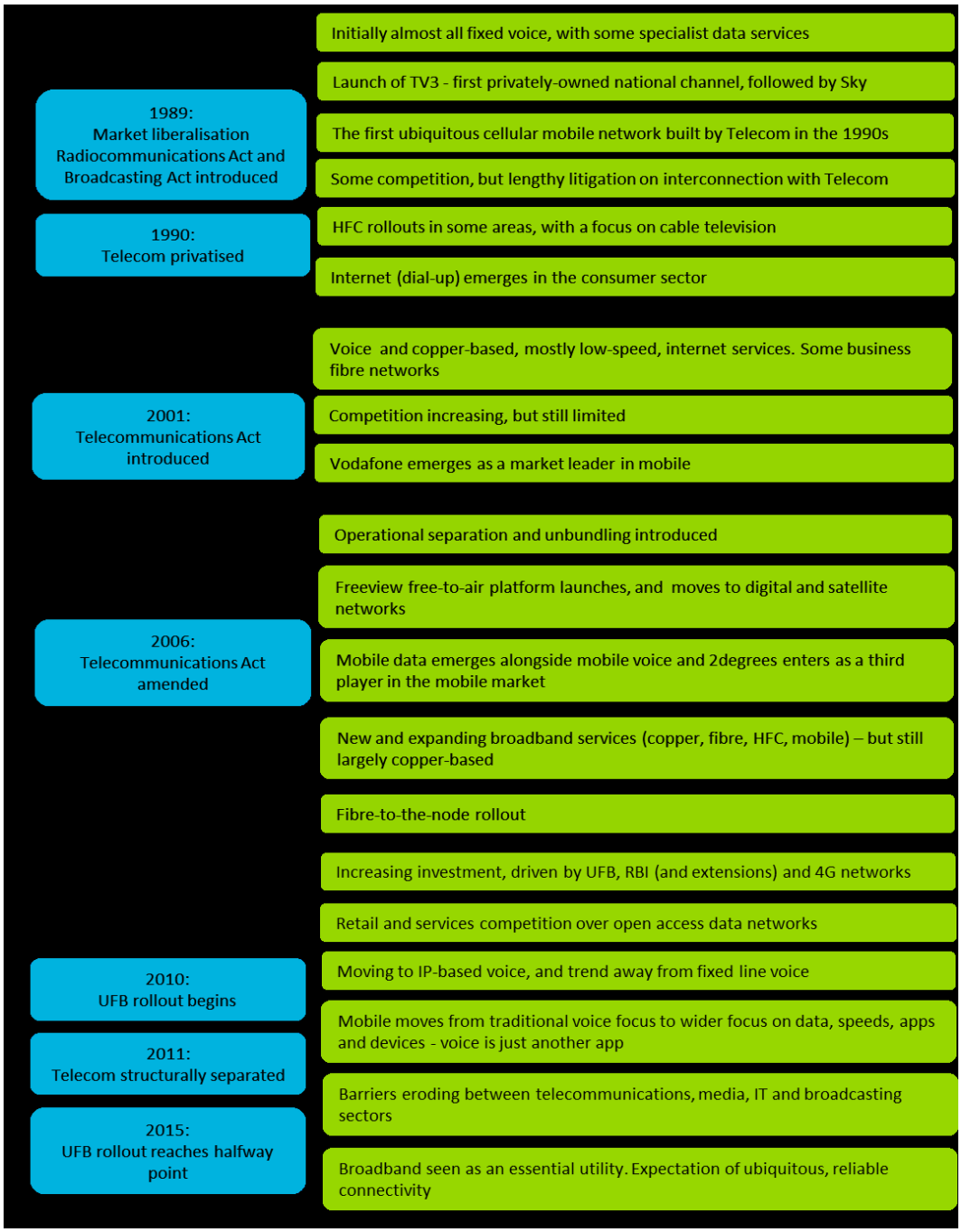


**Figure1: New Zealand Regulations History for Telecommunications; from the Ministry of Business and Employment; "Regulating communications for the future: Review of the Telecommunications Act 2001" (NZ MBIE, 2015)**

## Telecommunications Industry

In NZ the Telecommunications industry is broadly categorised as fixed-line infrastructure, fixed-line retail and mobile (NZ MBIE, 2015). In fixed-line infrastructure all the operators provide fixed lines including fibre and coaxial, while the fixed-line retail sector targets ordinary users and provides them with their telecommunications services using any fixed-line infrastructure. On the other hand, mobile services are targeting wireless



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communications where voice, text and data services are provided to the customers "on the go". Table 2 categorises telecommunication companies operating in NZ.

**Table 2: Telecommunications Industry**

| | Service Category | Companies involved |
|---|---|---|
| 1 | Fixed-line Infrastructure | Chorus, Hybrid Fibre-Coaxial Network by Vodafone and NZ's local fibre companies including Northpower Ltd., Waikato Networks Ltd. and Enabled Services Ltd. |
| 2 | Fixed-line Retailer | Spark, Vodafone, Callplus |
| 3 | Mobile | Spark, Vodafone, 2 degrees |

## Telecom Infrastructure

In NZ, the Telecom Infrastructure (including optical fibre) is maintained by Chorus, NZ's largest telecommunications network operator together with Crown Fibre Holdings. In addition to greater Auckland, Chorus has marked the start of the ultra-fast broadband (UFB) rollout in Wellington by deploying new network infrastructure in Kelson (Chorus NZ, 2011).

The UFB is being deployed in Christchurch City (South Island of NZ) by another company called Enable (Optical fibre deployment in Christchurch, n.d.). Overall, the NZ government regulates the investment and development of both fixed and wireless networks infrastructure in the country using the Telecom Act 2001 (Telecommunications Act, 2001).

## Telecom Services

### 1. Fixed-line telecom services

The NZ telecom industry continues to grow; however, the use of traditional fixed-line services has decreased since 2016 (Fixed Line Telecoms in NZ, 2015). There is an expected increase for fixed-line services forecasted as those connections improve their quality (NZ MBIE, 2015). Figure 2 shows the decrease in fixed-line users since 2013.



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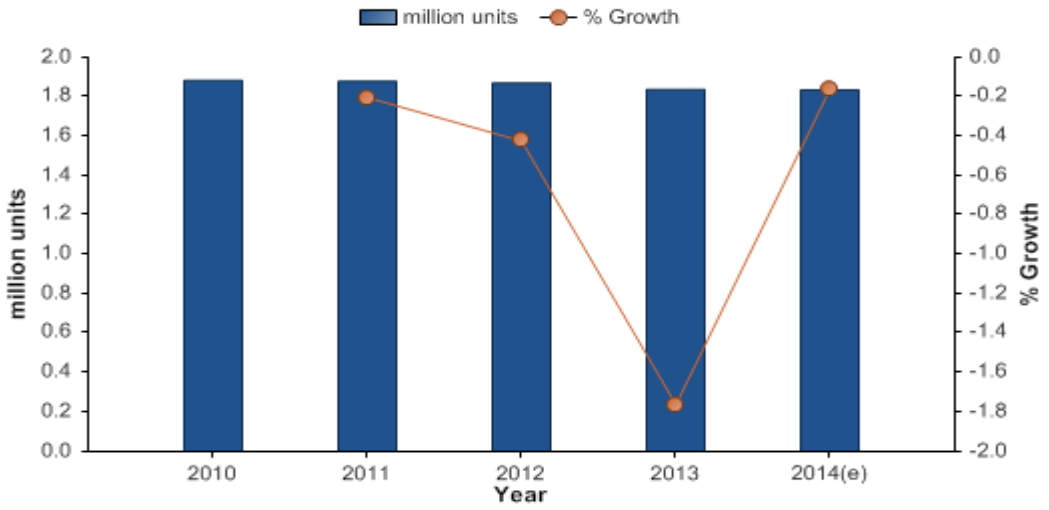


**Figure 2: Fixed-line telecommunications market volume in NZ: million units, 2010–14(e) (Fixed Line Telecoms in NZ, 2015) from MarketShare**

Spark (formerly Telecom Corporation of NZ) is still leading the fixed-line telecom services market in NZ and has 58.1% share of the current market (Fixed Line Telecoms in NZ, 2015). Figure 3 shows the market share for fixed-line telecom services among Spark, Vodafone and others.

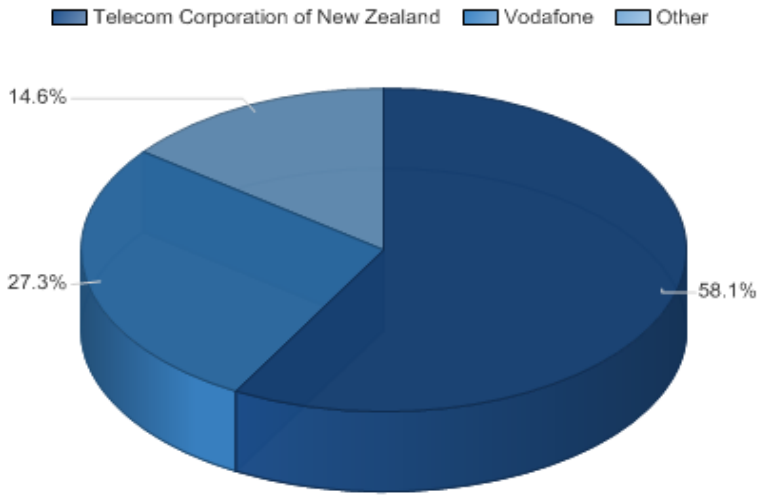


**Figure 3: Fixed-line telecommunications market share in NZ: % share, by value, 2014(e) (Fixed Line Telecoms in NZ, 2015) from MarketShare**

## 2. Wireless telecom services

NZ telecom users are more inclined to the use of wireless telecom services. The focus is on high speed data and mobility (NZ MBIE, 2015). There is a growing demand for using various services over the high speed data network without compromising on mobility. However,



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voice still plays the major role in wireless telecom services. As shown in Figure 4, voice services occupy the majority segment for wireless telecom usage (Wireless Telecommunication Services in NZ, 2015).

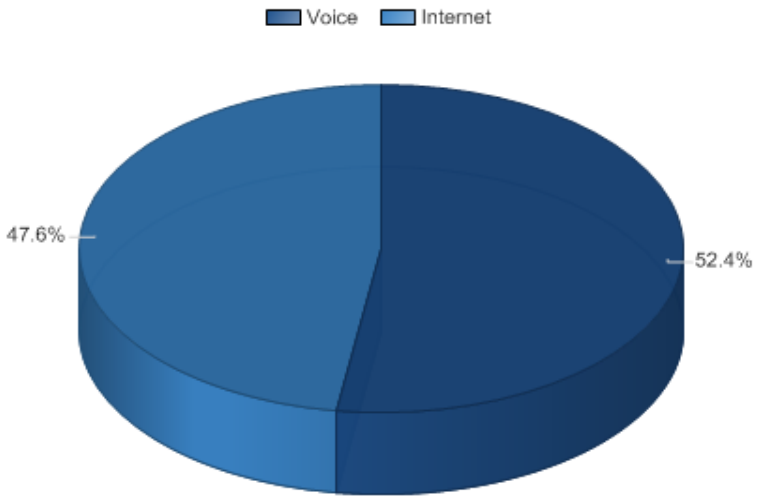


**Figure 4: Segmentation of wireless telecom services market in NZ: % share, by value, 2015(e) (Wireless Telecommunication Services in NZ, 2015) from MarketShare**

In contrast to the fixed-line telecom services, for wireless telecommunications services Vodafone is the market leader with a 38.4% market share (Wireless Telecommunication Services in NZ, 2015). Spark is struggling to keep its tradition of leading the telecom market and is very close to Vodafone with a 35.5% market share (Wireless Telecommunication Services in NZ, 2015). Figure 5 gives an overview of NZ's market share for wireless telecom services for various companies.

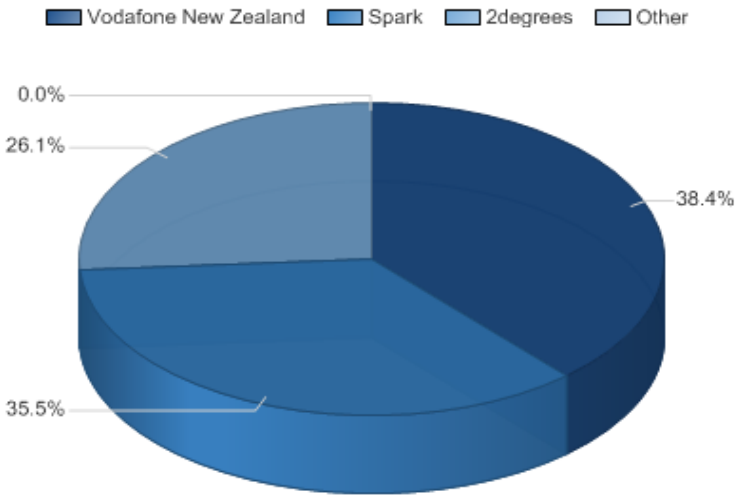


**Figure 5: Wireless telecom services market share in NZ: % share, by volume, 2015(e) (Wireless Telecommunication Services in NZ, 2015). from MarketShare**



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The wireless telecommunications sector is growing rapidly in New Zealand. Despite a small industry, NZ now constitutes 0.6% of the "Asia-Pacific Telecommunication Services" market value. Figure 6 illustrates NZ's share of the wireless telecom market in the Asia-Pacific region.

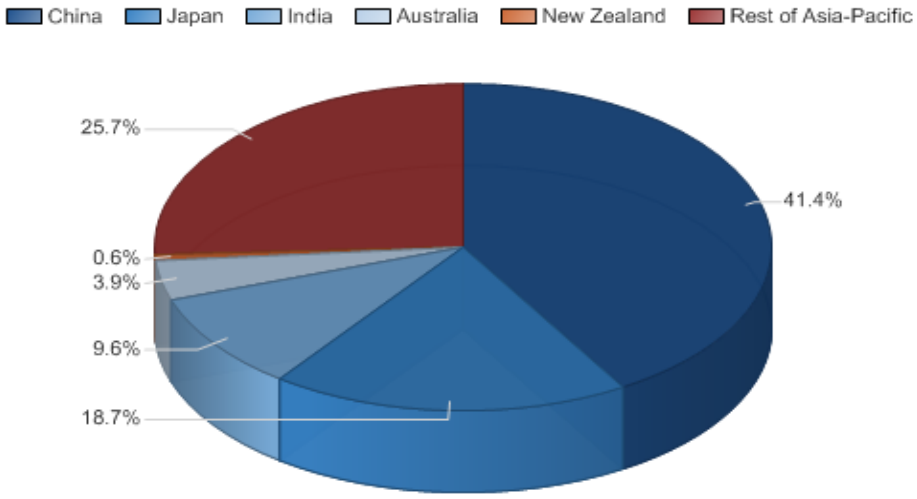


**Figure 6: Geographical segmentation of wireless telecom in NZ: % share, by value, 2015(e) (**Wireless Telecommunication Services in NZ, 2015**) from MarketShare**

## Current issues

The demand for high-speed communication with mobility is the key factor in the current picture of NZ's Telecom Sector. This demand is determined by the customer behaviour and demand for IT technologies and services (Chorus Quarterly Broadband Market Update, 2015). Currently New Zealanders are considered to be the fastest adopters of fixed broadband technologies more specifically Fibre (Telecommunications Enabling NZ's Future, 2016). Figure 7 depicts NZ's adoption of fibre technology and it compares it with several other countries.



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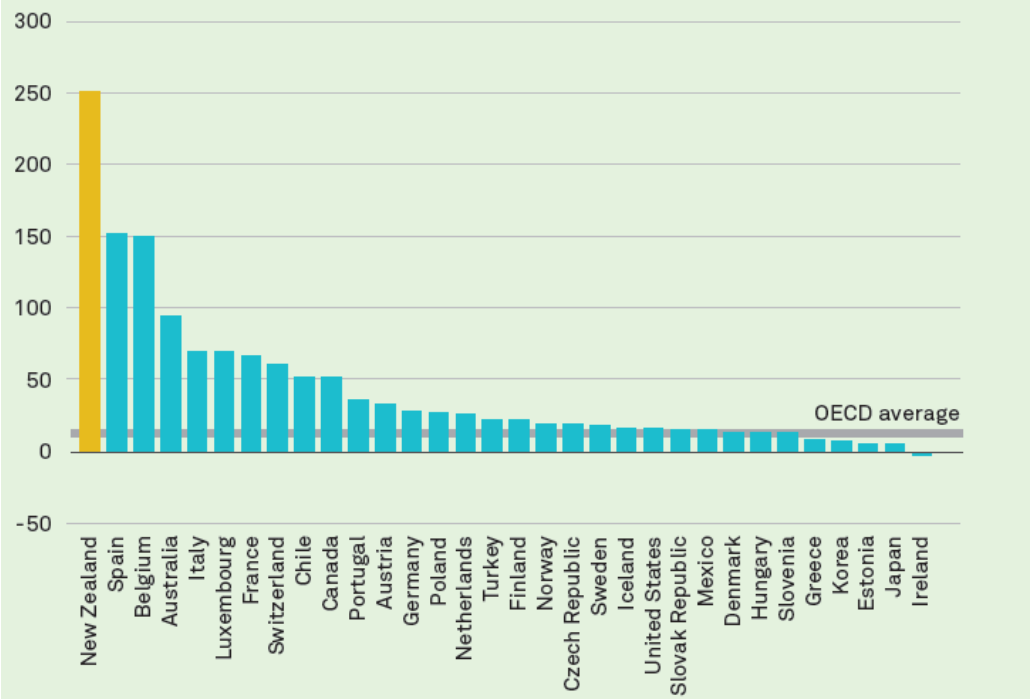


**Figure 7: Fibre connection growth for various countries; from Dec. 2014 to Dec. 2015 (**Telecommunications Enabling NZ's Future, 2016**)**

The high usage of Internet and related services is also highlighted in the NZ Telecommunication's Forum (TCF) report of 2016 (Telecommunications Enabling NZ's Future, 2016). The report focused on the continuing high usage of technology by New Zealanders. Figure 8 shows the data taken from the report presenting the main activities of Internet users. One can observe the steady increase in the use of Internet services in the country from 2006 to 2012. Internet Banking is regarded as one of the most popular activities by the Internet users, followed by social networking.



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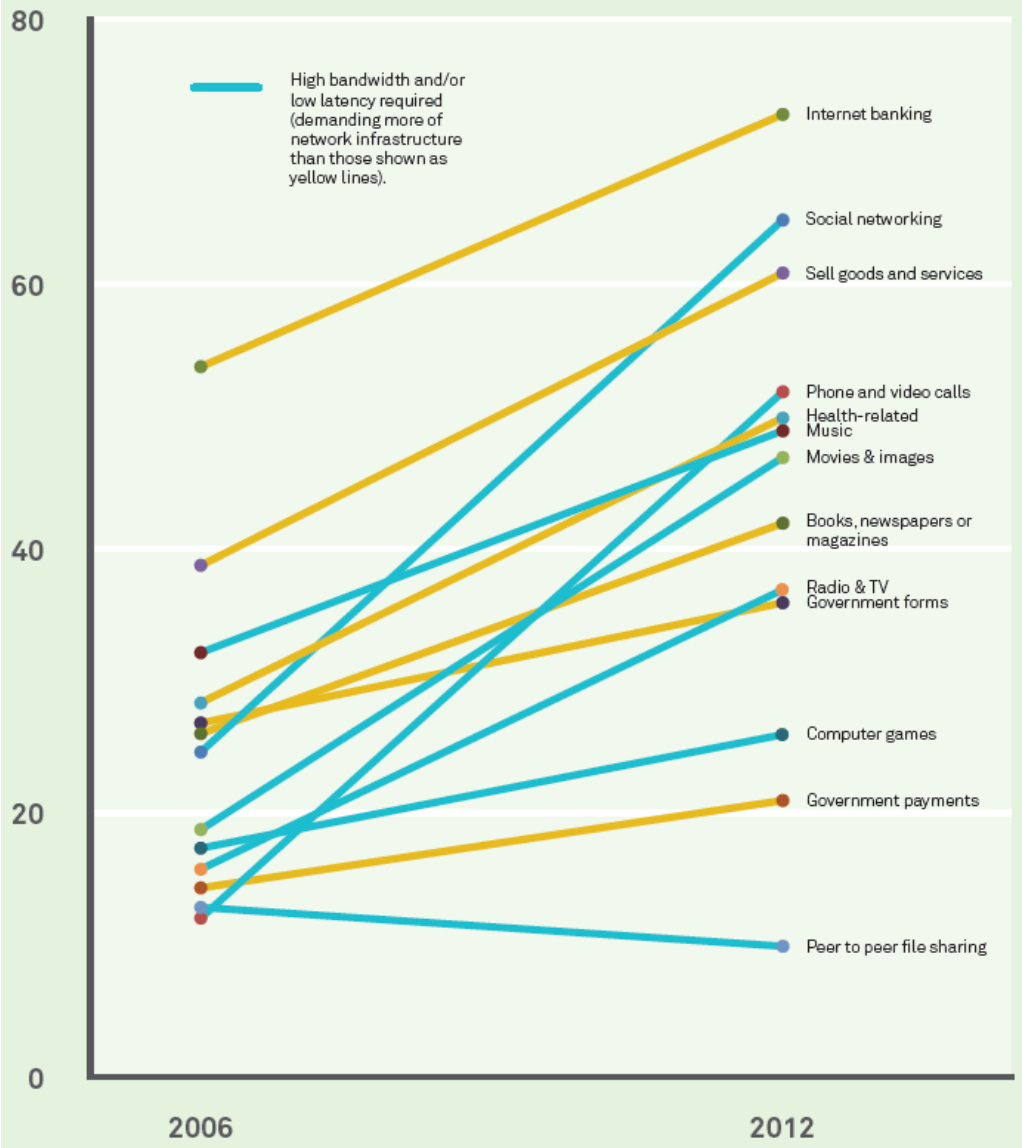


**Figure 8: Internet users' activities (in percentage) (Telecommunications Enabling NZ's Future, 2016)**

With the increase of internet usage of related services, especially video streaming, the Ministry of Commerce is forecasting an explosion in the usage of data (NZ MBIE, 2015). To satisfy the thirst for increasing connectivity, New Zealanders are adopting the use of high data packages or even moving to unlimited data packages (Telecommunications Enabling NZ's Future, 2016). Figure 9 shows the increase in usage of high data packages from 2012 to 2014. One can observe that there is a growing demand for high data packages even for unlimited packages in NZ.



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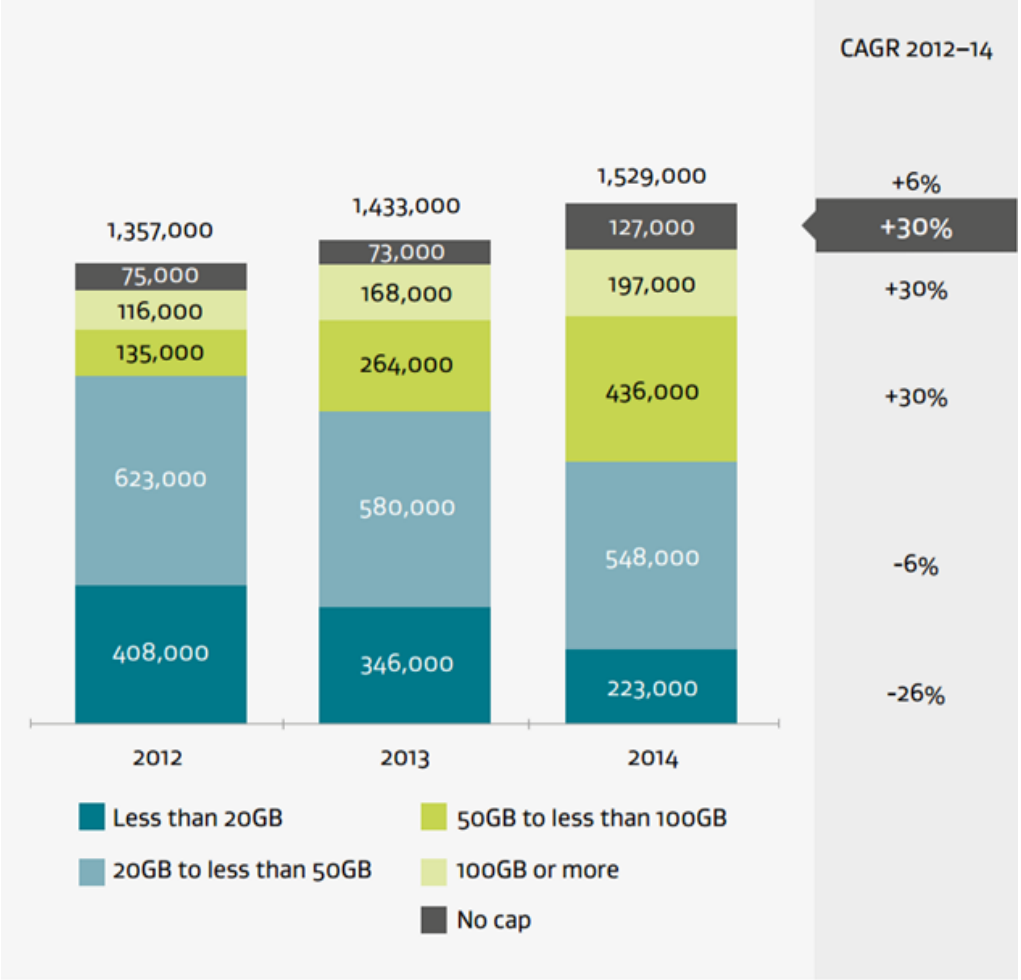


**Figure 9: from Ministry of Business, Innovation & Employment, NZ Sectors Report Series, Information and Communications Technology, 2015.**

Current forecasts indicate that data usage will continue to grow which also increases the competition for service providers; MBIE recognises this situation and trend and it has started working on the legislation to provide better communication services with reasonable prices to the customers while maintaining healthy competition in the market (NZ MBIE, 2015).

## Legislation and regulations affecting telecommunications market competition

The Commerce Commission of NZ (NZ Commerce Commission, n.d.) is the government agency which is responsible for enforcing the legislation in NZ. The main purpose is to encourage healthy competition in the country so New Zealanders can enjoy quality of product/services at competitive prices.

The first formal step in the relevant legislation was the *Commerce Act 1986* (Commerce Act, 1986) which was shortly followed by the *Telecommunications (Residual Provision) Act 1987* (Telecommunications (Residual Provisions) Act, 1987). April 01, 1989 is regarded as the first



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day of competition among the telecommunication service providers (NZ Statistics, n.d.). Later on, the *Telecommunications Act 2001* (Telecommunications Act, 2001) is considered as the main legislation for the telecom industry in NZ.

With the privatisation of Telecom NZ Ltd. in 1990 (NZ Statistics, n.d.), competition in the telecom industry really started to flourish. Various companies showed their interest in entering the industry and, since then, the investments in the telecom industry have continued to grow. Figure 10 shows the growth in telecom investments in NZ from 2005 to 2015 (2015 Annual Telecommunications Monitoring Report, 2016).

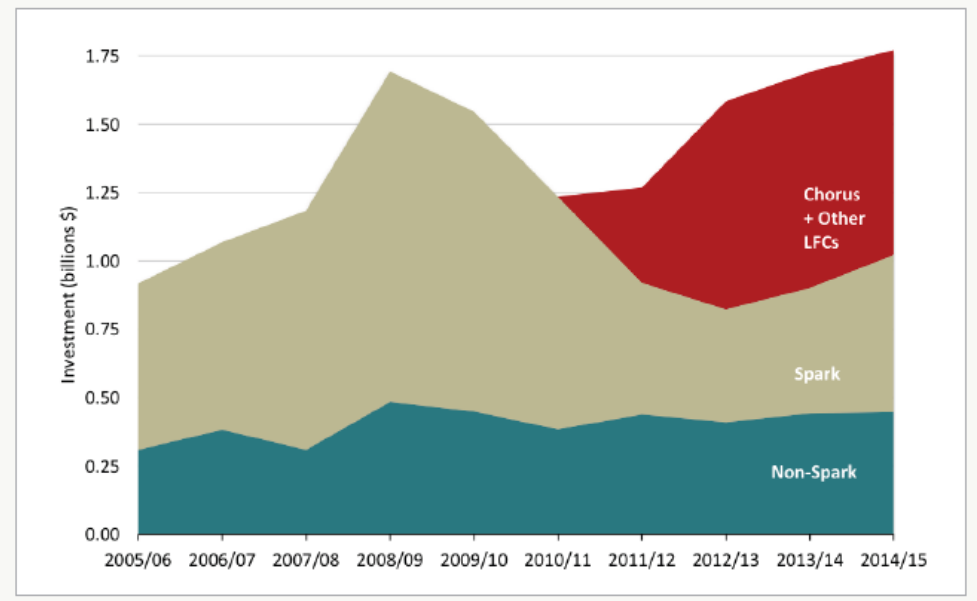


**Figure 10: Investment in Telecommunications Industry, NZ (2015 Annual Telecommunications Monitoring Report, 2016)**

Currently the Commerce Commission is using the *Telecommunication Act 2001* (Telecommunications Act, 2001) as the basis for regulation and legislation. The Act enables the commission to regulate the provision of telecommunication services in the country. In addition to the other functions of the Act, it is stated in it that the Act *"must monitor competition in telecommunications markets and the performance and development of telecommunications markets"* (Telecommunications Act, 2001). Table 3 lists the Acts and the corresponding main purpose that have been used to regulate the telecommunications industry in NZ.

**Table 3: Telecommunications Regulatory Acts in NZ**

| Year | Act | Main purpose/Goal |
|---|---|---|
| 1986 | Commerce Act 1986 (Commerce Act, 1986) | Regulates trade practices |



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| | | |
|---|---|---|
| 1987 | Telecommunications (Residual Provisions) Act 1987 (Telecommunications (Residual Provisions) Act, 1987) | Regulates the telecommunication service providers (residual provision) |
| 1989 | Broadcasting Act 1989 (Broadcasting Act, 1989) | Regulates linear broadcasting services (social aspects) |
| 1989 | Radio-communications Act 1989 (Radiocommunications Act, 1989) | Regulates creation and registration of right to use radio spectrum |
| 1903 | Wireless Telegraphy Act 1903 (Wireless Telegraphy Act, 1903) | Regulates the message passing using electricity |
| 2001 | Telecommunications Act 2001 (Telecommunications Act, 2001) | Establishes regulatory access regime and promotes competition |
| 2007 | Unsolicited Electronic Messages Act 2007 (Unsolicited Electronic Messages Act, 2007) | To promote safer and securer environment for Information and communication technologies in NZ by prohibited the prohibit unsolicited commercial electronic messages with a New Zealand link from being sent |
| 2013 | Telecommunications (Interception Capability and Security) Act 2013 (Telecommunications (Interception Capability and Security) Act, 2013) | Regulates the interception of telecommunication services by surveillance agencies |

## Recommendations for changes to legislation and regulations

The regulatory regime for telecommunications in NZ should be governed by the following five principles (NZ MBIE, 2015); these principles are consistent with the requirements of the *Telecommunications Act 2001* (Telecommunications Act, 2001):

1. **Clear Necessity:** Proper and clear justification for the need should be mentioned; regulations should not be imposed.
2. **Predictability:** There should be predictability and stability in the regulation regime.
3. **Proportionality:** The efforts put in following the regulations should constitute a fair proportion of the benefits accrued and the associated potential harm.
4. **Transparency and Accountability:** The enforcement and development of the telecom regulations should be transparent and the regulatory body should be accountable for all the actions taken in this regard.
5. **Flexibility, including technology neutrality:** The legislation and regulations regime should be flexible in approach and administration.



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In view of the rapidly changing environment of the telecommunications industry, two recommendations (i.e. market competition and meeting expectations) and a guideline for changes to the existing legislation and regulations in NZ are provided. These recommendations are based on the current and on-going demand for telecommunication services in the country as discussed in the previous sections.

## Market Competition:

The telecommunications legislation regime in NZ should create a healthy market competition within the companies/industries. Avoiding any particular company having a monopoly will also help the regulatory bodies to exert indirect control over the pricing of the telecommunications services.

## Meeting Expectations:

The telecommunications legislation regime in NZ should meet the expectations of customers, industry and administrative bodies (which are responsible for monitoring and enforcing the legislations). Meeting customers' expectations may involve providing agreed QoS with better prices; meeting industry expectations may include encouraging innovation and healthy industry environment to achieve their business objectives. Moreover, the telecommunications legislation regime should also support a cyclic approach for monitoring the existing regulations and to support proactive measures to be taken for legislations proper administration.

## Guideline:

Both the market competition and meeting expectations should be implemented along with the five existing legislation principles for telecommunications legislation in NZ. Figure 11 shows the proposed guideline/framework. It is anticipated that this will help the telecommunications regime in NZ to cope with the rapid growth and changing demands of the telecom industry in the country.



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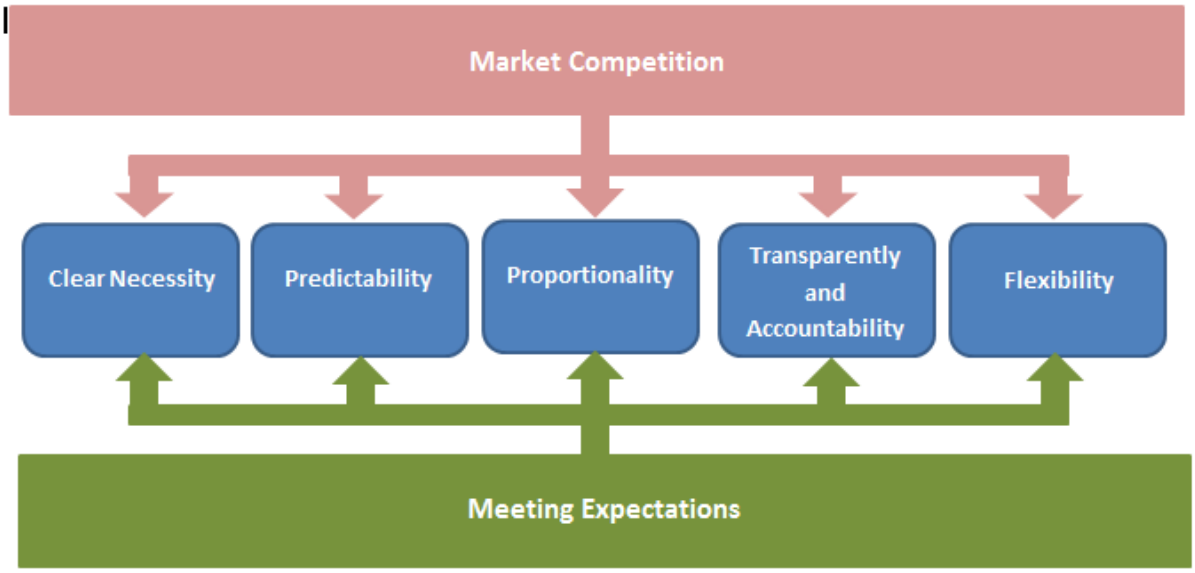


**Figure 11. The proposed guideline/framework for integrating market competition and meeting expectations with the existing five legislation principles**

## Concluding remarks

The telecommunications industry of NZ is rapidly growing. The growth is not only in terms of volume but also in terms of changing needs and technology. The Ministry of Business, Innovation and Employment is the government agency which deals with telecommunications legislation. The Commerce Commission of NZ is responsible for enforcing the regulations as per the approved legislative Acts. In NZ the existing legislation related to the telecom industry is bound to the *Telecommunications Act 2001* (Telecommunications Act, 2001). To address the challenges of the existing telecommunications industry some changes in the existing legislation regime are essential. However, this paper provides two recommendations and one guideline that would help telecommunications legislation regime will be strengthened and would be able to address the challenging needs of the telecom industry in NZ.

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http://doi.org/10.18080/ajtde.v4n4.70

# Appendix A – NZ Telecommunication Legislation

| | Year | Act / Legislation introduced |
|---|---|---|
| 1 | 1987 | Telecommunications (Residual Provisions) Act 1987 |
| 2 | 1989 | Broadcasting Act 1989 |
| 3 | SR 1989/299 | Telecommunications Network Operator (Civic Enterprises Limited) Order 1989 |
| 4 | 1989 | Radio communications Act 1989 |
| 5 | SR 1990/76 | Telecommunications Network Operator (Sky Network Television Limited) Order 1990 |
| 6 | SR 1990/92 | Telecommunications Network Operator (Kiwi Cable Company Limited) Order 1990 |
| 7 | SR 1990/285 | Telecommunications Network Operators Order 1990 |
| 8 | SR 1992/15 | Telecommunications Network Operators Order 1992 |
| 9 | SR 1992/205 | Telecommunications Network Operator (Trans Power NZ Limited) Order 1992 |
| 10 | SR 1992/205 | Telecommunications Network Operator (Transpower NZ Limited) Order 1992 |
| 11 | SR 1993/16 | Telecommunications Network Operators Order 1993 |
| 12 | SR 1995/84 | Telecommunications Network Operators Order 1995 |
| 13 | SR 1995/294 | Telecommunications Network Operators Order (No 2) 1995 |
| 14 | SR 1996/85 | Telecommunications Network Operator (Integrity Television Limited) Order 1996 |
| 15 | SR 1996/177 | Telecommunications Network Operators Order 1996 |
| 16 | SR 1996/213 | Telecommunications Network Operators Order (No 2) 1996 |
| 17 | SR 1996/315 | Telecommunications Network Operators Order (No 3) 1996 |
| 18 | SR 1997/41 | Telecommunications Network Operators Order 1997 |
| 19 | SR 1997/348 | Telecommunications (Call Data Warrant) Regulations 1997 |
| 20 | SR 1998/4 | Telecommunications Network Operator (University of Canterbury) Order 1998 |
| 21 | SR 1999/244 | Telecommunications Network Operator (Vodafone NZ Limited) Order 1999 |
| 22 | SR 2000/188 | Telecommunications Network Operators Order 2000 |
| 23 | 2001 No 103 | Telecommunications Act 2001 |
| 24 | 2001 | Radio communications Regulations 2001 |
| 25 | SR 2001/138 | Telecommunications Network Operator (Powerco Limited) Order 2001 |
| 26 | 2003 | Telecommunications Information Privacy Code 2003 |
| 27 | 2006 | Part 171 Aeronautical Telecommunication Services—Operation and Certification |
| 28 | SR 2007/214 | Telecommunications (Civil Infringement Notice) Regulations 2007 |
| 29 | SR 2007/302 | Telecommunications (Operational Separation) Determination 2007 |
| 30 | 2008 | Telecommunications (Northpower Limited) Network Operator Declaration |
| 31 | 2008 | Telecommunications (Datalight Limited) Network Operator Declaration |
| 32 | 2008 | Telecommunications (Hamilton Fibre Network Limited and Velocity Networks Limited) Network Operator Declaration |



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| | | |
|---|---|---|
| 33 | SR 2008/299 | Resource Management (National Environmental Standards for Telecommunication Facilities) Regulations 2008 |
| 34 | 2009 | Telecommunications (Unison Networks Limited) Network Operator Declaration |
| 35 | 2009 | Telecommunications (WASP NZ Limited) Network Operator Declaration |
| 36 | 2010 | Telecommunications (Araneo Limited) Network Operator Declaration |
| 37 | 2010 | Telecommunications (Christchurch International Airport Limited) Network Operator Declaration |
| 38 | 2010 | Telecommunications (Vivid Networks Limited) Network Operator Declaration |
| 39 | 2011 | Telecommunications (Enable Networks Limited) Network Operator Declaration |
| 40 | 2011 | Telecommunications (Pacific Fibre Limited) Network Operator Declaration |
| 41 | 2011 | Telecommunications (Snap Internet Limited) Network Operator Declaration |
| 42 | 2011 | Telecommunications (Ultrafast Broadband Limited) Network Operator Declaration |
| 43 | 2011 | Telecommunications (UltraFast Fibre Limited) Network Operator Declaration |
| 44 | 2011 | Telecommunications (Unison Fibre Limited) Network Operator Declaration |
| 45 | SR 2011/301 | Telecommunications (Declaration of TSO Instrument) Order 2011 |
| 46 | SR 2011/302 | Telecommunications (Structural Separation—Approval of Asset Allocation Plan) Order 2011 |
| 47 | SR 2011/325 | Telecommunications Operators (Commerce Commission Costs) Levy Regulations 2011 |
| 48 | SR 2011/377 | Telecommunications (Structural Separation—Approval of Proposal for Tax Purposes) Order 2011 |
| 49 | 2012 | Telecommunications (Metrolinx Limited) Network Operator Declaration |
| 50 | 2012 | Telecommunications (Woosh Wireless (NZ) Limited) Network Operator Declaration |
| 51 | 2012 | Telecommunications Whangarei Local Fibre Company Limited Network Operator Declaration |
| 52 | 2013 | Telecommunications Te Wananga o Raukawa Network Operator Declaration |
| 53 | 2013 | Telecommunications StrataNet Limited Network Operator Declaration |
| 54 | 2013 | Telecommunications (Amuri Net Limited) Network Operator Declaration |
| 55 | 2013 | Telecommunications (Gisborne.Net NZ Limited) Network Operator Declaration |
| 56 | 2013 No 91 | Telecommunications (Interception Capability and Security) Act 2013 |
| 57 | SR 2013/119 | Telecommunications (Approval of Code for Access to Multi-Unit Complexes) Order 2013 |
| 58 | 2014 | Telecommunications Lightwire Limited Network Operator Declaration |
| 59 | 2016 No 146-1 | Telecommunications (Property Access and Other Matters) Amendment Bill |



http://doi.org/10.18080/ajtde.v4n4.70

# The Australian Telecommunications Regulatory Environment

## An overview

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Abstract: The Australian telecommunications regulatory environment has moved since 1997 from the tentative deregulation of a managed fixed line duopoly (Telstra and Optus) to full deregulation, and then since 2010 back to having a state-owned enterprise (NBN Co) as the monopoly wholesale provider of fixed broadband services. At the same time, the more lightly regulated mobile sector has continued to grow.

This article provides an overview of the changing legal and regulatory regime for telecommunications and related services in Australia by charting the changes in regulation from 1901 to the present, and by indicating some of the changes that are still evolving. The article is intended to provide a framework for comparison between regulatory regimes in different jurisdictions, and as the basis for further analysis of the sector.

Keywords: Australian telecommunications law, regulation, telecommunications law, universal service obligation

## Introduction

This article provides an overview of the evolving legal and regulatory regime for telecommunications and related services in Australia. The approach taken is to address the core issues of the regulatory regime as a complete review would need to be addressed in a longer form (for example, Grant & Howarth, 2011).

To situate the current telecommunications regulatory environment, the article begins by considering the period leading up to partial deregulation and the managed duopoly that it established. In that context, the section also includes a discussion of spectrum management. The section ends in 1997.

The article then turns to the deregulatory and open competition period from 1997 to 2010. It provides a legislative and regulatory overview of the deregulatory approach before addressing the specific topics of Telstra privatisation, economic regulation, the access regime, carrier



http://doi.org/10.18080/ajtde.v4n4.76

powers and immunities and universal service. Each of the discussions is in the context of the regulatory environment from 1997 to 2010.

The next section deals with the current regulatory settings and has the title "The NBN era". It provides a context to the National Broadband Network and then moves on to discuss the legislative changes that flowed from policies associated with that network. The section deals with structural separation and changes to the access regime. It then considers Telstra's response, access regimes and disputation and the sector specific anti-competitive conduct provisions. The section moves on to consider universal service in the NBN era and dispute resolution and consumer protection as it stands at the date of this article. The section ends by providing a snapshot of the telecommunications sector in Australia.

The following section examines three areas of legislative and regulatory change. These relate to universal service, competition law and spectrum management. Finally, there are some brief conclusions.

## The managed duopoly

Prior to 1975, Australia did not follow the usual European model of a single Post, Telephone and Telegraph (PTT) administration for both domestic and international services. From 1901 until 1975, the Commonwealth Postmaster General's Department (PMG) had responsibility for domestic PTT operations together with international postal services, but international telecommunication services were managed separately. Authority was at the Commonwealth level using the powers over "postal, telegraphic, telephonic, and other like services" provided in in s.51(v) of the *Commonwealth of Australia Constitution Act 1901* (Cth). Starting in 1922, radio-based international telegraph and telecommunications services were contracted to Amalgamated Wireless Australasia (AWA). These services were provided by AWA from 1926 until 1946, when the Overseas Telecommunications Commission (OTC) was formed to take responsibility for all international telecommunications services (Nicholls, 2014c).

In 1975 the PMG was split into three bodies. Its postal operations were devolved to Australia Post and its domestic telecommunications operations to the Australian Telecommunications Commission, trading as Telecom Australia. The PMG's technical regulatory and other supervisory functions were transferred to a new Commonwealth Department of Communications. In 1981 a separate government-owned business Aussat Pty Ltd was created to provide domestic satellite-based services. In 1989, following the creation of an independent industry regulator, the Australian Telecommunications Authority (AUSTEL), the Australian Telecommunications Commission became the Australian Telecommunications Corporation (still trading as Telecom Australia).



http://doi.org/10.18080/ajtde.v4n4.76

The basic approach to fixed line telecommunications deregulation in Australia from 1989 onwards was a two-staged model of an initial "managed duopoly" followed by full deregulation. OTC and Telecom Australia were merged in 1992 to form the Australian and Overseas Telecommunications Corporation, renamed as Telstra Corporation Ltd in 1993. The Commonwealth owned satellite operator Aussat was granted a telecommunications licence and was offered for sale to create a second licensee. The second licence was allocated in a merit-based process (usually referred to as a "beauty contest") and the licence was awarded to Optus for a fee of $800 million. The second carrier licence included an allocation of spectrum at 900 MHz for GSM Services and the right to resell Telstra's analogue mobile services. A third mobile licence was issued to Vodafone in 1993, which was used for GSM services.

The *Radiocommunications Act 1992* (Cth) (the Radcomms Act) created three forms of spectrum use licence and these are relevant to the telecommunications regulatory environment. The traditional licence is known as an apparatus licence. It provides a right to an individual named entity to use technically specified equipment (apparatus) at specified locations. Apparatus licences were expected to have a term of one year with no expectation of renewal. The specifications include antenna type and height. A second licence type known as a spectrum licence defines boundary conditions in geography (licence area), frequency (adjacent channel interference) and time (the term, usually 15 years). Spectrum licences were expected to be sold using a price-based allocation, usually by an auction (Cave & Webb, 2015; Salant, 2014). The final form of licence is a variant of an apparatus licence, known as a class licence. A class licence defines the technical parameters of apparatus that can be used without an individual licence. Examples include garage door openers, cordless phones and WiFi equipment.

Between 1992 and 1997, there were three regulators in the telecommunications and broadcasting space. AUSTEL was responsible for the technical regulation of telecommunications and had taken over this function from Telecom Australia. The Spectrum Management Authority (SMA) was responsible for spectrum matters and the Australian Broadcasting Authority for broadcasting transmission and content regulation. Telstra remained a state-owned enterprise throughout this period.

The managed duopoly ran from 1992 to 1997. The current legislation, the *Telecommunications Act 1997* (Cth) (the Telco Act) received Royal Assent in 1997. The Telco Act is subject to the Radcomms Act.

## Deregulation

As part of the deregulatory and open competition phase, the regulation of telecommunications changed. The SMA and AUSTEL merged to form the Australian Communications Authority



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(ACA), the spectrum and telecommunications technical standards regulator. In 2002, the ACA and the ABA merged to form the Australian Communications and Media Authority (ACMA) (Nicholls, 2014a). The ACMA is an independent regulator that must respond to a Ministerial Direction if required to under the law. The independent competition regulator, the Australian Competition and Consumer Commission (ACCC) was tasked with delivering workable competition in an environment with many "natural monopolies" or bottlenecks. In 1997, telecommunications sector specific competition law was introduced as Part XIB and Part XIC of the then *Trade Practices Act 1974* (Cth). That legislation was replaced in 2010 by the *Competition and Consumer Act 2010* (Cth) (CCA).

The Telco Act was designed to provide a "light touch" regulatory environment. It did this by creating greater obligations for infrastructure providers than for service providers with little infrastructure. Anyone who provides a service for the carriage of communications to the public falls into a class known as carriage service providers. These carriage service providers fall into a class and are bound by the "service provider rules" associated with that class. The first of these rules is compliance with the Telco Act. In the initial phase deregulation, many entrants were simple resellers of Telstra services. As a result, they were carriage service providers. Carriage service providers that used their own infrastructure of any significance (defined in terms of length of fibre or operations of a cellular network) were determined to be carriers. Carriers need to be individually licensed and the regulator holds a register of carriers. There is no equivalent register of carriage service providers as joining such a register is not compulsory.

The Telco Act provides for a high degree of self-regulation for the sector. It has a policy objective in section 4 to promote "the greatest practicable use of industry self-regulation". Essentially, the industry can set its own codes through Communications Alliance and these codes apply to those who agree to be bound. The regulator can make binding codes, or incorporate codes into service provider rules, if the self-regulatory regime does not deliver outcomes which are aligned with policy.

The deregulatory framework provided what was expected to be a relatively clear delineation of roles in a vibrantly competitive sector. Telstra, the state-owned enterprise, would be privatised and would compete on a relatively level playing field. Carriers and carriage service providers would be able to seek access to bottleneck facilities and services under economic regulation provided by the ACCC. Technical regulation would be primarily driven by the industry, but with intervention possible by the technical regulator, if required. The Department of Communications and the Arts, under a variety of titles, provides policy direction in the telecommunications sector.



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The balance of this section describes the implementation of this framework and the following section, "The NBN Era" describes the changes that create the existing regime.

## Telstra privatisation

Until 1997, Telstra remained a 100% state-owned enterprise. The company was part privatised in three tranches. In 1997, one third of Telstra was sold, a further 16% in 1999 and 31% in 2006. The balance of 17% was held by the Future Fund (Australia's sovereign wealth fund to finance public servant superannuation). The Future Fund has sold down its stake in Telstra and ceased to be a major shareholder in 2011 and was "market weight" in the same year (Nicholls, 2014c).

## Economic regulation

The concept of "long-term interest of end-users" (LTIE) is one which is core to the regulation of competition issues in telecommunications in Australia. The objectives of the LTIE are set out in section 152AB(2) of the CCA. Broadly, the objectives of the LTIE are divided into three elements. The first is the promotion of competition. The second is achieving any-to-any connectivity in relation to carriage services that involve communication between end-users. The third is encouraging economically efficient use of, and economically efficient investment in, infrastructure by which telecommunications services are supplied and any other infrastructure by which telecommunications services are, or are likely to become, capable of being supplied.

The early thinking was to consider the extent to which an access network could be regarded as a natural monopoly. In general the fixed sector has an access network which has the characteristics of "a natural monopoly" (Sharkey, 1983). Definitions of natural monopoly are not pejorative and are often associated with the concept that a monopoly can, in some circumstances, be a socially desirable outcome (Gasmi et al, 2002).

In applying these objectives, the ACCC has historically (ACCC, 1999) considered that "long-term" has an economic meaning. That is, a balancing of the flow of costs and benefits to end-users over time in relation to the criteria. The ACCC has used a standard approach of regarding competition as the process of rivalry between firms, where each market participant is constrained in its price and output decisions by the activity of other market participants. The benefits of competition to end-users are lower prices, better quality and a better range of services over time. In turn, any-to-any connectivity encompasses the objective of end-users on different networks being able to communicate with each other, that is, not constraining consumers to the services of a single network provider. The approach to the LTIE analysis



http://doi.org/10.18080/ajtde.v4n4.76

assumes that economic efficiency has the three components of productive efficiency, allocative efficiency and dynamic efficiency.

Clearly, these objectives are interrelated. In many cases, the LTIE may be promoted through the achievement of two or all three of its elements simultaneously. In other cases, there may be some trade-off between the different elements, and this creates a need to weigh up the different effects. For example, it may be in the LTIE to receive a benefit for even a short period if its effect is not outweighed by any longer-term cost.

## The access regime

There are two meanings for the term "access" in telecommunications policy. The first is the ability of end users to acquire services, and the second is the ability for a competing service provider to have the use of bottleneck network services or infrastructure owned by another party. Competition policy and associated access regimes deal only with the second meaning, which is used in this section of the article.

There is no general right of access to telecommunications services provided in the CCA. There is a right of access to "declared" services and access must be provided on non-discriminatory terms and conditions. These are known as the Standard Access Obligations (under Division 3 Part XIC of the CCA). The ACCC is empowered to declare bottleneck services if declaration is in the LTIE. Before the NBN era, a declared service was subject to a "negotiate/arbitrate" framework. The access seeker was expected to negotiate price and non-price terms and conditions of access. If the negotiations failed, then an arbitrator would be determined to set those conditions. The arbitrator of last resort was the ACCC and all access arbitrations were heard by the ACCC. There were two major problems with the process. The first was that the access provider benefited by delay in the process. The second was that the main objective of access seekers was price discovery. As the results of arbitrations were not usually public, the system was initially a poor price discovery mechanism. In later years, the ACCC provided media releases in respect of determined pricing for some services.

## Carrier powers and immunities

Under Schedule 3 of the Telco Act, carriers have a right to enter land to inspect the land and install and maintain facilities and infrastructure. In doing this, they also need to meet the requirements of the *Telecommunications Code of Practice 1997*.

Carriers are exempt from some state and territory laws, including planning laws in respect of low-impact facilities. Otherwise, and as a practical matter, they must comply with state and territory laws and planning regulations. Low-impact facilities include some radiocommunications facilities (panel antennas), underground and above-ground housing,



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underground and some aerial cables, public payphones, emergency and co-located facilities. The facilities are designated by the Minister for Communications and set out in the *Telecommunications (Low-Impact Facilities) Determination 1997*.

The Telecommunications Code of Practice sets out the obligations on carriers. They must give 10 days' written notice before they start any work and pay compensation for financial loss or damage they do. Carriers, and their contractors, must comply with good engineering practice and consider noise limits, the environment, and obstruction of essential services when installing or maintaining facilities. Compliance with the Telecommunications Code of Practice is a licence condition.

## Universal service

The universal service regime was established under the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (Cth). It provided a mechanism to ensure universal access to a voice telephony service defined as a standard telecommunications service. It also provided payphone access. Before the NBN era, this service was provided by the universal service provider (Telstra). The cost of the universal service was determined by the Minister or the regulator and that cost was shared between all licensed carriers (including Telstra) in proportion to their revenue.

# The NBN era

The original National Broadband Network (NBN) was initially conceived by the Rudd Labor Government as a Commonwealth Government subsidy of up to $4.7 billion to the private sector to construct a fibre to the node network to provide broadband services to 98% of Australian homes and businesses. At the time of the policy decisions, it was thought that 12 Mbps was broadband and that the actual network cost would be about $12 billion (Scales, 2014). Although there were six bidders for the project, the review committee determined that Telstra's 12 page bid was not compliant. In January 2009, the review committee found that none of the other bidders would provide a solution that represented "value for money".

In April 2009, the Commonwealth Government announced that it would establish a new state owned enterprise called NBN Co. This would be charged with the construction of a fibre to the premises (FTTP) network to 90% of Australian homes and businesses, with the remaining 10% receiving services using terrestrial wireless (7%) or satellite (3%). The mix between FTTP, wireless and satellite was changed in the Commonwealth Government's Statement of Expectations that was provided to NBN Co in December 2010 to 93% FTTP, 4% terrestrial



http://doi.org/10.18080/ajtde.v4n4.76

wireless and 3% satellite. It was anticipated that the enhanced NBN network would cost up to $43 billion (Swan, 2009).

NBN Co was directed by the shareholder Ministers (Communications and Finance) to provide services at a uniform wholesale price throughout Australia.

After the election of the Abbott Coalition Government in 2013, the technology choices were changed. The current expectation of technology mix from NBN Co is about 20% FTTP, about 8% wireless and satellite, about 22% hybrid/fibre coaxial (HFC) cable and the balance as fibre to the node, fibre to the basement or fibre to the distribution point (NBN Co, 2016).

Regardless of technology, the NBN is a Layer 2 Ethernet access network which in many locations is provided as a replacement for existing fixed infrastructure with an assumption of monopoly characteristics. The legislative framework provided exemptions which would allow extensions of existing fibre networks of up to one kilometre and this "grandfather" provision has been used by TPG to deliver fibre to the basement services in metropolitan areas.

## Legislative changes in the context of the NBN

Since 2009 there have been two significant changes made to legislation to reflect the NBN policy.

The first was to the Telco Act in 2010. This created a choice for Telstra. It could either voluntarily provide a structural separation undertaking in a form acceptable to the ACCC, or be subject to certain limitations to its business operations. The separation undertaking would require Telstra to cease using its own fixed access network to deliver retail services but would acquire services on a wholesale basis from NBN Co. The business limitations were that Telstra would be unable to acquire spectrum licences in the 700 MHz and the 2.5 GHz band, which would be expected to be used for Long Term Evolution (LTE) mobile services. In addition, Telstra could be prevented from continuing its 50% ownership of the pay television business Foxtel and its ownership of its HFC network. This policy might seem to be an unusual regulatory approach. A more usual form would be to permit a functional separation and to enforce a structural separation if the functional separation did not achieve the intended effects. The policy reflected in the legislation was to avoid a regulatory taking. That is, the acquisition of property other than on just terms under section 51(xxxi) of the Constitution. Telstra was given the option to undertake (on a voluntary basis) to enter in to a structural separation undertaking. If it did not exercise that option, then the Government would functionally separate it (not a regulatory taking) with significant restrictions.

The second change was to the CCA (Nicholls, 2014b). The ACCC can still declare services. However, there are now four potential access arrangements with a defined order of



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precedence. The primary access to a declared service is by an access agreement. This is a written agreement, capable of specific performance between the access seeker and the access provider for the supply of a declared service. Access agreements have to be filed with the ACCC within 30 days of execution but the ACCC does not publish these or keep a public register of the filings. The second form of arrangement is a special access undertaking (SAU). An SAU is provided under Div 5 of Pt XIC of the CCA and is an undertaking that specifies terms and conditions upon which an access provider proposes to supply a carriage service to any access seeker. There is a prohibition on the ACCC declaring a service which is the subject of an SAU and it is consequently a "safe harbour" regime. The ACCC must assess SAUs in accordance with s 152CBD of the CCA and only accept or reject the undertaking. A binding rule of conduct (BROC) made by the ACCC under s 152BD is the third form of access arrangement. A BROC is temporary (lasting less than a year) and would be used by the ACCC to correct an unintended consequence of an access determination. It does not require a public inquiry before it is made. The fourth form of access arrangement is a safety net. This is provided through an access determination by the ACCC. An access determination sets a minimal set of price and non-price conditions for the supply of a declared service by an access seeker to an access provider.

## The role of Telstra

In 2011, Telstra entered into definitive agreements with NBN Co and the Government to lease and sell infrastructure required to construct the National Broadband Network. The net present value of the agreements to Telstra was $9 billion in 2011 terms (NBN Co, 2011). The total to Telstra was boosted to $11 billion under the universal service arrangements set out below. This amount was not clearly set out as an element of the $43 billion originally announced (Swan, 2009). In 2012, Telstra gave a Structural Separation Undertaking (SSU) to the Australian Competition and Consumer Commission (ACCC) which committed Telstra to become a wholesale customer of NBN Co and not to use its own local loop infrastructure to provide both wholesale and retail services. The SSU has extensive migration provisions and there is a Migration Plan, which was also accepted by the ACCC. The definitive agreements have been amended to reflect the changes in technology mix over time while retaining the same net present value for Telstra (Telstra, 2014).

## Access regimes and disputes

The negotiate/arbitrate element of the initial access regime was problematic as it did not provide efficient price discovery. As part of the SSU, Telstra agreed to provide rate card prices for declared services (Telstra, 2016). The final access determinations for declared services provide a large amount of pricing information, but the rate card generally provides the prices associated with the declared service and associated commercial services. All access seekers



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understand the highest price that they, and their competitors, will pay and a dispute is no longer necessary for price discovery.

## Anti-competitive conduct

As mentioned above, the current CCA includes sector-specific competition law in Part XIB. This Part prohibits anti-competitive conduct by a carrier or carriage service provider. Relevantly, the CCA provides, at section 151AJ, that a carrier or carriage service provider engages in anti-competitive conduct if the carrier or carriage service provider has a substantial degree of power in a telecommunications market and takes advantage of that power in that or any other market with the effect, or likely effect, of substantially lessening competition in that or any other telecommunications market. That is, breach of the law is determined by an "effects test".

The important distinction between anti-competitive conduct in the telecommunications sector and anti-competitive conduct under general competition law is that section 46 of the CCA requires a "purpose test" rather than an effects test.

Part XIB sets up a scheme by which the ACCC issues one of two forms of "competition notice" if it considers that there has been anti-competitive conduct. The competition notice regime has a reverse onus of proof, in that the carrier or carriage service provider that receives the notice must show that it has not engaged in the conduct. As a practical matter, no competition notices have been issued by the ACCC since 2006.

## Universal service in the NBN era

As part of the definitive agreements between Telstra, NBN Co and the Government, Telstra was awarded a 20-year contract to provide universal voice and payphone services. The Telstra Universal Service Obligation Performance Agreement (Department of Communications and the Arts, 2016c) sets out the scope of services to be performed by Telstra in delivering standard telephone services and payphone services.

This has created an unusual environment where Telstra is the retail telecommunications provider of last resort and NBN Co is the wholesale telecommunications provider of last resort. The approach to funding the universal service obligation remains the same. There is also a policy discrepancy. NBN Co is required to provide universal wholesale access to a broadband service that could carry voice over Internet Protocol and Telstra is required to provide universal retail access to fixed voice service. The shortcomings of the current approach to universal service have been discussed in this journal (Coutts, 2015; de Ridder, 2015; Gregory 2015; Raiche, 2015).



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In December 2016, the Government announced that it would seek to impose a charge on all fixed line broadband services to create an explicit price signal for the cost of providing broadband on a universal wholesale price basis. This approach adopts a recommendation of the Vertigan Review (Vertigan, 2014). The effect of this approach would be a charge of about $7 per broadband service (mainly payable by NBN Co and TPG). The exposure draft of the legislation, provides that NBN Co will become a Statutory Infrastructure Provider (SIP), which will require it to supply wholesale services upon request from retail service providers. When the NBN is rolled out, NBN Co will be the universal SIP.

## Dispute resolution and consumer protection

The Telecommunications Industry Ombudsman (TIO) is an independent alternative dispute resolution body for small business and residential consumers in Australia who have unresolved complaints about their telephone or internet services. Disputes are funded by the carrier, rather than the customer (TIO, 2016). Customers can complain to the TIO after they have attempted to resolve the matter with the carriage service provider (Li, 2016).

Under the SSU, there is an alternative dispute resolution body for wholesale customers of Telstra who are of the view that Telstra has not provided equivalence of outcomes under the SSU or the Migration plan. This is the Independent Telecommunications Adjudicator. The Independent Telecommunications Adjudicator can only resolve non-price disputes in relation to certain fixed line declared services. These are services which are listed on the Telstra rate card, referred to above. The Independent Telecommunications Adjudicator reports that there have been no such disputes in the financial years from 2013 to 2016 (Independent Telcommunications Adjudicator, 2016). It is reasonable to suppose that simplicity of price discovery has contributed to this outcome.

The *Telecommunications Consumer Protections Code* is an industry code developed by Communications Alliance and registered with the ACMA. The code sets minimum standards for telecommunications providers in their interactions with customers. This includes standards for advertising services, contracts, billing, sales techniques and redress mechanisms. The TIO can investigate breaches of the code.

The Australian Communications Consumer Action Network (ACCAN) is a Commonwealth Government funded but independent body that represents Australian consumers on telecommunications issues. ACCAN works with industry and Government to promote the availability, accessibility and affordability of telecommunications services.



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## The telecommunications sector

In November 2016, the ACMA released its annual Communications Report for 2015/2016 (ACMA, 2016). This provides a useful basis for describing the telecommunications sector in Australia. One of the key features is the extent to which service number are dominated by mobile services. As set out in Table 1, the number of mobile internet services is 28 million and growing at 3.7% per year. There are seven million fixed line internet service subscribers.

Table 1: Number of services

| Service | June 2016 (million) | 2015-2016 change |
|---|---|---|
| Mobile services (voice and data) | 32.59 | 2.6% |
| Mobile handset internet subscribers | 21.97 | 4.6% |
| Mobile wireless broadband | 6.04 | 0.6% |
| Total mobile internet services† | 28.01 | 3.7% |
| Total internet service subscribers‡ | 35.26 | 4.5% |
| Fixed line telephone services | 8.18 | -3.8% |

This is in the context of a decline in users of fixed line telephone users as set out in Table 2. However, it is important to note that the increasing number of "cord cutters" may still have a fixed line service to deliver broadband. Telstra is obliged to provide unbundled network elements that are declared services. However, it does not offer an explicit "naked DSL" service. That is, all Telstra retail offerings include voice services and this may have an influence on the statistics presented.

**Table 2: Number of users**

| Service | June 2016 (million) | 2015-2016 change |
|---|---|---|
| Fixed-line telephone users | 12.56 | -4.0% |
| Smartphone users | 13.75 | 2.5% |
| Mobile phone users without a home phone | 5.78 | 7.6% |



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Telstra has a significant portion of the number of mobile services on each of the three mobile networks as shown in Table 3, which includes mobile virtual network operators and resellers.

**Table 3: Mobile share**

| Carrier | June 2016 services (million) | June 2016 (share) |
|---|---|---|
| Telstra | 17.76 | 54.5% |
| Optus | 9.34 | 28.6% |
| Vodafone Hutchison Australia | 5.49 | 16.9% |

The ACMA also reported that 1,098,634 premises had activated an NBN service, an increase of 126 per cent since June 2015. This includes 942,356 premises connected to the NBN fixed network and 156,278 premises connected to fixed-wireless or satellite services.

# Areas of legislative and regulatory change

## Changes to universal service

In April 2016, the Treasury set out terms of reference for the Productivity Commission to review the universal service regime. These included:

> *The primary policy question to be addressed in this inquiry is to what extent, in the evolving Australian telecommunications market, Government policies may be required to support universal access to a minimum level of retail telecommunications services. This will involve a consideration of the nature, scope and objectives of a universal service obligation, whether the retail market for relevant services will deliver appropriate outcomes for consumers without Government intervention and, if not, what options should be considered by Government to deliver universal services and the costs and benefits of these interventions*. (Productivity Commission, 2016)

The Productivity Commission delivered an issues paper in June 2016 (Productivity Commission, 2016) and is expected to provide its final report in April 2017.

In this context, ACCAN has joined a coalition of advocacy groups called the Regional, Rural and Remote Communications Coalition (ACCAN, 2016). Other members are the National Farmers' Federation (NFF), the Country Women's Association of NSW, the Isolated Children's Parents' Association and AgForce Queensland.



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This group is advocating for five outcomes as measures of equitable connectivity for regional and remote consumers:

a) A universal service obligation that is technology neutral and provides access to both voice and data;
b) Customer service guarantees and reliability measures to underpin the provision of voice and data services and deliver more accountability from providers and NBN Co;
c) Long term public funding for open access mobile network expansion in rural and regional Australia;
d) Fair and equitable access to Sky Muster satellite services for those with a genuine need for the service, and access which reflects the residential, educational and business needs of rural and regional Australia; and
e) Fully resourced capacity building programs that build digital ability, and provide learning and effective problem solving support for regional, rural and remote businesses and consumers.

## Changes proposed in competition law

On 1 December 2016, amendments to the CCA were introduced into the parliament as the *Competition and Consumer Amendment (Misuse of Market Power) Bill 2016*. These included amendments to section 46 of the CCA which introduce an effects test. Following a short consultation by the Department of Communications and the Arts (Department of Communications and the Arts, 2016a), most of the sector specific competition elements of Part XIB will be removed if the amendments are passed (Gregory, 2016). These amendments flow from the recommendations of the Harper review of competition law and policy (Harper et al, 2015). It is likely that the section 46 amendments will be opposed by the Labor Opposition, but accepted by the cross bench of the Senate.

## Changes proposed in spectrum management

Australia was one of the first countries to use spectrum auctions and its spectrum licences, based on boundary conditions rather than being determined by technology, were leading concepts when the relevant legislation was put in place in 1992. However, as the issues raised by these case studies illustrate, there are problems with the complexity of processes and the associated uncertainty. As a result, the Commonwealth Government conducted a spectrum review that reported in May 2015 and that report has been accepted (Department of Communications and the Arts, 2015). There has also been consultation on the drafting



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instructions for the proposed legislation (Department of Communications and the Arts, 2016b).

There are three proposed policy changes:

The first is a **reduction in the complexity of processes**. The number of legislative instruments required to change spectrum use or to conduct an auction would be reduced significantly.

The second is the **introduction of a unified licensing regime**. The terms of the licence, including the processes that will occur at the end of the term of the licence, will be included on the face of that licence. This means an environment where licence charges will reflect the expectations of renewal. The single licensing arrangement is also designed to facilitate spectrum sharing on an underlay or overlay basis. It will also permit flexibility if technologies emerge which facilitate sharing.

The third is a **process for valuing spectrum**. Ultimately this process will assist in ensuring that the amounts that are budgeted for sales of spectrum are realistic and do not necessarily drive reserve prices.

# Conclusions

This article has provided an introduction to the telecommunications legislative and regulatory environment in Australia. It has demonstrated the evolution from a managed duopoly emerging from an atypical PTT environment through a deregulatory period to the NBN era, which is characterised by a state-owned enterprise operating a monopoly fixed line network and a vibrantly competitive mobile sector.

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http://doi.org/10.18080/ajtde.v4n4.76

# The Shape and Implications of Korea's Telecommunication Industry:

# Crisis, Opportunity and Challenge

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## Abstract

This article aims to provide readers with a better understanding of the telecommunication industry in Korea by reviewing its development and progress. Firstly, a brief history of Korean telecommunications is supplemented by an overview of the social and economic factors the Korea is experiencing. Secondly, this paper focuses on the government's role as a key player within industry and relevant policy is then analysed. Thirdly, an analysis of the market competition and regulation systems as well as customer protections is conducted. Finally, IoT and 5G as technologies are introduced as well as new services that Korea is currently focusing on, to enable it to continue leading the global market into the future. The 3 key themes that emerge through this paper are crisis, opportunity and challenge.

Keywords: Korean telecommunication industry and its history, Telecommunication Company, law and regulation, stakeholders within telecommunication market, strategic move for the future

## Introduction

The term 'digital society' has become a common expression used to define today's technology driven lifestyle. Innovative technologies that have been introduced have generated dynamic discussions regarding social activities as a whole. It has become clear that the areas leading the change are that of the ICT and related internet industries.

Within this general context, South Korea has been in the spotlight of discussion during recent years due to the visible results emerging from its highly developed ICT environment. South Korea tops the ranking in terms of households with internet in the ICT Development Index established by the International Telecommunication Union (ITU), with 98.5% of



http://doi.org/10.18080/ajtde.v4n4.75

Korean households having access to the internet. The Index also notes that 84.3% of the population has used the internet (ITU 2015). Due to this, Korea is often used as a benchmark by many countries seeking development of their ICT infrastructure. However, it was not until the 1990s that the Korean telecommunications industry had become a focal point for researchers and policy makers.

How did Korea achieve such ICT success in such a short period of time? How did Korea become globally competitive within the industry? How did the government, policy and market regulations influence the process? And how can Korea continue to maintain its global leadership in the coming years?

To answer these questions, this paper will examine the dynamic features of Korea's telecommunication industry. It will also discuss some of the implications for countries that are trying to become more globally competitive. This is achieved by altering the rules and regulations of the telecommunications industry to promote growth and fair competition within the marketplace. Firstly, it will provide a brief history of telecommunications in Korea from a social and economic context. Secondly, an explanation of the key role played by the Korean government and the policies implemented are shown. Thirdly, competition and regulation within the market system, and discuss consumer protection will be outlined. Finally, technologies and services that Korea is currently developing to maintain their status as a leading country will be briefly examined.

## Brief history

Modern telecommunications in Korea began with the launching of a telegraph service between Seoul and Inchon city on October 28th, 1885. For more than one hundred years, the telecommunications industry developed gradually as a series of government sponsored projects until it was formally nationalised into a state-run monopoly in the 1970's, as was the case in many other developed nations during that same period.

A few years after the Korean War came to an end, the Korean economy began to grow again, leading to a surge in telephone usage among Koreans. This prompted the government to recognise the telecommunications industry as a national priority with the potential to connect citizens while increasing economic activity. To better harness the potential of telecommunications technology, the Korean government revised its plan for the industry.

In December 1981, the Korean government began privatisation of the industry by releasing Korea Telecom Authority – KTA (later renamed KT) from government control. At the time, KTA was the exclusive service provider of telecommunication in Korea – being fully owned and operated by the Korean Ministry of Communications. Five years later, KT completed a



http://doi.org/10.18080/ajtde.v4n4.75

long-distance digital switching network and automated all of its telephone lines and has continued to make some visible outcomes.

In 1984, a new privately held telecommunications company named Korea Data Telecom (KDT) entered the industry by developing a value-added network (VAN). This eventually allowed the information sector to grow within the telecommunications industry. Soon afterward, Korea Mobile Telecommunication Co. (now SK Telecom) and LGU+ entered the market, providing network, mobile, and internet services as privately-held companies. Finally, by 2002 KT had been fully privatised as the Korean government sold off the remainder of its shares to private investors. Through this process, the market moved from a state-run monopoly into an Oligopoly, centred on competition (Cho 2002).

It is important to note that the Korean government wanted the industry to become more competitive. To achieve this end, and to move away from being a state-run monopoly, it auctioned off two licences, which eventually allowed SK telecom and LG U+ to enter the industry. Market forces eventually played out as these new entrants competed with KT for market share resulting in an oligopoly. Hence, government policy as well market competition had an influence on the outcome.

These rapid changes in market structure from a government-run monopoly into an oligopoly resulted in fundamental changes to the industry. Due to the series of policy changes that were aimed to create competition, the telecommunication industry expanded rapidly. Increased industry competition led to improvements in technology to satisfy customer demand. Some researchers assess this as a transition period into a quality-oriented competitive system. The government set a goal to increase the penetration of telecommunications infrastructure throughout Korea. Since then, they have installed more than a million lines every year since 1982. With the total number of telephone lines exceeding 10 million in 1987, Korea opened the era of one telephone per household (Cho 2002). As of 2015, wire telephone subscribers have exceeded 26 million. This means that on average, there are at least two lines per household when considering the whole population of 51 million people. See Table 1 for the trends of telephone penetration during the 1980's in Korea.



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**Table 1 Telephone penetration in Korea during the 1980s**

| Classification | 1983 | 1985 | 1988 | 1990 |
|---|---|---|---|---|
| Telephone lines (Thousand) | 5,337 | 7,538 | 11,239 | 15,293 |
| Subscribers (Thousand) | 4,810 | 6,517 | 10,306 | 13,276 |
| Per 100 inhabitants | 12.0 | 15.8 | 24.6 | 31.0 |

*. Source: Cho, S. 2002. Telecommunications and Informatisation in South Korea. *Netcom 16,* 1-2.

The second turning point in Korean telecommunications was during the 1990s. During this period, Korea developed its own satellite communication and broadcasting systems, launching three satellites called Koreasat 'Moogoongwha 1', 'Moogoongwha 2' and 'Moogoongwha 3', the first two being sent out in 1996 and the third in 1999.

It is important to note that the Korean economy experienced its worst recession in 1998. At the time, Korea lacked foreign exchange reserves, and was bailed out by the International Monetary Fund (IMF). The Korean economy appeared hopeless in the aftermath of the financial crisis (Lee & McNulty 2003; Ypsilantis & Min 2000).

Surprisingly, the Korean economy managed to recover quickly and gain momentum. During that time there was a worldwide boom in the ICT industry generating many new productive opportunities. Korea was able to capitalise on this trend, and managed to develop its domestic ICT infrastructure while establishing its own ecosystem of production within the industry – with the emergence of many new companies. Growth came rapidly without interruption, and many of these new investments in ICT became profitable. The value added from ICT production in 2000 accounted for 13.4 percent of GDP, which was a significant increase from 8.6 percent in 1997. Total ICT production rose from 81.1 trillion won in 1998 to 115.0 trillion won in 1999 and 148.2 trillion won in 2000 – up 30.5 percent in 1999 and 28.9 percent in 2000 in comparison to the previous year. Korea considers itself to still be experiencing the ICT boom. This boom has been spurred on by the development of a number of new technologies including mobile phones, internet-related industries, broadband, digital-TV, and wireless Internet. The emergence of this wide variety of new technologies has played a crucial role in boosting economic activity alongside the traditional IT industries such as personal computers (PC) and semi-conductors (Ypsilantis & Min 2000).

The recession provided Korea with both crises and opportunity. Several exemplary companies, such as KT, SK telecom, and LG U+ were able to become more competitive primarily due to the Korean government's strategic policies.

The Korean government viewed the financial crisis as an opportunity to change their economic constitution. Considering the global trend such as ICT boom, the government



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actively provided policy support to foster the telecommunication industry. Telecommunication companies followed government policy as well, and have developed their global competitiveness through domestic market competition. The recession was a catalyst to improve the industry and its related environments.

Based on this competitiveness, the companies are still considered to be prime movers within the telecommunications industry, having played a key role in leading the recovery. Since the mid of 1990s, this group of companies has maintained a dominant share of the market in the majority of sectors within the telecom industry. Among with these companies, KT maintains the largest share in telephones, Internet Protocol Television (IPTV) and satellite markets, while SK telecommunication is the primary player in the market for mobile phones. LG U+ has maintained third position in the market for wired telephones, mobile, high speed internet and IPTV. However, when looking at the Internet of Things (IoT) sector, LG U+ lead the market, allowing it to maintain a competitive advantage since 2015 when it launched its first IoT service in Korea. See Table 2 for the market shares of telecommunication companies by business sector in Korea.

**Table 2: The market share of telecommunication companies by business area**

| | Mobile phone | Wired telephony | High speed Internet | IPTV |
|---|---|---|---|---|
| KT | 28.8% | 80.5% | 49.7% | 46.4% |
| SK Telecom | 50% | 16.3% | 29.5% | 30.5% |
| LG U+ | 21.1% | 3.1% | 20.7% | 23% |

*. Source: www.msip.go.kr. The ratios in this table have differing reference point. IPTV data is as of August 2016 and the others are as of the end of 2015.

Figure 1 gives an overview of the progress and current status of Korea's ICT environment. According to the National Information Agency (NIA) of Korea, 82.1% of the population have used the internet and 95.5% have used mobile ICT devices. When looking at the figures for e-cash usage, internet banking and volume of online shopping, we can observe the market has grown significantly. When looking at internet speed, the majority of Koreans have enjoyed broadband internet averaging 23.6Mbps. Additionally, the broadband penetration rate runs at 94% of users (NIA 2014), which means that almost everyone in Korea has access to the internet while enjoying a high speed. It is important to note that Korea is currently the country with the fastest internet speed, and the highest rate of access in the world.



http://doi.org/10.18080/ajtde.v4n4.75

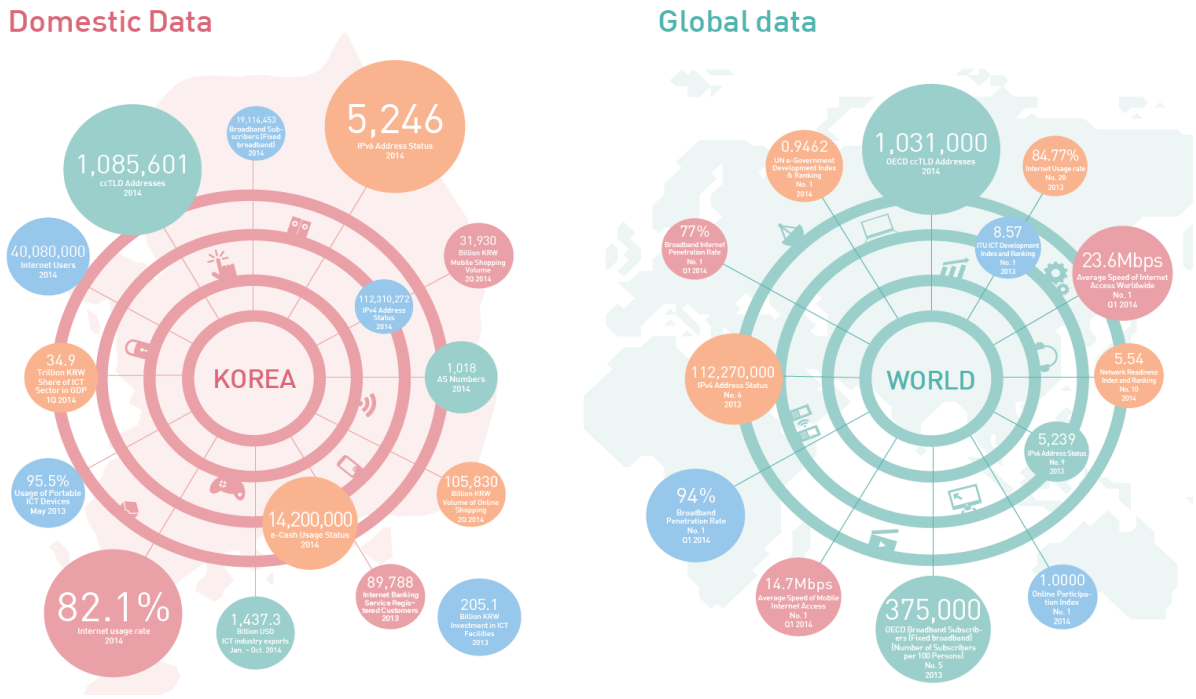


**Figure 1 Progress and status overview of Korea ICT environment as of 2014**

Source: http://www.nia.or.kr

## Government and policy

Constructing an effective national telecommunication and information infrastructure has become one of the highest priorities among governments around the world. The purpose of a nation's telecommunications infrastructure is no longer exclusively used to search for information and to communicate; policy makers should view it as a fundamental pillar for citizens' economic participation, contributing to its the social digital fabric while promoting economic competitiveness in the global marketplace. That may be the reason why governments around the world have decided to improve their ICT infrastructure, and Korea has been no exception to this trend.

In order to quickly adapt to changes in the telecommunications environment, the government body in charge of ICT related policies has been re-organised four times since 1980. For example, television technology evolved into IPTV, leading to the convergence of telecommunication related services and media broadcasting into a common sector. This eventually resulted in the restructuring of government bodies overseeing these areas in order to better suit the evolution of the marketplace.

Whenever a new president came into power, the name of the government body overseeing the sector was updated and its structure was reorganised. However, what has remained constant is the government's role in supporting and encouraging the industry. Originally the Korean Communication Commission (KCC) was the sole government body overseeing the



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industry. However from 2013 onwards, KCC has maintained its role of regulating the industry while an additional organisation called Ministry of Science, ICT & Future Planning (MSIP) was created to promote growth. It was reasoned that two specialised organisations could more effectively manage the industry than a single large one. In this regard, whether this separation was more effective is still a matter of contention. See Table 3 for the regulatory changes in telecommunication and broadcasting in Korea since 1980.

**Table 3 Korean regulatory reform in broadcasting and telecommunications**

| | 1980 | 2001 | 2008 | 2013 - present |
|---|---|---|---|---|
| Broadcasting | Ministry of Culture and Tourism/Korean Broadcasting Communication (MCT, KBC) | Korea Broadcasting Commission (KBS) | Korea Communications Commission (KCC) | Korea Communications Commission (KCC) |
| Telecommunication | Ministry of Information and Communications (MIC) | Ministry of Information and Communications (MIC) | | Ministry of Science, ICT and Future Planning (MSIP) |

MSIP, newly established in 2013, primarily deals with promoting the industry while KCC focuses on maintaining market regulations among market participants. In terms its role as a commissioner and regulator, KCC is equivalent to the Federal Communications Commission (FCC) of the U.S. However, the two commissions are different in terms of their range of responsibility and status, since KCC only oversees regulations related to the telecommunication and broadcasting market, whereas the FCC has a broader mission (D. Kim, 2011).

Previous studies have shown that the role of the Korean government in developing the ICT environment was far reaching and profound. According to previous studies (Cho 2002; Shin 2007; Kim 2016; Rhee 2016; Hong, Byun, & Kim 2016), the government's role can be classified into direct or indirect. Shin's study (2007), analysed ICT policy and the Korean government's role therein, thus providing a clearer viewpoint from which to understand the relationship between government and industry. The research shows the direct role that the Korean government played in developing the industry. This participation was classified them into four parts: controller, builder, regulator and market investor. Secondly, Shin (2007) classified the role of the government as an indirect facilitator into four distinct indirect roles: strategist, guider, leader and integrator. See Table 4 for each role of Korean government for the ICT industry.



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**Table 4: Roles of the Korean government for the ICT industry**

| Direct role | Indirect role |
|---|---|
| **A controller**:<br>• To set goals and guidelines for private industries to follow<br>• To maintain effective market conditions for industry allowing players to compete | **A strategist**:<br>• To be the main organisation that develops a vision for the country. Taking on a leadership role<br>• To define the direction of future growth<br>• To Allocate the appropriate resources in order to reach the information age within Korea |
| **A builder**:<br>• To provide the physical infrastructure that would allow citizens to access information on the internet | **A guider**:<br>• To maintain the proper environment for innovation and growth in ICT.<br>• To channel and mobilise financial and human resources within the ICT sector and related activities |
| **A regulator**:<br>• To create an environment for fair competition to deter fraudulent, undesirable businesses practices<br>• To create an environment for risk taking in business without encouraging rampant abuse of the system | **A leader**:<br>• To establish ICT as a national priority<br>• To provide a national plan for ICT and networked readiness<br>• To launch large ICT projects<br>• To accelerate ICT adoption by government departments and the public sector, for example, by promoting e-government |
| **An investor**:<br>• To be a producer and buyer of ICT and ICT-related products. Provide tax incentives and special grants<br>• To encourage local enterprises<br>• To invest in technology so as to exploit the new medium of trading | **An integrator**:<br>• To ensure that the various programs and projects, such as Digital Cities, are well integrated<br>• To become a cohesive strategy in allowing Korea to thrive in the information age |

Source: Shin, D. 2007. A critique of Korean National Information Strategy: Case of national information infrastructures. *Government Information Quarterly*, 24(3), 624-645.

Considering these changes, one can estimate that the Korean government has actively intervened in newly emerging markets in order to quickly make them more globally competitive. The government may have also come to the conclusion that waiting for the market to mature without government intervention could have taken too long to yield desirable results.

The Korean government has strongly intervened in the ICT industry with systematic and specific policies to carry out its planned strategies since the 1980s. In 1984, the Korean government started the first phase of development of the National Basic Information Strategy (NIS), in which it created five major networks. They are: the National Administration Information System; the Financial Information System; the Education and Research Information System; the National Defence Information System; and the National Security Information System (Jeong & King 1996; Shin 2007).



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From 1987 to 1991, the NIS aimed to establish IT as the foundation of economic growth in Korea by building the physical computer networks of the National Computerisation Agency (NCA). The second phase involved the deployment of Korean Information and Communication Infrastructure (KII). The government successfully connected public and private infrastructure throughout Korea, and as a result, was able to provide the Korean economy with a competitive advantage, as most other countries had yet to establish a robust ICT environment.

Following the success of KII, Korea improved its existing ICT strategy to adapt to advances in technology by developing a new phase dubbed IT839, named after eight services (Wibro, DMB, Home network, Telematics, RFID W-CDMA, Terrestrial D-TV, and Internet telephone (VoIP)), three infrastructures (BcN, U-sensor network, and IPv6), and nine new growth engines (Next-generation mobile communication, Digital TV, Home network, IT SoC, Next-generation PC, Embedded SW, Digital content, Telematics, and Intelligent service robot). The Korean government aims to lead the development of these projects while establishing standards that will be adopted worldwide. In the process, they hope to achieve a "first mover" advantage for Korean companies involved in the production and development of new devices and components. Compared to its previous projects, which were no more than technical roadmaps, IT839 has a more comprehensive view focusing on interconnectivity between infrastructure, services, and applications.

Previous focus has been on simple IT investment and strategy was centred on the outcomes and benefits of individual projects. IT839 focused on the development of the basic telecommunications infrastructure for Korea. In addition, IT839 followed a realistic plan of action aligned with a national strategic blueprint (Shin, 2007). The implementation of this policy and strategy created remarkable outcomes. Korea established itself as a competitive player in the global market while becoming a leader in the majority of ICT related domains. In 2006, spurred by its own success, the Korean government revised the IT839 strategy, with the goal of creating a ubiquitous network environment throughout Korea, dubbing this updated strategy u-IT839. In 2013, a partially updated strategy named ICT WAVE was launched by the newly elected Park Geun-hye administration which focused on achieving four goals. Firstly, developing the world's leading ICT environment, secondly activating R&D ecology, thirdly revitalising the ICT related industry, and finally enhancing life in general. Implementation of these initiatives has continued to be successful. See Table 5 for ICT policy and strategy implementation in Korea during the last 30 years.



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**Table 5 strategies established in Korea for ICT development and policy goals set by the strategies**

| | NIS | KII | IT839 | u-IT839 | ICT-WAVE |
|---|---|---|---|---|---|
| Goal | IT for economic growth | Deploy information and communication infrastructure | Promote information society | Revising and updating IT839 and Ubiquitous networks | World best ICT, Activating R&D ecology, Vitalising industry, Enhancing life |
| Period | 1987-1991 | 1993-2000 | 2004-2006 | 2006-2012 | 2013-2017 |
| Administration | National Computerisation Agency (NCA) | National Computerisation Agency (NCA) | Ministry of Information and Communication (MIC) | Ministry of Information and Communication (MIC) | Ministry of Science, ICT and Future Planning (MSIP) |
| Focus | Building physical computer networks | Building information system | Architecture, standard, interoperability and interface of IT service and Infrastructure | Convergence Service | Leading future technology such as IoT, 5G and developing its related service |
| Achievement | Basic networks building | Interconnecting public and private infrastructure | Upgraded Korea's IT level, IT industry's revitalisation | Unknown | |

Source: Shin, D. 2007. A critique of Korean National Information Strategy: Case of national information infrastructures. Government Information Quarterly, 24(3), 624-645. www.msip.go.kr, www.kcc.go.kr. Some of content within table was modified and supplemented by the author.

# Competition, regulation and protection

## Market competition

After separating KT from government, Korea has kept its telecommunications market open in order to promote competition based on the principles of market liberalisation. Since then, the regulatory framework in Korea has undergone progressive reforms by abolishing unnecessary legal impediments in order to facilitate the entry of firms which provide telecom infrastructure and related services. This means that if any player in the market meets the legal conditions, they may operate a business in the field of telecommunications. This policy has enabled enhanced competition in several telecommunication related industries such as wired, mobile and value-added markets.

Recently, due to the advancement and convergence of ICT related technologies, markets which had once been distinctly differentiated, can now be viewed as whole. This trend of convergence has fostered an environment of increased competition while a variety of media platforms and services have emerged allowing the industry to become more competitive vis-a-vis its global counterparts. In the past, telecommunication companies had been restricted to providing basic telephone service only, but are now offering a variety of options such as



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broadcasting, mobile, and internet related products and services. This means that the boundary between telecommunication and broadcasting has become blurred and competition between markets has accelerated. Since the year 2000, telecommunication operators have provided broadcasting services, while broadcasting companies have profited by selling them content. At the moment, these two business concerns no longer operate independently, requiring us to understand them as a single market having participants duelling in a reciprocal competitive relationship. And this phenomenon, where all products and services have converged into a single competitive market, has become more prevalent in Korea than any other country around the world.

An exemplary case of market convergence in Korea is IPTV provided by the three major telecommunication companies (KT, SK telecom and LG U+). IPTV can be defined as multimedia services such as television/video/audio/text /graphics/data delivered over IP based infrastructure (Newslog, 2006). Triple play service (internet, wired telephone and IPTV) or quadruple play service (internet, wired telephone, IPTV and mobile phone) are also regarded as services provided by telecommunication companies and are a representative case showcasing convergence and competition within a liberalised market.

As a result of market convergence, companies once operating separately within their distinct markets have begun to cross their traditional boundaries and are now competing directly with existing players. Many conflicts have arisen as more competitors are competing for the same share of customers.

Currently, conflicts among stakeholders have led to a public debate about many issues such as whether or not telecommunications companies should be permitted to leverage their market power by use of exclusionary bundling (Kang 2016), what rules should be applied when calculating the cost of retransmission for broadcasting content (Choi 2015), and how should the profit be shared between stakeholders when content is broadcasted over a network (Kim, Park, & Baek 2015). These conflicts are still ongoing. Every market stakeholder, including the government, is searching for the best solutions. See Figure 2 explaining the conflicts from between stakeholders within the Korean telecommunications and broadcasting market from 1990's until the present.



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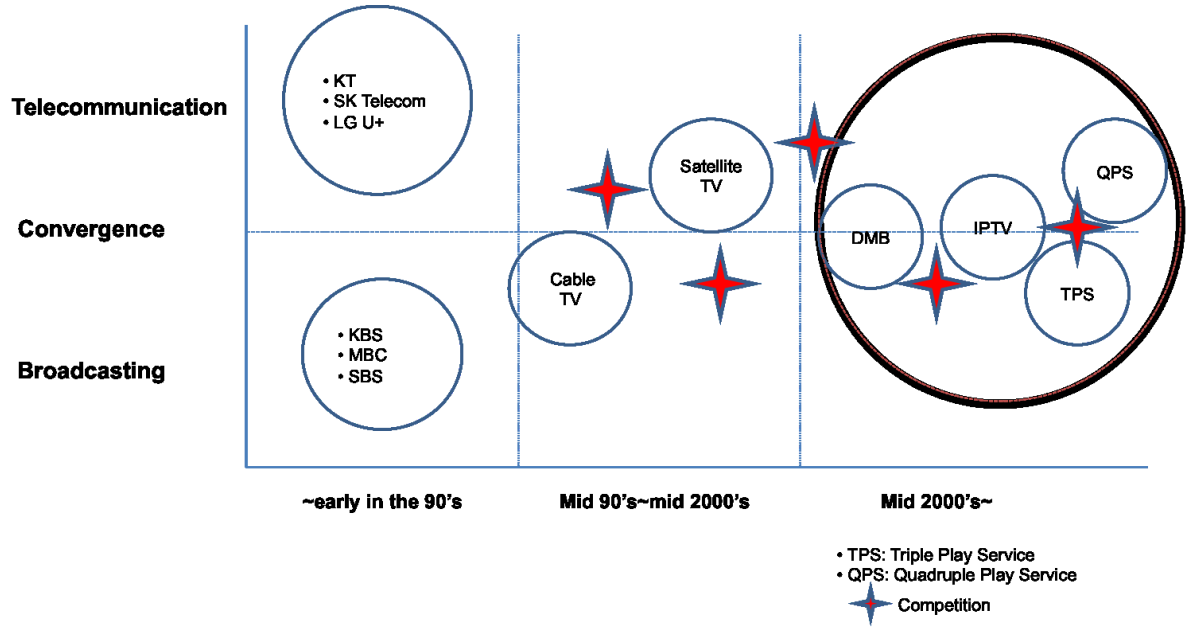


**Figure 2: The competition among players evolved in Korea since 1990's**

## Regulatory framework

The regulatory framework is regarded as one of the most important considerations for the development of industry. Almost all of players in the market start from setting direction and range of business within the regulatory framework. Regulatory frameworks serve as a guide arm to players within the industry influencing the direction of market activity. Market regulations should be explicitly defined, and consistent, in order to provide market participants with a stable and predictable business environment (Mazzucato 2016).

Within this general context, MSIP and KCC have progressively reformed and implemented regulations in order to liberalise the telecommunication service market and introduce competition. Post-1980, the Korean Telecommunication and Information Acts have helped shape the country's current regulatory frameworks. Table 6 illustrates the key areas of the Acts.

The two key Acts for telecommunication services are the *Telecommunications Basic Act* and the *Telecommunications Business Act*. The purpose of the *Telecommunications Basic Act* is to contribute to the enhancement of public welfare by managing telecommunications effectively and stimulating the development of the industry. A significant portion of the Act is taken up by clauses on the 'promotion of telecommunication technology', promotion of research, technical criteria (standards), providing MSIP with authority to 'adopt new telecommunication modes', promotion of standardisation, type approval issues, etc. For regulatory reform, the *Telecommunications Business Act* (TBA) is more relevant than the



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*Telecommunications Basic Act*. The TBA is concerned with defining the types of businesses within the telecommunications industry, licensing, cancellation of licenses, telecommunications business practices, promotion of competition among telecommunication service providers, the installation, and maintenance of telecommunication facilities and penal provisions.

The legislation for informatisation has consisted of two key acts, the *Basic Act on National Informatisation* and the *Information and Telecommunication Construction Business* Act. Here, the term "informatisation" means the making of activities in each sector of society possible, or facilitating the efficiency of such activities, by producing, distributing or utilising information.

According to National Informatisation Act of Korea, the *Basic Act on National Informatisation* was designed to identify the principles to build an information society. The legislation contains a basic action plan to actively promote the digitisation of Korean society. In contrast, the *Information and Telecommunication Construction Business A*ct lays down the rules and regulations for the construction of telecommunications infrastructure firstly classifying businesses involved in the construction of telecommunications facilities, then by setting the licensing criteria for those businesses within the scope of the industry.

**Table 6 Regulatory frameworks to influence telecommunication and broadcasting market**

| Legislation | Intention of legislation |
|---|---|
| Telecommunication Act (created in 1983 and revised several times) | • Established guiding principles for telecommunications<br>• Gave Ministerial authority regarding the promotion of telecommunications technology and technical standards<br>• Managed telecommunication networks<br>• Defined the organisation and operation of the telecommunications minister |
| Telecommunication Business Act (created in 1983 and revised several times) | • Established licensing criteria and reporting procedures for telecommunication service providers<br>• Established safeguards for competing service providers<br>• Established the rights of telecommunication service users |
| Information and Telecommunication Construction Business Act (created in 1971 and renamed in 1997 after being revised several times) | • Established guiding principles for telecommunications construction principles<br>• Classified the types of construction business, established licensing criteria and scope |
| Basic Act on National Informatisation (created in 1995 and renamed in 2009) | • Established the basic guiding principles on building information society<br>• Defined a basic and action plan for informatisation promotion<br>• Operates the informatisation promotion fund |

Source: Ministry of Science, ICT and Future Planning, http://www.msip.go.kr/web/main/main.do



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## Consumer protection

The interests of consumers in the Korean telecommunication industry will continue to be enhanced through effective competition, which eventually could lead to lower prices, improved choice, and better quality, thereby improving the welfare of consumers. To achieve these desired results, it is clear that the government continues to play a key role. It has established a set of institutions such as the Industry Ombudsman and the Customer Complaints Centre while operating organisations overseeing the industry (KCC & FTC); this allows it to behave as a social device to protect consumers in the market. The missions of the KCC and the FTC (Fair Trade Commission) are to observe and when necessary, punish unfair trading practices within the telecommunication market. Based on this regulatory framework, some industry pundits claim that telecommunication companies are overburdened by a set of regulations. Whether or not this may be the case, the Korean government continues to maintain this system with the belief that it will lead to a more beneficial market, even though there have been some controversies regarding the effectiveness of it.

The aspects of customer protection have been specified by the law and legislation. As we see in Table 6, the *Telecommunications Business Act* identifies the rights of telecommunication service users. According to this legislation, telecommunications operators in Korea must establish steps to resolve consumer complaints. These complaints can be resolved at either customer service centres, at the ombudsman (which consists of outside experts), or by organisations aiming to narrow the digital divide (for example the informatisation & promotion committee).

Based on these organisational and institutional devices, consumers may claim compensation from operators in a number of ways as mandated by the consumer protection regulation described in these telecommunications acts. These include protection from double billing, property damage from telecommunication facilities installations, and overpayment from operator errors. The KCC maintains a Consumer Complaints Centre and requires telecom companies to report consumer related complaints to them. The telecommunications companies also have a means to seek redress from complaints while seeking appropriate actions from the Minister. If carriers fail to reach an agreement with consumers who continue to seek compensation, they are allowed to request intervention by the KCC who can then arbitrate the dispute under the Telecommunications Basic Act.

# The future

What's next? The answers that Korea has regarding this question are divided into two parts. The strategic move for Korea in leading the market has been a focus on Internet of Things



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(IoT) and 5th generation (5G). These two areas are essential in the continued competitiveness of Korea's telecommunication and digital sectors.

## Internet of Things (IoT)

The concept of IoT describes a system where objects in the physical world, and sensors within or attached to these objects, are connected to the Internet via wireless and wired Internet connections. These sensors can use various types of local area connections such as RFID, NFC, Wi-Fi, Bluetooth, and Zigbee. Sensors can also have wide area connectivity such as GSM, GPRS, 3G, and LTE (Kumar et al 2016). In other words, IoT establishes an environment where all machines will be designed to communicate with one another and work together in order to provide humans with useful information (Kim, 2016). Currently, although less than 1% of 'things' are connected to the internet, the proliferation of the hyper-connected revolution, in which all things are connected to the internet, will lead to the creation of diverse innovations and business opportunities in different industries in the near future. This means that the opportunities and challenges caused by the IoT may surpass our expectations. According to the Korean NIA (2014), the worldwide market for the IoT is forecast to grow from AUD 269 billion in 2013 to AUD 1.35 trillion by 2020. Korea is currently looking at this market and encouraging telecommunication companies to develop efficient technology and services, based on the 'Master Plan for IoT' drafted by the Korean government.

In 2015, Korea became one of the first countries to commercialise IoT related products and services. LG U+, which is one of the major telecommunication companies in Korea, launched the world's first IoT service called 'IoT@home' which allows homeowners to control household devices such as switches, plugs and gas valves remotely and automatically via their smartphones and media devices. After the launch of this service the market responded positively. KT and SK telecom, which are major telecommunications companies, began to compete with LG U+ by developing their own set of IoT technologies and services. In this emerging market, companies are fiercely competing to secure new subscribers by promoting their own unique services. KT has launched health oriented IoT services, SK telecom has forayed into business oriented IoT, while LG U+ has focused primarily on home oriented IoT technology. The price of their services ranges from $16.14 to $33.63 AUD while total subscribers of IoT services in Korea are expected to reach to 1 million by the end of 2016. The Korean government expects that the fierce domestic competition will likely increase Korea's global competitiveness in the production of IoT related technologies.



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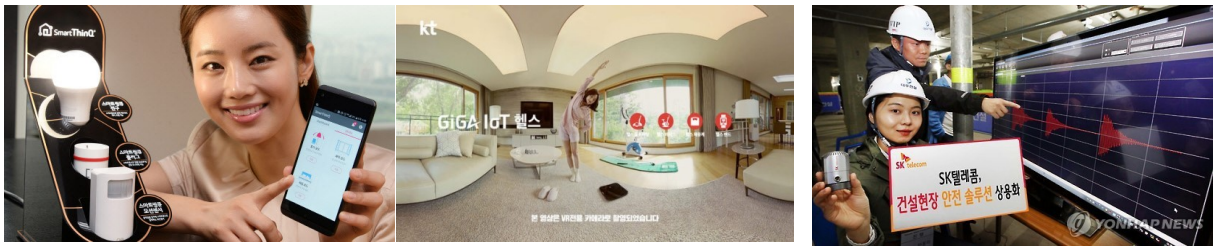


**Figure 3. Advertisement to promote subscription of IoT service published by three major telcos: LG U+ (Left), KT (Middle), SK telecom (Right).**

Source: http://news.naver.com/main/read.nhn?mode=LSD&mid=sec&sid1=101&oid=029&aid=0002365818

Source: http://news.naver.com/main/read.nhn?mode=LSD&mid=sec&sid1=105&oid=109&aid=0003358939

Source: http://news.naver.com/main/read.nhn?mode=LSD&mid=sec&sid1=105&oid=001&aid=0008780480

## 5G

According to previous studies (Dohler et al. 2016; Rost et al. 2016) , 5th generation (5G) is the word used to express the next generation of mobile networks beyond 4G LTE mobile networks. Theoretically, 5G is expected to show fast network speeds of 20 G/bps or higher, more than 200 times faster than existing 4G networks. 5G also has extremely low latency when transmitting large amounts of data. Under 5G, not only will people be connected to each other, but so will machines, automobiles, city infrastructure, public safety systems and more. 5G networks are also expected to have 'always-on' capabilities and be energy efficient, all of which will likely require new protocols and access technologies. Massive amount of information will be created, distributed and consumed at a level far beyond our current capacity. Society can expect to develop many new experiences by increased access and proliferation of information. Interestingly, as of mid-2016, 5G technology standards have yet to be determined, while the extent to which it will play a part in our daily lives remains unknown.

The reason that Korea has focused on 5G is just that. All things considered above, the Korean government has judged that their current ICT environment will provide them with an advantage to lead in 5G. Korea's highly advanced network, telecommunications technology, and competitive marketplace, are exemplary accomplishments in the field of ICT. As a result of venturing into 5g, Korea has developed several important international players.

Three companies have managed to develop 5G technology and stand out in a notable manner. KT, which is the official telecom partner of the 'Pyeongchang Korea 2018 Olympic Winter Games', is currently preparing 5G technologies and services for all visitors. According to KT, spectators around the world will have access to a number of services built from the nation's next-generation 5G wireless network. This will include the ability to watch an event from the



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perspective of a competitor, 360-degree videos, and holographic interviews to enhance a viewer's experience, may all become standard features during the 2018 Olympic broadcast. KT considers the 'Pyeongchang 2018 Olympics' an opportunity to show the world their 5G technologies and services. See Figure 4 for example of holographic interviews and 360-degree video.

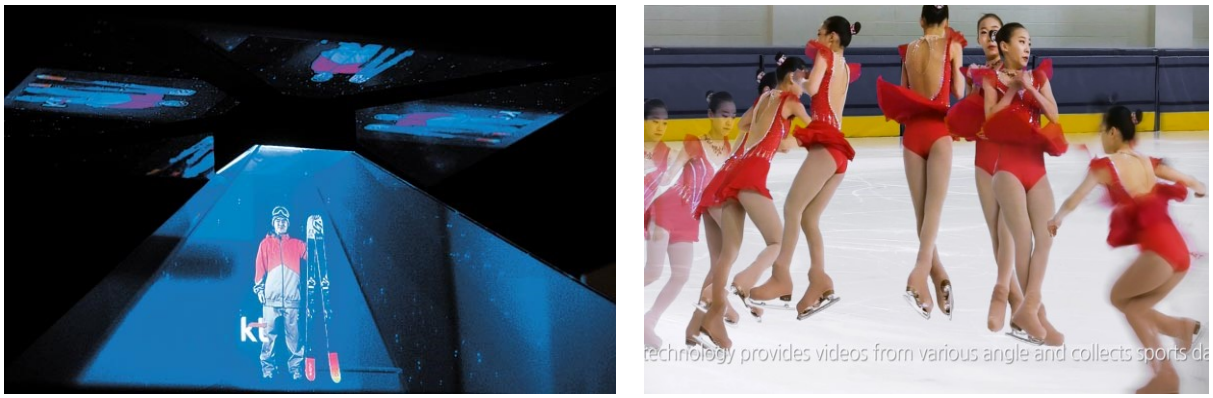


**Figure 4. Example of holographic interviews (Left) and 360-degree video (Right) which will be served by KT during 'Pyeongchang 2018 Olympic Winter Games'. Source: www.kt.co.kr**

SK telecom, the country's most widely used mobile carrier, aims to be the world's first operator of a 5G network. However, the company is struggling to develop 5G-related technologies and services by cooperating with several conglomerates, which are trying to use 5G technologies around the world. SK telecom's attempt to commercialise self-driving cars can be considered as an example in the continued pursuit of difficult challenges. In November 2016, SK telecom tested a technology called T5, an experimentally connected car running on a 5G trial network developed together with Ericsson. Two vehicles were each outfitted with a 5G receiver allowing them to communicate over 5G. According to SK Telecom, the trial was the world's first field test using a 5G trial network while applying 5G to a connected car traveling on the road. Based on this success, SK Telecom is anticipating to commercialise the technology in the near future. SK is looking at focusing on the development of its commercial technology and services swiftly while KT has spurred on an improvement of 5G-related source technologies independently. While SK is focusing on products and services that run on 5G networks, KT is involved in the development of the core technologies related to 5G.

Based on this research, it is clear that Korea continues to energise its ICT industry by introducing promising technologies such as 5G while creating a competitive environment for technology to thrive and flourish. The Korean government will continue to play a major role as a guide, investor, controller, and facilitator in order to achieve this goal.



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## Conclusions

As we have seen in the preceding discussion, the implications of Korea's achievements could be summarised by three main areas of focus.

Firstly, Korea has been able to turn crisis into opportunity, by using the recession of 1998 as momentum to reorientate its economy towards the production of advanced technologies. It is important to note that the competitive market environment in the field of ICT was driven by government policies which helped to overcome the crisis. Looking back at the recovery, we can conclude that strategic cooperation between government and industry stakeholders can create a healthy market environment allowing all stakeholders a chance to achieve success.

Secondly, although the ICT market operates according to the principles of a free market, during all stages of progress, Korea was able to carefully plan the development of its ICT industry; this was no coincidence. In order to sustain global leadership in the field of ICT, the Korean government continues to fine-tune its market environment allowing it to maintain competitiveness in the global market.

Thirdly, the key drivers, aside from the government's commitment to industry, are the many innovative private telecommunications companies which are complemented by a tech-savvy population. Spending on ICT and high-technology by consumers and producers has allowed Korea's economy to transform itself into a knowledge-based information society while moving Korea further into the 'smart-age'. It seems to be clear that Korea is preparing for the next challenges, based on the advantage gained in overcoming the crisis. Nobody can guarantee that Korea can continue to succeed. Nevertheless, the reason that we have to pay attention to Korea's challenge, regardless of the success in the upcoming future, is the implications from challenge and overcoming hardships. We have learned a lot from historical facts and we know well that the historical lessons could become the cornerstone of success.

On reflection, we've experienced a rapid change since the introduction of smart media devices, and the change continues to occur around us. The speed of change may be faster and we may be forced to accept it more actively. Time continues on, so it is imperative that we do not shy away from the opportunities this great change presents us. Perhaps the most interesting point is the unpredictability to the future and because of it, we can get a lot more than we anticipate in the field of ICT-centred telecommunication industry.

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http://doi.org/10.18080/ajtde.v4n4.75

# Telecommunications in Poland

## Infrastructure, market and services

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Abstract: In the modern digital world, we have seen the emergence of enormous potential for electronic communication as well as diverse forms of information transfer between subscriber devices. As such, the need for a highly capable networking infrastructure to sustain this communication is a crucial factor for the further development of Poland's economy. The present article describes the telecommunications market in Poland, and explores the organisation and infrastructure of Poland's networks as well as the evolution of this sector within the last few decades. It attempts to put a number of issues in the Polish experience in perspective. This can be used to focus further efforts in both Poland and in other nations.

Keywords: telecommunications, communication and media market regulation, telecommunication infrastructure and services, fixed-line and mobile communications, Internet access

## Introduction

Telecommunication networks have experienced rapid development over the past 40 years. Portable user devices have evolved from simple appliances that set up voice calls, to sophisticated computer equipment devices that combine the advantages of cheap communication offered by the Internet with the convenience of mobile phones. As digitalisation and new ICT technologies exert more and more influence on our lives', the telecommunications sector has become a pillar of our modern economy. Founded on the basic elements of information and knowledge, telecommunications continues to maintain strategic importance, as its development stimulates growth and competition within the economy. It is clear that the successful advancement of the modern economy, as well as economic transformation, is dependent on the capability of networking infrastructure and services.

In this article we will present an overview of issues concerning the development of the telecommunications market in Poland. The paper will describe the organisation of the



http://doi.org/10.18080/ajtde.v4n4.73

telecommunications sector, existing legislation, and authorities that manage market regulation. We discuss the evolution of that sector over the past 30 years, including the transformation period and the phase after accession to the European Union (EU). Following this we survey the existing infrastructure for communication networks and services. Prospects for development of the Poland's telecommunications market are presented in the last section.

# Telecommunication sector organisation and market regulation

It is widely recognised that proper conditions and the developmental level of networking infrastructure are a prerequisite for successful growth of a country's economy. Immature (not fully developed) infrastructure is a major reason for economic underdevelopment in a number of sectors, not only within electronic communications. Other factors also have impact on the development of the telecommunications sector. Most of all, it is existing legislation and sector-specific regulations that influence the amount of investments and the state of communication infrastructure.

In Poland, the introduction of changes found within legislation and regulations concerning telecommunications (or more precisely, the electronic communications and media) began in the 1990s. The general direction of sector transformation was set taking into consideration the previous experience of Western European countries', i.e. a liberalisation of the telecommunications sector was seen as a replacement of a comprehensive, state regulation by an open, competitive and self-regulating market into the future.

## Legislation and institutions for market regulation

The first significant and innovative form of legislation was the *Communications Act* of 23 November 1990 (OECD 2003). This Act laid down the terms and conditions by which the Polish Post, Telephone and Telegraph (PPTT) enterprise was split into two separate companies: the Poczta Polska SA – Polish Post, and the Telekomunikacja Polska SA (TP SA) – Polish Telekom. As a result, this Act allowed independent entities entry into selected market segments. With regard to telecommunication undertakings, it was assumed that the phone call service market would be gradually released, starting from local calls, then regional calls, but still maintaining the monopoly for international calls. As a consequence, the so-called "duo-pol" principle was implemented in the local call markets, i.e. except for the presence of dominant operator (TP SA), where the functioning of an extra service provider was permitted. In 1995, the amendment of the *Communications Act* allowed the regulatory authority (at that time a government communications department, later the Office for the Regulation of



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Telecommunications) to issue permits (licences) for private entities/undertakings in such segments of telecommunications as a mobile cellular and fixed-line telephony.

Development of communication technologies and the need to adjust Polish legislation to the regulations of the EU led to further changes in the law. The *Telecommunication Law*, enacted in 2000, significantly advanced business rules in the telecommunication sector. The most important changes included (Telecommunications 2000):

- the abolition of the obligation to obtain a licence for the provision of telecommunication services;
- the release of domestic phone calls market;
- establishment of the Office for the Regulation of Telecommunications that took over the regulation powers of the government communications department.

An amendment of the *Telecommunications Act* in 2003 was aimed at further harmonisation of Polish law with EU directives. It changed the definition, terms and conditions of the universal service obligation and released the market of fixed-to-mobile call connections (The Act 2003). In July 2004, Poland's Parliament enacted a new *Telecommunications Law* (Telecommunications 2004), the purpose of which was to create better conditions for equal and effective competition on the telecommunications market, as well as clear rules for reserving frequencies and development of modern communication infrastructure. The new law enhanced the power of an independent telecommunications regulator – the Office of Electronic Communications (UKE) – and decreased the prices of telecommunication services.

The President of the UKE is the regulatory authority responsible for the telecommunications industry and market. His duties include frequency resource management and compliance with criteria relating to electromagnetic compatibility (e.g. the inspection of products and telecommunications equipment placed in the Polish market).

In order to prevent and, when necessary, eliminate disruption of both the functioning and development of competition and consumer protection in Poland, the Office of Competition Consumer Protection (UOKiK) was established. This organisation is a central government authority with activities financed from the state budget. The UOKiK acts as an independent consumer protection organisation, where it prevents competition-restricting practices (e.g. the abuse of a dominant position) and anticompetitive concentrations of network operators, service providers and telecommunications enterprises, e.g. the establishment of cartels (distortions of competition caused by overconcentration of frequencies in the hands of a given association or capital group), protects collective consumer interests, monitors state aid and ensures product safety, as well as monitoring the quality of products on sale.



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The powers of UOKiK were laid down in the *Competition and Consumer Protection Act* of 16 February 2007 (The Act 2007), with the aim of the Act to protect competition from distortions resulting from the behaviour of enterprises operating in the market. The main values and mission of the UOKiK can be found in the Competition and Consumer Protection Policy (CCPP) adopted in September 2015 (Office 2015). Within this, for the first time, the strategy for protection of competition and the strategy for protection of consumers were combined in a single document, and thus defined as having a common goal, which is striving to ensure consumer welfare and creating conditions in which effective competition also means integrity in trader-consumer relationships.

In line with the basic principles of the CCPP, UOKiK focuses on information-sharing and taking coordinated measures by relevant authorities when a threat to consumer welfare becomes apparent. UOKiK analyses provided information concerning possible violation of competition law and infringement of consumer rights received from local government authorities, the Office of Electronic Communications (UKE), the Consumer Ombudsman, and the Commissioner for Human and Citizen Rights Protection (who also acts as the Independent Telecommunications Ombudsman) etc.. A crucial aspect of UOKiK is its role in the process of formulating legislation which protects consumers and supports the development of competition.

Sector-related regulations (i.e. laws targeted at undertakings/enterprises in individual sectors) also apply to the telecommunications market. The need for such regulations arises from a number of factors, such as the operation of a dominant company under natural monopoly conditions using indispensable (telecommunication) network infrastructures, who may block the market entry of new undertakings. The essence of a telecommunication sector regulation has been explained by the Supreme Court's ruling of 19 October 2006, III SK 15/06, in a comment that states: *"Telecommunications law is an instrument by means of which the state authorities may create relevant conditions enabling equal and effective market competition"* (Telecommunications 2004).

Hence, the sector regulation is often referred to as a *regulation for competition or procompetitive regulation,* as it aims to achieve a state of competition in the market. The state can use both telecommunications and competition law instruments to regulate the economy, though the provisions of the *Telecommunications Law*, as well as through the *Act on Competition and Consumer Protection*. These laws deal with competition within the telecommunications market from a different perspective. The competition law operates *ex post* and aims to protect competition by preventing those behaviours that restrict competition. The telecommunications sector regulation, in turn, is applied *ex ante,* and focuses on



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providing conditions that enhance competition. This is why the telecommunications sector is governed both by competition laws and sector-specific regulations.

Detailed description of the relations between competition protection law and telecommunication sector-specific regulation, as well as the cooperation between the Office of Competition and Consumer Protection, (UOKiK) and the national authority in charge of regulating the telecommunications (UKE), have been described in (Kułak 2014).

# Development of telecommunications market in Poland

Before the development of systemic transformation, Poland's telecommunication sector was severely underdeveloped, in both quantitative and qualitative aspects (Databases 2003; OECD 2003). The infrastructure of communication was also underdeveloped where a significant shortage of supply in communication services, was considered a distinctive feature of the telecommunications market. Since 1947, the long-established monopolist (PPTT) provided services at a substandard level for a relatively small number of subscribers (cf. Table 1).

**Table 1 Telecommunications in CE Europe in 1989**

| Country | Number of main lines (× 1000) | Telephone density (%) |
|---|---|---|
| Czechoslovakia | 2226 | 14.26 |
| Romania | 2161 | 9.42 |
| Poland | 3121 | 8.22 |
| CE Europe | 13979 | 11.67 |

The number of subscribers per 100 inhabitants was 30% lower than the average density for Central Europe (CE), and more than five times lower than the average for OECD countries. The penetration level of fixed-line telephony in rural areas presented an even more dramatic problem, i.e. 2.69 lines per 100 inhabitants compared with 12.28 for urban subscribers in 1990 (OECD 2003).

## Changes in the transformation period

The legal adjustments of the 1990s aimed at stimulating the expansion of the telecommunications industry through the liberalisation of the market, the introduction of transparent regulations, and the privatisation of the national operator (TP SA) as well as adjusting Polish regulations to EU directives.



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The expansion period of the telecommunications sector can be divided into the following stages:

1) 1990 – 1995: the opening phase, and

2) 1996 – 2003: the phase of liberal reorientation.

In order to increase the supply of communication services to areas with a shortage of telecommunications infrastructure, the Ministry of Communications opted for the open formation of 'duopolies' in local markets. Through this duopoly approach, the Ministry acts as a regulator of the industry in the opening phase, while refraining from stimulating the market development at a central level. As a result, 23 new operators began providing services and TP SA have made numerous investments in infrastructure. At the same time, Poland's telecommunications industry was privatised, i.e. the manufacture of telecommunication equipment was purchased by three international companies (Siemens, Alcatel and Lucent), which have become major producers and suppliers in the Polish market. The first operator of a mobile cellular network in Poland began operations in 1992 and used the analogue NMT450i system.

Self-regulation through local telecommunication markets was intended to increase the penetration rate in rural or underdeveloped areas but this was not achieved. In the mid 1990s, the government decided on the liberal reorientation of policy in the telecommunications sector, i.e. in order to increase the market power of independent operators, half of which were allowed to extend the operation to one region only while the second half received permission for business activity in more than two regions.

Apart from a considerable increase in the number of telephone lines and subscribers over the next 12 years, the penetration rate (32% for fixed-line telephony, and 45% for mobile cellular) was still below average European levels. Meanwhile industry liberalisation did not affect the dominant position of the national operator (TP SA), with its market share in the fixed-line telephony market at a level of 80 – 90%. The three wireless (mobile cellular) network operators, on the other hand, carried out their activities in a competitive environment.

Although most alternative operators are new companies, they have already gained a considerable share of the Polish telecommunications market. Despite a difficult financial situation, new operators are developing their own access networks and connecting new users more efficiently. They also created main lines to be able to deliver long-distance services and to offer international connections after January, 2003. However the liberalisation of the Polish market came at least five years too late (Office 2002). This fact caused difficulties with the rising capital for investments in the telecommunications sector and difficulties with so-called "last miles" (i.e. reaching distant customers).



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Nevertheless, the still dominant national operator (TP SA) uses all legal possibilities to delay free competition in the most profitable sectors of the telecommunications market. This behaviour took place in the case of opening the long-distance market in 2001, and during the liberalisation of the international phone call connections market in January 2003.

In 2002, the total value of Poland's telecommunications market was EUR 8.77 billion accounting for 4.4% of GDP, with half of the market falling within the fixed-line telephony, 39% – within the mobile communication and the rest within data transmission and the Internet services (4th Report 2004).

At the end of the transformation period, barriers to the expansion of the telecommunication industry included (Office 2004):

- inefficient regulations,
- low societal living standards,
- high prices (which reduced demand for services),
- weak financial standing of new operators,
- a lack of appropriate expansion policies, especially in rural (i.e. non- urban) areas, and
- the dominant operation of TP SA (with its monopolistic practices).

During this period, independent operators specified a need for more effective engagements with regulatory authorities (URTiP in that time) and more efficient regulations. Ultimately, Poland's Parliament enacted telecommunication legislation in 2004 (Telecommunications 2004).

## The last decade and present status

After accession to the EU in 2004, Poland's telecommunication market commenced its next phase of development, constituting a further extension of liberal reorientation, and the creation of new opportunities concerning the development of the telecommunications industry. As a result of the introduction of new sector-specific regulations in the realm of telecommunications, competition has become more advanced, where there has been a gradual increase in the level of investment made by new alternative operators.

As found in 2010, fixed-line telephony services were supplied by 126 operators, which provided local, regional and international call connections (Office 2011). At the end of 2010, the number of fixed telephone lines (including ISDN access) amounted to 8.2 million, with 7.7 million found in urban areas. The penetration level of fixed voice services (i.e. the number of main telephone lines per 100 inhabitants or the telephone density) reached 21.6 % [cf. Fig. 1]. However, the highest number of main telephone lines in Poland (approx. 12 million)



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was when the country joined the EU (in 2004 the telephone density reached 32.7 % [cf. Fig. 2]). Due to this, there has been a gradual decrease in the penetration of fixed voice services, where there is insufficient usage of copper infrastructure within communication networks for the development of Internet services and the migration of users to alternative operators of mobile cellular networks.

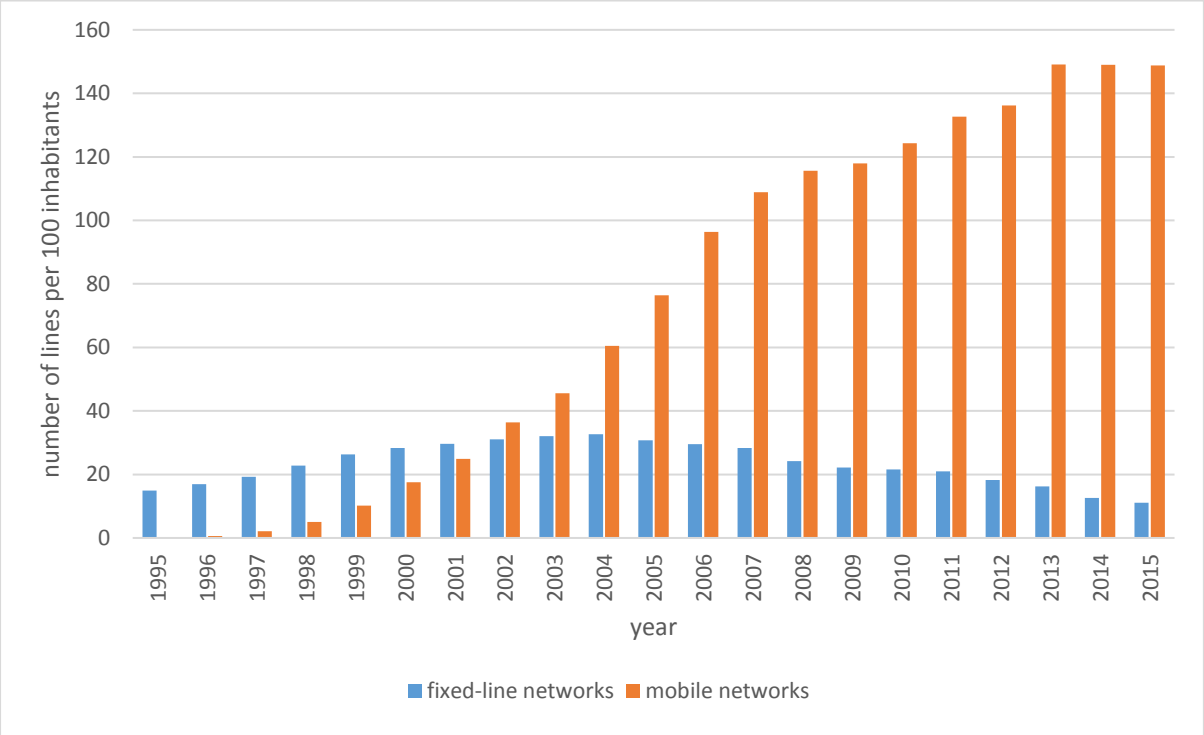


**Figure 1 Telephone density in Poland during the past two decades)**

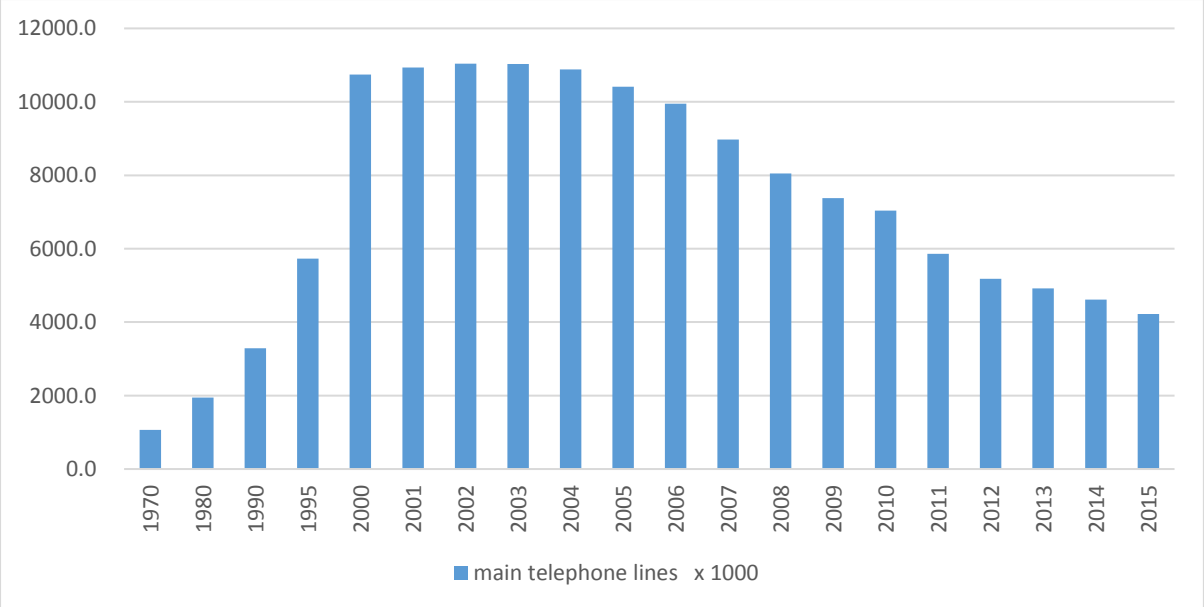


**Figure 2 Development of Poland's fixed voice networks – number of main telephone lines (without ISDN)**



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The cause of penetration decline can be segregated into two factors.

First there was a lack of capital investments in the telecommunication infrastructure of the country with systematic transformation of Poland's economy starting only in 1989. Second there was continuous development of mobile communication in Poland [cf. Fig. 1], which impacted on development strategies (provided by the dominant operator – TP SA).

As opposed to fixed-lined telephony, during the past two decades a dynamic growth of mobile segregation in Poland's telecommunications market occurred (as observed in cf. Fig 3).

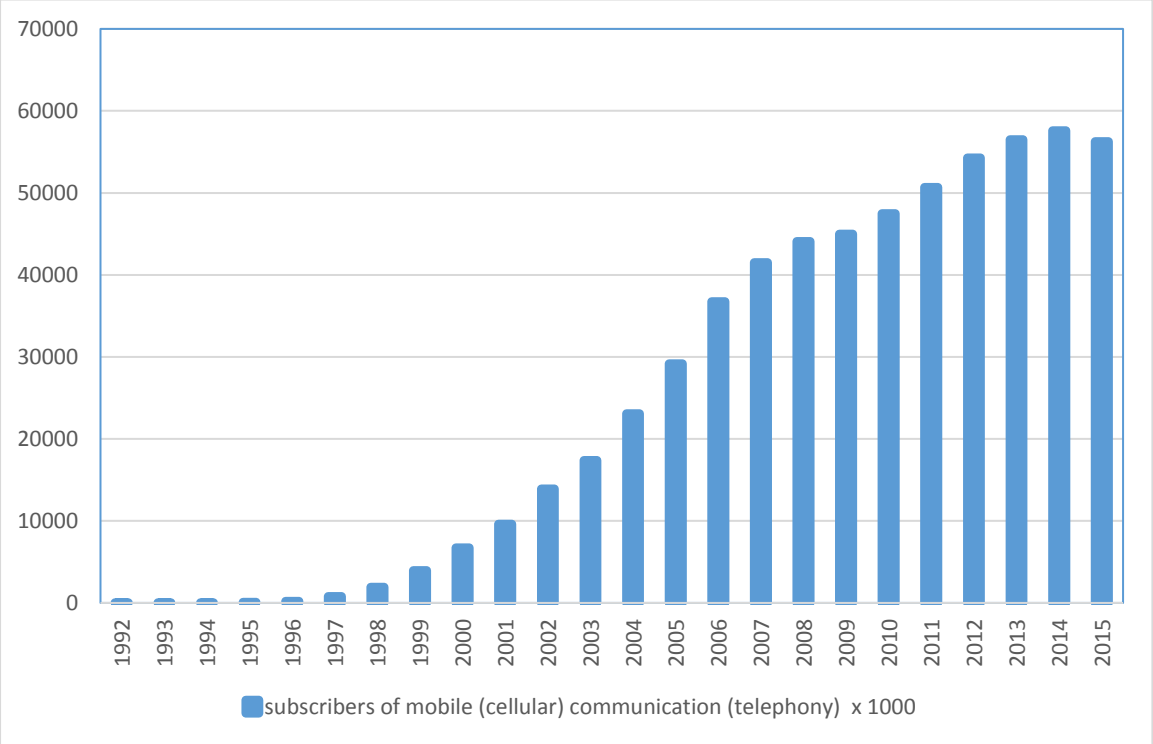


**Figure 3 Number of subscribers in Poland's mobile networks**

The number of users in mobile cellular networks has already exceeded the number of subscribers for a fixed-line telephony, where further development of that market sector depended on the entry of a fourth mobile network operator on the market. This occurred in 2007. Moreover, implementation of the TETRA (Terrestrial Trunked Radio) system in some sectors was crucial for the function of the state, also impacting on more dynamic developments concerning Poland's market of electronic communication.

Similar to the mobile sector of the telecommunications market, internet access services were also rapidly developing: in particular, broadband access [cf. Fig 4]. During the time of Poland's accession to EU, the rate of internet users reached an approximate 7.5 million, which penetrated such services by 20%. In Poland, Internet Service Providers (ISPs) use various technologies to supply broadband access services e.g. ADSL, SDI(ISDN), Wi-Fi, WLAN, CDMA, LMDS or satellite.



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In order to stimulate faster development of broadband access for internet services, in December 2003 the Polish government accepted the National Strategy for Development of Broadband Access to the Internet (Office 2004). The legislation specified governmental aid of 140 million EUR, during undertakings in the country between 2004- 06. As a result of this, one could observe continuous development of broadband access for internet services [cf. Fig 5]; however in comparison to highly developed countries, the developmental level of fixed-line access in Poland is still significantly low [cf. Fig. 6], in contrast to the penetration rate of mobile Internet access [cf. Fig. 7].

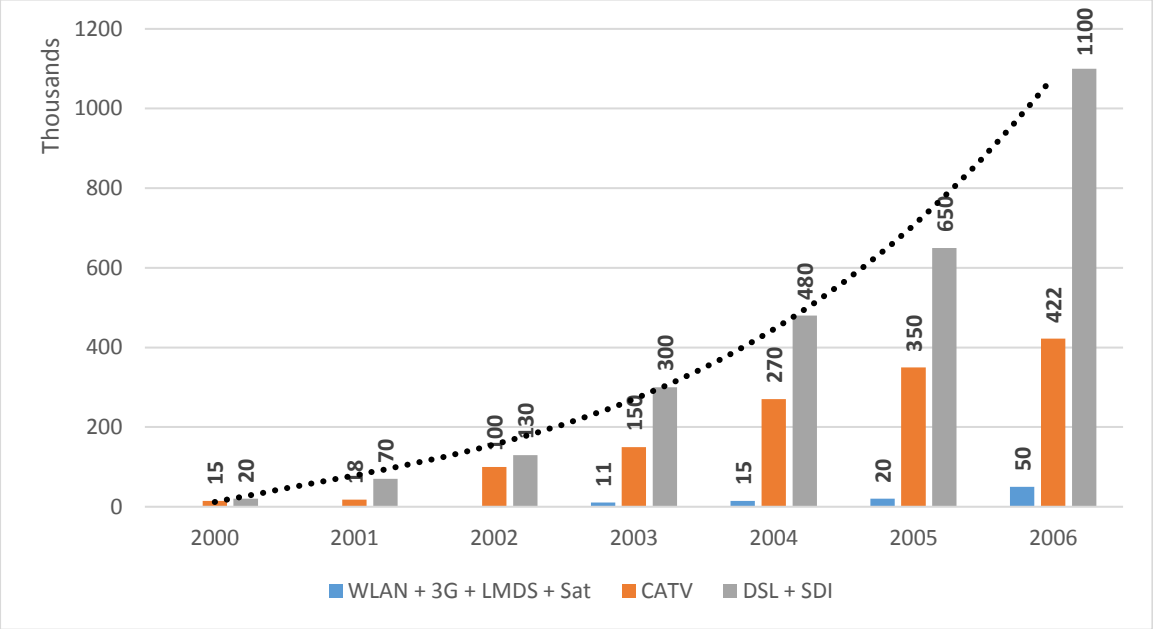


**Figure 4 Usage of broadband access technologies in Poland, before and after accession EU**

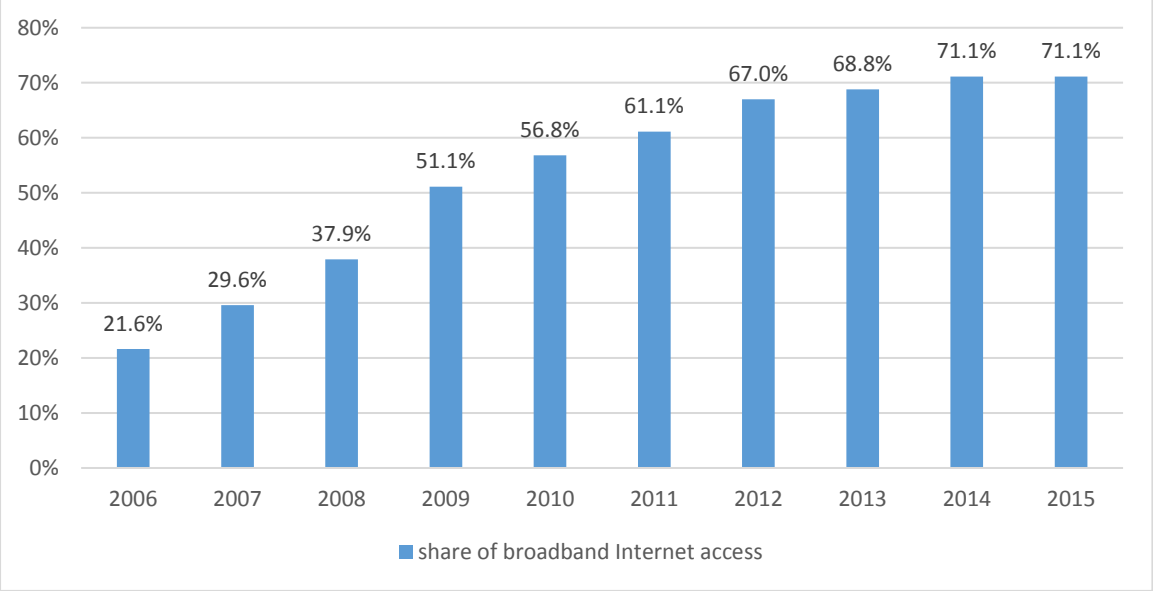


**Figure 5 Penetration rate of broadband Internet access services in Poland**



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As a consequence of increasing demands for wireless broadband data transmission, the issue of building Next Generation Access (NGA) networks for reaching rural areas, was subsequently addressed in the new National Broadband Plan of 2014- 2020 (Ministry 2014).

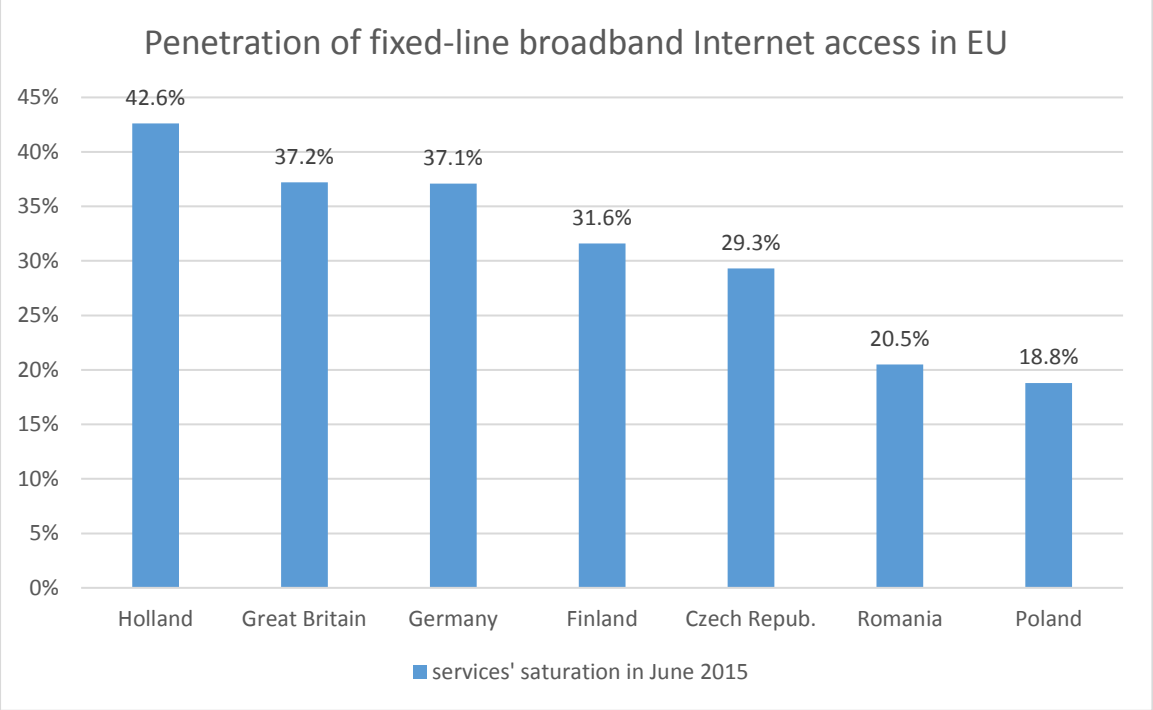


**Figure 6 Penetration rate of broadband Internet access services in EU**

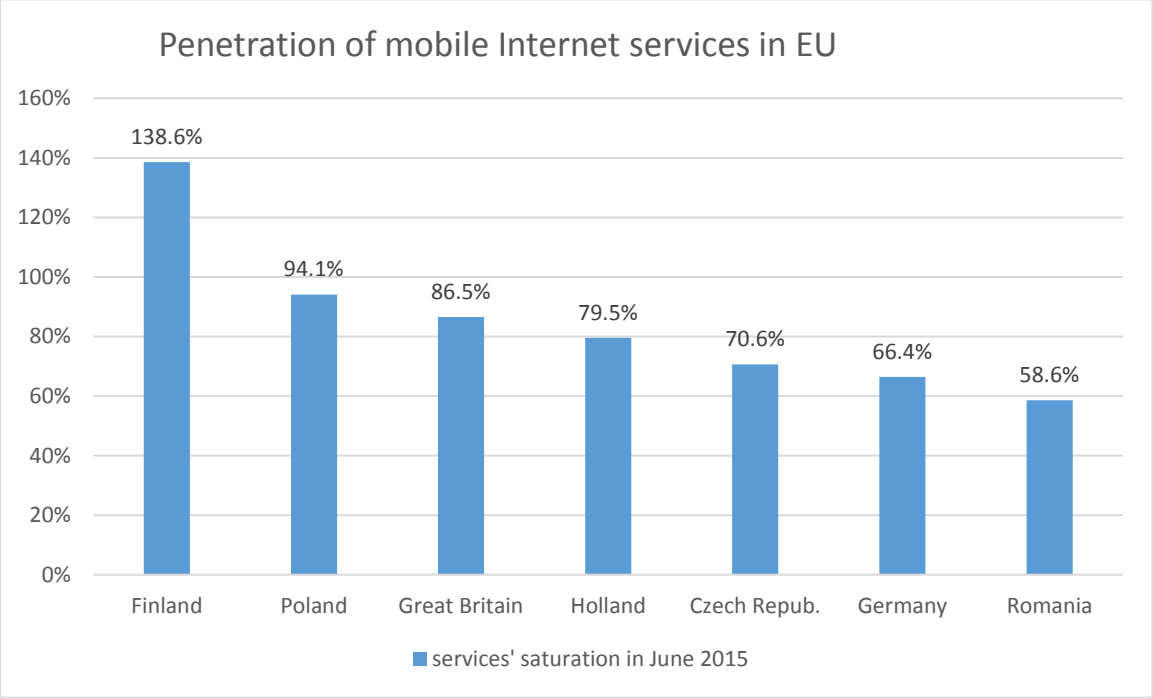


**Figure 7 Penetration rate of mobile Internet access services in EU**



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Through this, a rough estimate shows that NGA networks will be able to provide broadband services for all of Poland's inhabitants by the year of 2020. However, this is only in areas where the estimated cost of connecting a subscriber is higher than 5000 PLN (approx. 1200 EUR) as highlighted by barriers of investment of ISPs and network operators. The requirements included in the new National Broadband Plan are also consistent with The Digital Agenda for Europe (Digital Agenda 2010).

In 2015 there were almost 14 million internet users in Poland where the penetration rate of households with internet access services exceeded 100%. Internet penetration stood at a level of almost 102% at the end of 2015, which was 11.6% higher than in the previous year [cf. Fig. 8].

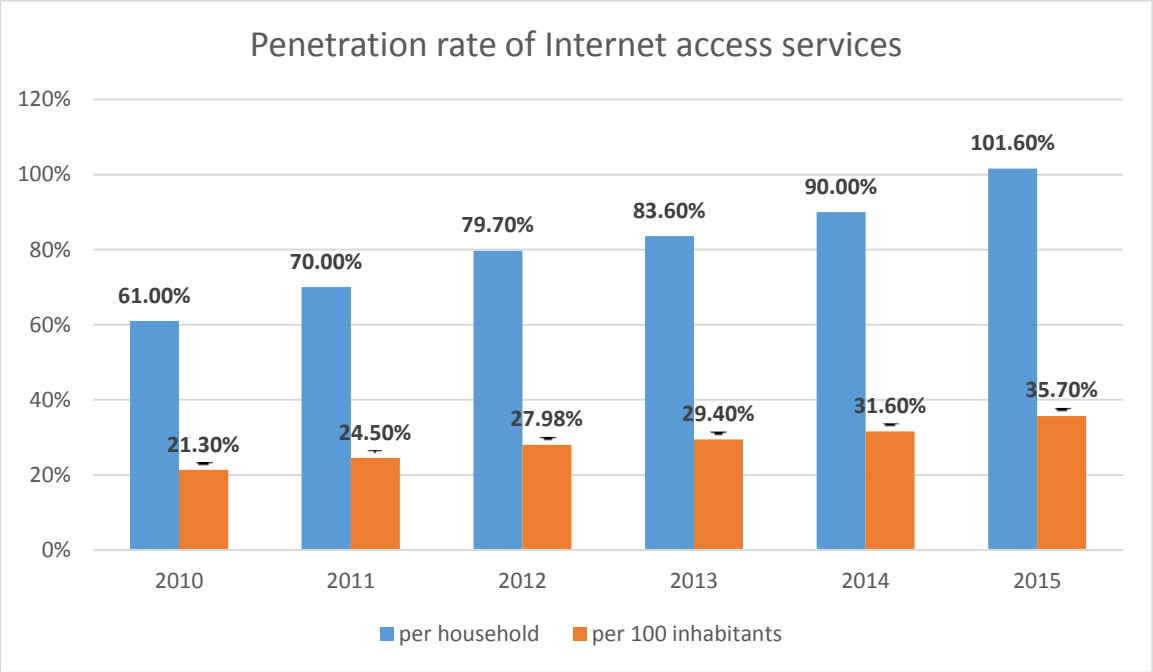


**Figure 8 Penetration of Internet access services in Poland**

As found in prior years, more people relied on fixed-line Internet access (7.1 million), where the difference between fixed-line and mobile technologies became smaller. The number of lines with capacity of more than 10 Mbit/s increased up to 61% of all lines, where almost 11% of subscribers used faster Internet access exceeding 100 Mbit/s (Databases 2015; Office 2016). In 2015, 6.67 million customers used mobile Internet, which is around 0.5 million less than in the case of fixed-line access. This proves that the accessibility of fixed-line Internet improved thanks to investments in this technology. Market evolution also highlighted a significant growth due to revenues taking place in fibre-based Internet access services. The largest revenues were generated by mobile Internet access services provided by means of dedicated 2G/3G/4G devices.

The declining trend for fixed-line telephony continued, i.e. in 2015, where the number of subscribers decreased by approximately 0.5 million, while revenues generated by fixed-line



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services were more than 13% lower than in 2014. On the other hand, the number of VoIP service users increased up to 1.5 million in the past year where most (≅64%) of them were served by operators in their own networks (Office 2016).

In 2015, due to subscriber database correction, the penetration rate of mobile services amounted to 147.2 % which was 3% less than the previous year (i.e. it was 56.6 million SIM cards in reality). Though 50.6 % of all mobile subscribers used the popular option pre-paid services, the revenues generated by those services were only 19 % of the total of operators' revenue (Office 2016). This statistic suggests rapid growth of data transmission segmentation within the mobile market. In contrast, the number of bundled service users also increased and stood at 5.9 million in 2015, (i.e. approximately 37% of Polish households subscribed to such services) featuring of the lowest prices in Europe.

In 2015, the total value of Poland's telecommunications market amounted to PLN 39.5 billion (approx. 9.4 billion EUR) which was the first growth in revenues of the whole telecommunications sector in the last couple of years (Databases 2015; Office 2016). Yet, for some market segments, lower revenues were observed (excluding the rate found in 2014) where such a decline was compensated by migration to new services based on data transmission typical for a modern e-society.

In December 2013, TP SA and PTK Centertel merged into a single company known as Orange Polska SA which is now Poland's leading telecommunications provider, operating in all segments of the domestic telecommunications market. The company owns the largest communication infrastructure in Poland, supporting the provision of different services (mobile, fixed voice, broadband, TV) for over 23 million customers (in 2015), and is the main provider of leased lines (with a standardised transmission band) for other telecom operators, government and financial institutions, and ISP providers.

## Prospects for market development

While Poland's telecommunications market continues to evolve through the advancement of new technologies, and the replacement of communication systems, service usage within Poland's telecommunication market has reached its saturation level i.e. operators try to minimise any losses to their customer bases and maintain current users. This results in the permanent development in the market of bundled services, which continues to sustain a steady growth.

As such, the most significant impact on data transmission and market development was the formulation of cloud and big data, where a double increase in data transmission volume was ranked as the most rapid service development. Annual data transmission growth also



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influenced an influx of consumer awareness when utilising modern services, and the dissemination of smart phones. Operators are continually improving the quality of their networks, where for example, the share of M2M cards, allowing communication between machines or between humans and machines, is steadily becoming more popular. The influx of users within this form of service may, in the future, constitute a significant share in the total volume of individual services.

In 2015, mobile services in Poland were provided by 25 operators, five of which comprised undertakings operating on the basis of their own infrastructure (MNO). In terms of the volume of registered SIM cards, Orange Polska became the dominant leader, with a 27.7% share of the mobile market. The next three MNOs (Polkomtel, P4, T-Mobile) shared almost the rest of that market percentage, i.e. while virtual operators (MVNO) shared only 3.2% (Office 2016).

In the immediate future VoLTE services are expected to launch 4G networks. This advancement will allow improvements in the coverage and quality of calls. Taking into account the structure of the minority group undertaking investment plans, the next few years will bring a large influx of growth in services provided on the basis of fibre networks. This is a result of both the development of mobile networks, and the growing needs for high-speed lines, where the goal is to provide the best quality not only to mobile networks, but also to businesses.

As highlighted earlier, the decrease in revenues experienced by fixed-line telephony was a result of a substitution from mobile telephony, all while increasing popularity of VoIP services. This shows that a certain level of market saturation was reached, causing customers to attach greater importance to more advanced and bundled services.

Among the lines that support the provision of fixed-line telephony, POTS lines remained the most popular (57% of the subscribers) with CATV ranking as the second most popular (14%) (Databases 2015). Orange Polska had the largest market shares (approximately 55%), both in terms of the number of users and the level of revenues, where the next two operators of fixed voice services and market shares stood at almost 75% (Office 2016), irrespective of the 87 alternative entities operating in that same market division.

The analysis of investment data in terms of applied technologies showed a clear trend in replacing cable with fibre technologies. However, a significant proportion (25%) of complete investment in access networks came from public funds, found available under the Innovative Economy Operational Programme and the Eastern Poland Operational Programme, which commenced in December 2015. In conjunction, market evolution significantly influenced the growth of revenues, specifically within fibre-based Internet access services; and over the next few years, further rapid growth in data transmission can be expected. This can be observed in particular, through data download, and also where there is a higher frequency of users sharing



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large files (photos, videos) with each other for purposes such as social media. Due to the future-oriented trend of the so-called "Internet of things" – i.e. the possibility to connect to a larger number of devices within a network, the telecommunications market will in the near future, most likely be dominated by Internet services – in particular, mobile internet. Along with this, satellite access to Internet services could be an attractive alternative, which is currently supplied by Eutelsat, where such services are already available in Poland (provided by Europasat Poland).

In order to meet the goals of the Polish National Broadband Plan, there is not only a requirement for new technologies, but also new innovative solutions in the area of telecommunications, e.g. innovative, cost-effective micro base stations such as LTE-Advanced, working within a 3.4 – 3.8 GHz frequency band, with a high transmission power (10W +), which can be highlighted as an attractive solution for building Next Generation Access networks in urban and rural areas.

## Conclusions

The broadband infrastructure (fixed, mobile and satellite) of the telecommunications field creates new capabilities for the transmission of information in diverse forms, e.g. IPTV, where at the same time it allows for the programming of other electronic communications media outlets, i.e. DVB and DAB. Through this, there is a need for the continuous development and modernisation of the telecommunications infrastructure as it is a crucial factor in determining the growth of any sector of the economy.

Throughout this paper, the development of Poland's telecommunications sector has been described, taking into account different aspects such as existing legislation and regulations, consumer protection, and a suggested upgrade of networking infrastructure to provide a portfolio of diverse communication services. It has been argued that through legislation the market has become liberalised with the introduction of transparent sector-specific regulations, as well as the privatisation of the national operator (TP SA), all while adjusting Polish regulations to match EU directives. The telecommunications industry has become more advanced since its underdevelopment in the 1990's, through the stimulation of continuous expansion and persistent development.

Where market segments of the telecommunications sector are open, there is still a requirement to control such areas in order to preserve continuous competition and to protect consumers. Such tasks are performed by independent authorities, which have been established by the Government. Guided market forces can achieve positive outcomes for national communications infrastructure, as recent experience in Poland shows.



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Despite the significant transformations and improvements of the telecommunications industry over the past 30 years, there still remains a need for technological innovation in order to sustain the national economy, where Poland's telecommunications market is still subject to further stimulation. While other nations have varied situations, a core element of stimulating market forces appears to be common for strong outcomes.

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http://doi.org/10.18080/ajtde.v4n4.73

# The retention and disclosure of location information and location identifiers

## OTT content and communications services

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Abstract: This article describes how Australia's metadata retention and disclosure regime addresses the retention and disclosure of location information and location identifiers by locally licensed telecommunications service providers and those that do not require a licence to operate in Australia. It specifically addresses over the-top-content and communications services. It proposes the three-tier TelCo and the two-tier Content and Communications Service Provider framework in the Service Provider-Retention-Disclosure Obligation Relationship Table, as the lens through which to understand the roles of the various parties. The duty to retain and disclose location information and location identifiers to law enforcement and national security agencies without a judicial warrant are described in contrast to the powers of the agencies to access and use location information from free online social networking services. The law however acts to restrict the retention and thereby the disclosure of location information, in respect of over the-top-content and communications services that are not provided by the licensed or unlicensed telecommunications service provider. The paper argues, the retention limitations in respect of over the-top-content and communications services are undermined by the actions of the agencies to harvest location information and conduct Big Data analytics. Similarly, so does the discretion granted to the telecommunications service provider to retain location information in respect of over the-top-content and communications services provided by a third-party service provider and then to be required to disclose it, without any additional safeguards. The actions of the agencies and the discretion granted to the telecommunications companies undermine privacy protections.

**Keywords**: Metadata, location information, over-the-top content and communications services, location-based services, law enforcement and national security, privacy, personal information

## Introduction

Telecommunications service providers (the TelCo) all over the world are required by laws of various jurisdictions to retain and disclose location information and location identifiers to law enforcement and national security agencies, commonly referred to as metadata. Australia revised its telecommunications metadata retention and disclosure regime (the



http://doi.org/10.18080/ajtde.v4n4.68

Regime) on the 13th of October 2015 ("*TIA Amendment (Data Retention) Act 2015 (Cth)*," item 2).

The Regime imposes diverse legal obligations on the TelCo. These obligations are however dependent on the type of telecommunications services provided and the type of TelCo ("*TIA Act 1979 (Cth)*," Section 187A(1) and (3 ). This paper dissects the categories of TelCo's and discusses the extent of their role with respect to the retention and disclosure of location information and location identifiers.

The article argues, in areas where the law does not impose a retention obligation, that there is still a mandatory warrantless disclosure obligation attached to the location information, in the event the TelCo happens to possess the location information and location identifiers ("*TIA Act 1979 (Cth)*," Sections 172 - 184) and (Fair, 2016). Additionally, the announcement to collect and analyse location information from social networking websites undermines privacy, data protection and data minimisation, which safeguards can be said to be practically created by excluding OTT content service providers from being regulated under the Regime. There appears to be no alternative formal regime under which these service providers are regulated.

The paper firstly discusses the literature that relates to location-based services (LBS) and over-the-top (OTT) content and communications services. It then describes how the LoCation Services (LCS) functionality operates in relation to OTT content and communications services, which are LBS. In doing so, it sketches the technical background, prior to discussing the legal obligations and policy implications. This is in turn contrasted against the legal nature of the TelCo. The corresponding exceptions to the role of the TelCo are then outlined. The impact of the policy positions on privacy are critically assessed against the safeguards bestowed by the law.

## Related works

Soon after the *TIA Act 1979 (Cth)* was amended in 2008, Nicholls and Rowland criticised access to prospective location information by law enforcement and national security agencies without a judicial warrant (Nicholls & Rowland, 2008b). Nicholls and Rowland outlined the legal obscurities regarding what they called communications metadata. They described the Regime as uncertain. This uncertainty referred to the lack of a definition of telecommunications data. Less detail was publicly available about the extent and the types of information to be retained and the limitations placed on the TelCo about the types of location information to retain and in respect of which types of services and communications. The legal position was largely uncertain, as identified by Nicholls & Rowland (2008b), but it has since been revised.



http://doi.org/10.18080/ajtde.v4n4.68

Rodrick (2009) addressed the privacy impacts of mobile phone data location, arguing the Regime, as it was then, should be reconfigured to afford better privacy protection to the individual. The peculiarities of OTT content and communications services and the various TelCo were however not considered.

Abbas et al (2013) sketched and proposed a LBS regulatory framework in the Australian social context. Although the authors recognised that LBS are bound by surveillance, telecommunications, privacy and national security legislation, they concluded the framework existing at the time did not adequately address location information. They also concluded that the 2013 framework inadequately addressed the themes and challenges in the conceptual framework. They concluded:

> A number of issues inevitably emerge upon closer examination of the current LBS regulatory framework in Australia. With regards to privacy legislation, it was noted that (location) information derived from LBS solutions might or might not be personal information and is unlikely to be sensitive personal information. The Privacy Act may not cover the data. Regarding Australian telecommunications legislation, location information may not specifically be classed 'telecommunications data' in all circumstances. The location-dependent carriage service introduces ambiguity regarding definitions (Abbas et al., 2013, p. 585).

Furthermore, in 2013, Abbas et al. (2013) found that the framework does not account for location information generated by LBS, due to its technology-neutral approach. Recent legal developments have since specifically addressed location information in respect of LBS ("*TIA Act 1979 (Cth)*," Section 187A(4)(c).

Michael & Michael (2011) discussed the social and behavioural implications of LBS in the current global "uberveillance" environment and the risks to privacy. They stated that the way forward regarding the social implications of LBS may be to see it play out in a court of law or to introduce legislation to curb potential harm. Michael & Michael (2011) however cautioned that the right balance should be struck by such regulatory measures so as not to stifle the development of the technology. The Regime has undergone major changes since 2008 and 2011. The latest changes were effected in mid-October 2015.

Clarke & Wigan (2011) described the generic threat to privacy posed by location-based systems, without specifically undertaking a study regarding LBS offered by the Australian TelCo and foreign OTT content and communications service providers (Clarke & Wigan, 2011). The paper investigated the political threats in 2011 and proposed controls and protections. This was four years prior to the Regime being revised and not due to the privacy



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threats posed within the legal and policy context of the 2015 revised Regime. In any event, Clarke and Wigan only considered traffic administration, traffic law enforcement, public safety and criminal law enforcement.

Cuijpers & Pekárek (2011) discussed the regulation of LBS in the EU. They identified a particular challenge posed by the non-identifiability and non-traceability of the sources of location information in LBS. This paper describes how the Australian Regime addresses the issues related to non-identifiability and non-traceability.

Gibson (2004, p. 17) defines open source intelligence (OSINT) as information that is legally available and that is in the public domain. Bell & Congram (2014, p. 58) identify OSINT as available on the Internet and accessed by law enforcement agencies. They state that OSINT however poses legal issues, but fail to indicate or speculate about these legal challenges.

Li (2015) did not address retention obligations of OTT content and communications service providers. Instead, Li proposed OTT regulation for universal service purposes.

Existing literature fails to address the recent policy and legal changes in relation to the duties of the TelCo in relation to LBS. These recent changes to policy and law, particularly in relation to the technical specifications of LCS, remain largely un-examined. Recent legal developments therefore require analysis as is undertaken by this article. This paper addresses this shortcoming and proposes the 'Service Provider Retention-Disclosure Obligation Relationship Table' as a framework in terms of which the role of the TelCo may be outlined. This framework addresses privacy protections embedded within it, but also critically highlights how policy decisions erode those same protections, by not regulating OTT content and communications service providers for the purposes of the Regime.

## OTT content and communications services

Content and communications services include online information services, online entertainment services (for example, a video-on-demand service or an interactive computer game service), or any other online service ("*Telecommunications Act 1997 (Cth)*," Section 15).

OTT content and communications services runs over the public Internet infrastructure (European Parliament, 2015: p. 22). OTT content and communications services are provided independently of the telecommunications network operator. OTT content and communications services are delivered over a telecommunications network that is not offered by that same network operator. Instead, OTT content and communications services ride on top of the infrastructure service (ACMA, 2015: p. 131). The OTT content and



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communications service provider is therefore generally separate from the operator of the IP network that it uses (Li, 2015: p. 30; EuropeanParliament, 2015: p. 22).

Any type of information, entertainment, social media service or application, that is used on a mobile device and that makes use of the devices' approximated geographic location, in name, latitude, longitude or altitude may be considered an LBS (AMTA, 2010: p. 4).

LBS may include mobile location-based advertising, friend location-based services, anonymous chats, dating location-based services and mobile games (AMTA, 2010: p. 5).

## The "LoCation Services" functionality used to provide OTT content and communications services

LCS is a standardisation service concept in the telecommunications network. LCS specifies the vital network elements, their functionalities, interfaces and communications messages, for the operation of location positioning in the cellular network (ETSI, 2016b: p. 12 and 13). The LCS functionality is used on relation to OTT content and communications services, making it location-based.

OTT content and communications services are software applications that interact with the LCS server for the purpose of obtaining the location information and location identifiers of a relevant device. For this reason, OTT content and communications services may be referred to as LCS clients (ETSI, 2016b: p. 13). The OTT content and communications service processes the location information and uses it in one way or another. An OTT content and communications service that processes location information and uses it is therefore a location-based application and becomes an LBS (ETSI, 2016b: p. 12 and 13). The positioning feature can be used internally by the telecommunications network, or by the value-added network services, or by the device directly, or through the telecommunications network or by third party services (ETSI, 2016b: p. 20).

Location identifiers are used to identify the device and its estimated location. Location identifiers are the location information about a device, that is related to a given location or is general information. This general information is information about the Global Cell-ID in cellular networks, Line-ID in fixed broadband networks, and the Media Access Control (MAC) address of the Wi-Fi router or mobile device (ETSI, 2016b: p. 13).

The methods used to approximate the position of the device includes using the radio cell coverage, GPS or Assisted-GPS methods based on the Time-Of-Arrival (TOA) algorithm and/or the Time-Difference-Of-Arrival (TDOA) algorithm. The variations include Uplink Time Difference of Arrival (UTDOA), Observed Time Difference Of Arrival (OTDOA) and the Enhanced Observed Time Difference (E-OTD) methods (ETSI, 2016b: p. 14).



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Measuring the location is dependent on the design of the network by the TelCo. Most devices, whether idle or active, use the positioning functionality provided by the access network. The radio access network shares the location information with the core network (ETSI, 2016b: p. 20). The positioning functionality may be used for billing purposes by the TelCo for the service the device is connected to (ETSI, 2016b: p. 20). The positioning functionality uses the radio signals to determine the geographic location of the device, which information is forwarded to the OTT content and communications service software application, which is the LCS client, for its use. The radio signals are measured, processed, the estimated location is then produced and delivered to the requesting LCS client (ETSI, 2016b: p. 20).

The LCS functionality is used in both packet-switched and circuit-switched networks. It is technically feasible for various LCS clients to request simultaneous location information in relation to one device (ETSI, 2016b: p. 20).

The IP Multimedia Subsystem (IMS) is used to deliver interactive content, text and voice, which lies at the heart of OTT content and communications services. The IMS Public User Identity (SIP-URI) (ETSI, 2016b: p. 143) and the Mobile Station Integrated Services Data Network Number (MSISDN) (ETSI, 2016b: p. 17) are key device identifiers, that are of interest to the agencies.

The IMS uses the SIP-URI to route LCS service requests for location estimates to the home network of a device. The SIP-URI is used as the public identity of the device on the public Internet (ETSI, 2016b: p. 143). The MSISDN is the number of the device in the IMS. The MSISDN is obtained by the home network of the device from the Home Subscriber Server (HSS) (ETSI, 2016b: p. 27). The MISISDN comprises the Country Code (CC) and the National (significant) mobile number. The National (significant) mobile number in turn comprises the National Destination Code (NDC) and the Subscriber Number (SN) (ETSI, 2016a: p. 22).

The LCS service request is forwarded along with the MSISDN by the home networks' SIP-URI via the interface to the home Gateway Mobile Location Centre (GMLC).

Pre-configured destination addresses or Domain Name Server (DNS) lookups may be used to identify the home network of the device in order to route the information. The MSISDN may be used to get the Internet Protocol (IP) address from the Home Subscriber Register (HLR) or HSS (ETSI, 2016b: p. 143).

Figure 1 below depicts the LCS architecture and demonstrates the LCS functionality in generating and communicating location information and device identifiers, as discussed above.



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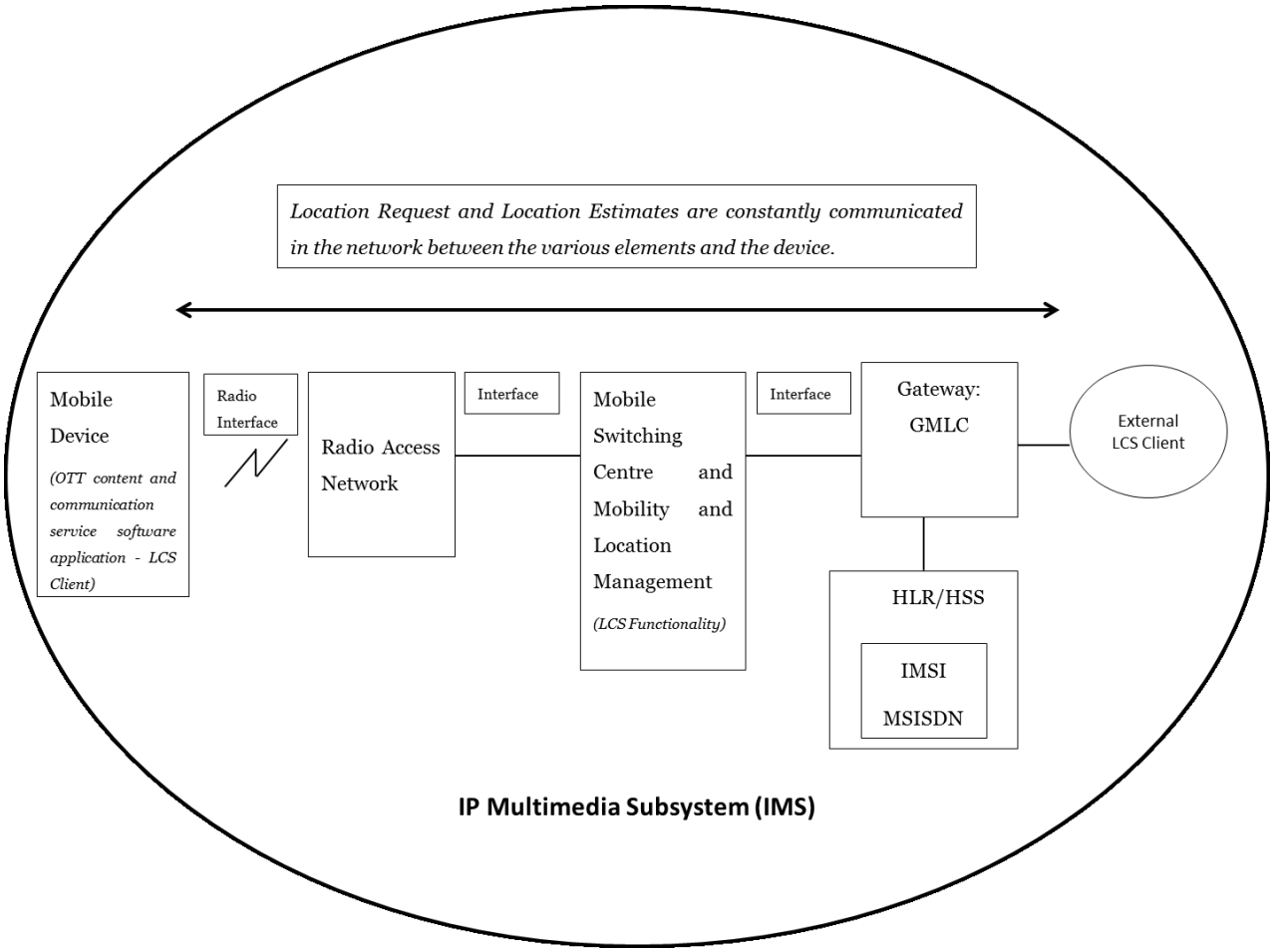


**Figure 1: The LCS Functionality and Architecture (Cisco, 2016: p. 299)**

The TelCo is therefore required to retain the following types of location information if the TelCo used the information to provide the service:

- International Mobile Subscriber Identity (IMSI),
- International Mobile Equipment Identity (IMEI),
- IP addresses,
- port numbers in respect of OTT content and communications services, which in turn are multi-media communications such as in
  - e-mail,
  - Voice-over-Internet Protocol (VoIP),
  - instant messages or
  - video communication

(*Explanatory Memorandum, 2015*: pp. 47-48).

The degree to which this duty applies to a given TelCo and the OTT content and communications service provider is critically discussed below.

## Compelled and voluntary assistance: retention and disclosure

The Australian TelCo is generally required to provide such help as is reasonably necessary to



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law enforcement and national security agencies ("*Telecommunications Act 1997 (Cth)*," Section 313(3) and (7)).

The Regime commenced on 13 October 2015 requiring the TelCo to retain location information and location identifiers in respect of the telecommunications services provided and the communications carried ("*TIA Act 1979 (Cth)*," s 187A and 187AA).

The information retained in respect of the telecommunications equipment or a line used in connection with communication, must be retained for a minimum two-year period ("*TIA Act 1979 (Cth)*," Section 187AA(1) items 2, 3, and 6 and Section 187C). The information of the equipment or the line to be retained, is the physical or logical location at the time a communication starts and the location at the time the communication ends ("*TIA Act 1979 (Cth)*," Section 187AA(1) item 6 ).

The law enforcement and national security agencies authorise the disclosure and the use of the location information and device identifiers by and for themselves, without a judicial warrant being required. The TelCo may voluntarily disclose the information to the agencies for the purpose of law enforcement and national security ("*TIA Act 1979 (Cth)*," Sections 172 - 184 ).

This retention and disclosure scheme is enforced by means of civil penalty provisions ("*Telecommunications Act 1997 (Cth)*," Schedule 1 Part 31) and (Explanatory Memorandum, 2015: p. 10).

However, location information and location identifiers are only required to be retained in respect of a relevant service. A relevant service is a telecommunications service operated by a carrier or an Internet Service Provider (a TelCo in other words), that carries communications or that enables communications to be carried. This TelCo owns or operates telecommunications infrastructure located in Australia, that enables the relevant telecommunications service ("*TIA Act 1979 (Cth)*," Section 187A(3)). OTT content and communications services such as e-mail, Voice-over-Internet Protocol (VoIP), instant messages or video communication are multi-media communications (Explanatory Memorandum, 2015: pp. 47-48), which may or may not be relevant service, depending on the type of provider. In respect of the retention obligation, there was confusion about which type of TelCo is required to retain metadata in respect of OTT content and communications services (Stanton, 2016).

Infrastructure includes any line or equipment used to facilitate communications across a telecommunications network ("*TIA Act 1979 (Cth)*," Section 5(1), definition of 'infrastructure'). Infrastructure includes website hosting servers and servers hosting services that are provided by OTT content and communications service providers. It also includes



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line links and network units (A-G' s Department, 2015: p. 18).

Line links are constituted in three ways: when one line is connected to another line; if two line links are connected; and if the links are connected to the same facility ("*Telecommunications Act 1997 (Cth)*," Section 30). A network unit is formed when a designated radiocommunications facility is used, or is for the use of supplying a carriage service between several points all located in Australia ("*Telecommunications Act 1997 (Cth)*," Subsection 28(1)).

An OTT content and communications service is a telecommunications service that enables communications to be carried. The mandatory telecommunications metadata retention and disclosure obligations generally apply to OTT content and communications services (Explanatory Memorandum, 2015: p. 41), except as stated below.

The TelCo is generally required to retain and disclose the location identifiers such as the IMEI, IMSI, MSISDN (A-G's Department, 2015: pp. 16, 37, 42, 44, 48 and 49 ) and MAC address (A-G's Department, 2015: pp. 43-44, 49-51). The TelCo is also required to retain the SIP (Session Initiation Protocol) (ETSI, 2016b) address information (A-G's Department, 2015: p. 13).

## The three-tier TelCo and the two-tier Content and Communications Service Provider framework

As can be seen from the discussion above, the degree to which the legal obligation to retain and disclose location information and location identifiers is imposed, is largely dependent on the combination of the nature of the telecommunications service and the type of TelCo providing the service. It is also dependent on its distribution and access; who controls and owns the infrastructure; and its configuration ("*TIA Act 1979 (Cth)*," Section 187A(1), (3) and (4).

Three tiers of TelCo may be identified in the telecommunications industry:

- the licensed carrier,
- the CSP and
- OTT content providers.

Whereas the first two are regulated by the Regime, the latter may not be (Fair, 2016). This paper however identifies five role players in the OTT content and communications services provider chain. Their respective nature and how that relates to their retention and disclosure obligations, or not, is discussed in the following sections.



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## Licensed carrier

The first TelCo is the Australian licensed carrier that owns or operates the telecommunications infrastructure ("*TIA Act 1979 (Cth)*," Section 187A(3)(b)(i) and (c)).

The first tier includes carriers that own network units in Australia, such as microwave or satellite links, but not limited thereto (Fair, 2016).

## Carriage Service Provider

The second TelCo is the Australian unlicensed ISP, that owns or operates the telecommunications infrastructure ("*TIA Act 1979 (Cth)*," Section 187A(3)(b)(ii) and (c)). The ISP is the CSP that does not require an ACMA licence to operate (ACMA, 2016).

The second tier includes the CSP. The CSP resells the capacity which is available on the network units of the carriers and therefore does not require a licence to operate (Fair, 2016). The CSP uses a network unit to: '...resell time on a carrier network for phone calls, provide access to the internet (Internet Service Providers) or provide telephone services over the internet (VoIP service providers)' (ACMA, 2016).

The first and second TelCo's may be referred to as the Category A TelCo and the Category B TelCo, respectively.

The Category A TelCo has control over the access and core networks used to provide the OTT content and communications services (European Parliament, 2015: p. 20).

The Category B TelCo may either be a Mobile Virtual Network Operator (MVNO), leasing capacity from the telecommunications network of the aforementioned Category A TelCo (A G's Department, 2015: p. 41), or operate its own network (Fair, 2016).

The Category A or Category B TelCo may provide OTT content and communications services such as Telstra's Data services, BigPond Mobile Services, previously known as Telstra Active or WAP.

BigPond Mobile Services is a mobile video and audio content service (Telstra, 2014: p. 38). In using BigPond Mobile Services, Telstra is licensed to sub-licence these services to its customers. Telstra is licensed to use Blackberry application services and permitted in turn to licence its retail customers to use the service (Telstra, 2014: p. 17).

A TelCo such as Telstra may be classified as a Category A TelCo, in the context of these third party licensed content and communications services. In the event that Telstra develops and licenses its own online content, Telstra would be considered a Category C TelCo, in respect of that OTT content and communications service.



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The Category A or B TelCo provides an Internet access service to its individual customers, which customers may access the public Internet to use services such as Gmail or Skype; and use other Invoiced or Free OTT Content and Communications Services.

## Over the Top Content Providers

The law appears to create a new category of TelCo that is either a licensed carrier or an unlicensed CSP. The OTT content and communications service is not operated by another person using the relevant service operated by the Category A or Category B TelCo ("*TIA Act 1979 (Cth)*," Section 187(4)(c)).

The law clearly assumes the TelCo itself may be providing an OTT content and communications service without the involvement of a third party, such as Blackberry. This, despite the statements from the Australian Mobile Telecommunications Association (AMTA), and the Australian Communications and Media Authority (ACMA) that OTT content and communications services are provided independent of the TelCo that is the network operator (Li, 2015: p. 30) and (European Parliament, 2015: p. 22).

For example, a carrier grade VoIP service Category A or Category B TelCo is packaging and bundling for its customers, that Category A or Category B TelCo has the responsibility to collect the relevant metadata (Stanton, 2016).

This TelCo may be referred to as the Category C TelCo. Telstra's Mobile Location Manager Service is an OTT content and communications service (Telstra, 2014: pp. 38-40).

Other examples include the Telstra services accessed via its Unstructured Supplementary Service Data (USSD) and Wireless Access Protocol (WAP) for mobile Internet, to ensure the services are interactive. It therefore uses WAP browsers:

- "Whereis", that allows the user to request nearby "points of interest" and the information is send via SMS;
- Local Weather;
- SMS Games;
- MobileFun, a service that you can use to personalise your mobile phone by downloading content including logos, colour wallpaper, animated wallpaper, monophonic and polyphonic ringtones, truetones, real tones, video ringtones, video greetings and SMS picture messages; and
- SMS Alerts from time to time by opting in to receive SMS Alerts via the MobileFun service (Telstra, 2014: pp. 38-40).



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Telstra may be operating the service itself, on top of its own IMS network or it may be a licensed service which would classify Telstra as either a Category A or C TelCo with varying retention obligations.

The location of the device is determined by using the cellular network of the TelCo, probably assisted by the GPS and the TOA and TDOA methods (ETSI, 2016b: p. 14). In this instance, the operator may be required to retain the approximate location and location identifiers of the device. These services may use a combination of USSD, WAP (IP network) and the cellular network, to provide the service and to determine the approximate location of the device. The infrastructure that is used is owned and operated by Telstra, as the Telco. Telstra is required to retain the location of the device in its network, when the customer is requesting the content via SMS and the content is delivered via SMS, using the cellular network.

Telstra may then be required to retain and disclose the location information and location identifiers of the device that is accessing and using the OTT content and communications service provided by it. These appear to be the OTT content and communications services Telstra informed the Parliamentary Joint Committee on Intelligence and Security (PJCIS), from which it can extract location information and location identifiers:

> Today we will keep, and, for our purposes, we can tell you, that this phone call was initiated *from this phone* onto *that tower*. After that, if that phone moves around the city, *we do not track what tower it goes to for the purposes of that billing event*. That is why we capture the first thing—*there is a phone call being made*; there is a charge; we need to account for that for billing purposes. Separately in our system, *as we are maintaining a call or allowing a phone to maintain data connectivity if it is talking to a weather app or doing some web browsing, we do know—the system knows; the humans do not know—where that phone is*. So, in that case that Mrs. Hughes gave, if we are looking at where a phone was last seen, *we are able to interrogate our system and, depending on the load of the system, we may well be able to answer that question and say, 'At 2.45 yesterday, we saw that phone for the last time attached to that tower* (Burgess, 2015) (emphasis added).

## Other entities

The fourth category of entity that may not necessarily be a TelCo, is an entity that does not own or operate infrastructure in Australia, and does not have a licence to operate in Australia. It is the entity that is the other person that operates the OTT content and communications service using the relevant service operated by the Category A or B TelCo ("*TIA Act 1979 (Cth)*," Section 187(4)(c)). This is the entity that licenses the Category A and B



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TelCo to sub-licence its OTT content and communications services to its individual customer. This is a subscription service that is not operated for free, such as Blackberry application services.

This entity may be referred to as the Invoiced Content and Communications Service Provider.

## Other providers

The fifth category of entity may not necessarily be a TelCo either. It does not own or operate infrastructure in Australia, and does not have a licence to operate in Australia. It is the entity that is the other person that operates the OTT content and communications service using the relevant service operated by the Category A or B TelCo ("*TIA Act 1979 (Cth)*," Section 187(4)(c)). This is a subscription service that is operated by this third party, but provided for free. This entity may be based locally or internationally. This entity develops the OTT content and communications service as an online service and distributes it over the public Internet for free use without the licensing of the Category A or B TelCo (European Parliament, 2015: p. 20).

This entity may be referred to as the Free Content and Communications Service Provider, such as social networking platforms.

## Limitation of information to be retained

There are limitations on the extent to which OTT content and communications services are subject to the obligation to retain and disclose location information and location identifiers.

## The first exception

Location information about a telecommunications device, the service or the communication information that states an address to which a communication was sent on the Internet, from a telecommunications device, using an Internet access service provided by the Category A, B or C TelCo; and that was obtained by the Category A, B or C TelCo only as a result of providing the Internet access service, is not required to be retained.

The Category A, B or C TelCo is not required to retain location information and location identifiers about a user's web browsing history ("*TIA Act 1979 (Cth)*," Section 187A(4)(b)). The destination IP addresses, the Uniform Resource Locator (URL) port numbers and other Internet identifiers generated by solely accessing an Internet access service provided by the TelCo are exempted (Explanatory Memorandum, 2015: p. 48).



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The policy position appears to be that a URL is considered to be content of a communication, but that in certain instances it may be telecommunications data: 'The provision is required because a URL is in some cases telecommunications data rather than content' (Explanatory Memorandum, 2015: p. 43).

It would appear that for a URL to be disclosed, the law enforcement agencies may not use the warrantless telecommunications metadata authorisation and disclosure process. This is however an issue that requires further investigation and clarification, both from a policy and a legal perspective.

However, the TelCo is required to retain location information and location identifiers that state an address from which a communication was received using an Internet access service provided by the TelCo; and was obtained by the TelCo as a result of providing OTT content and communications services. The destination IP addresses, the URL, port numbers and other Internet identifiers generated in respect of an OTT content and communications service are required to be retained (Explanatory Memorandum, 2015: p. 43) and disclose same ("*TIA Act 1979 (Cth)*," Sections 172 - 184).

## The second exception

The Category A, B or C TelCo is not required to retain, and may therefore not be required to disclose, location information and location identifiers that relates to a communication that is being carried by means of another service and that is operated by a third party. This third party is using the relevant service operated by the Category A, B or C TelCo. The information could be contained in a physical document ("*TIA Act 1979 (Cth)*," Section 187A(4)(c)). The TelCo may be required to retain and disclose the information if it has it available (Explanatory Memorandum, 2015: pp. 43-44) and ("*TIA Act 1979 (Cth)*," Sections 172 - 184).

The general rule is, information and identifiers such as destination IP addresses, the URL port numbers and other Internet identifiers in respect of OTT content and communications services are required to be retained (Explanatory Memorandum, 2015: p. 43). However, if the latter data is generated from an OTT content and communications service that is operated by a third party that is using the telecommunications network of the TelCo to distribute the OTT content and communications service, the Category A, B or C TelCo is not required to retain the data ("*TIA Act 1979 (Cth)*," sections 172 - 184).

Both the Category A, B and C TelCo may provide managed services. A managed VoIP service, for example, is one purchased via the TelCo. The TelCo will typically provide the hardware such as the device and issue the phone number (ACMA, 2015: p. 41).



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Generally speaking, in respect of e-mail and VoIP OTT content and communications services, the Category A, B and C TelCo is required to keep records of the destination IP address identifiers and port number (Explanatory Memorandum, 2015: p. 43): 'However, if a provider offers an additional OTT service, such as VoIP, it will be required to retain the relevant destination communication information' (A-G's Department, 2015: p. 22). The TelCo that is the provider of the VoIP service must retain the destination information for VoIP calls (A-G's Department, 2015: p. 22).

If the service is Skype or the like, that the Category A, B or C TelCo may not have control nor have visibility of the information. The service is just operating on the data stream, then its not the responsibility of the Category A, B or C TelCo to collect information about the device (Stanton, 2016) either. If the Category A, B or C TelCo does not provide the service, but it simply passes over the top of its telecommunications infrastructure, the Category A, B or C TelCo is not required to retain the location information or location identifiers in respect of that service or the device (Explanatory Memorandum, 2015: p. 44).

However, the position appears to be that the TelCo is granted the discretion to retain the location information and location identifiers, if the information is available to the Category A, B or C TelCo, whether it is a third party OTT content and communications service or an OTT content and communications service that is proprietary to the Category A, B or C TelCo: 'This item seeks to ensure that service providers are only required to retain telecommunications data to the extent that such information is available to that service provider' (Explanatory Memorandum, 2015: pp. 43-44).

The Category A TelCo that is the wholesaler to the MVNO (the Category B or C TelCo), is not required to retain the location information and location identifiers from the OTT content and communications services provided by the MVNO. The Category A TelCo, as the wholesaler is not required to inspect the IP packets of its reseller (the Category B or C TelCo) in an effort to "create" location information to ensure compliance with the law (A-G' s Department, 2015: p. 18). The parties may however commercially agree to retain location information and location identifiers on each other's behalf, because the information and identifiers must either be kept or cause to be kept ("*TIA Act 1979 (Cth)*," Section187A(1)).

## The third exception

Location information and location identifiers about a telecommunications device, the TelCo does not use to provide the service the device is connected to, is not required to be retained ("*TIA Act 1979 (Cth)*," Section 187A(4)(e)). The Category C TelCo uses the location information and location identifiers for billing, as discussed above and must therefore retain same.



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The Category A and B TelCo may not be required to retain location information and location identifiers in respect of OTT content and communications services provided by a third party that the Category A or B TelCo does not use itself. Location information and location identifiers to be retained are limited to information and identifiers that are used by the Category A, B or C TelCo in respect of the relevant service. Examples include information related to cell site location, Wi-Fi hotspots, or the Base Transceiver Station (BTS) the telecommunications device was connected to, at the start and at the end of the communication ("*TIA Act 1979 (Cth)*," Section187AA(1) item 6). The location information and location identifiers that are generated as the mobile device moves from tower to tower or from wireless access portal to portal, are not required to be retained whilst connected to the OTT content and communications service provided by a third party, that is simply using the network of the Category A or B TelCo (Explanatory Memorandum, 2015: p. 50).

The Category C TelCo is not obliged to create and retain detailed location records different to the location records used to provide the relevant service (Explanatory Memorandum, 2015: p. 44). The Category C TelCo is however not prohibited from doing so, as the statement from Telstra above indicates that it may use the available location information from a different service to disclose the latest location of the device (Burgess, 2015: p. 18). There are no specific retention and disclosure guidelines in the event any Category TelCo opts to do so. There are also no specific access and use guidelines in the event the law enforcement agencies opt to access detailed location records any Category TelCo may be in possession of.

## The exceptions vis-à-vis the categories of entities

Irrespective of whether the Category A or B TelCo uses the location information and location identifiers, as long as the OTT content and communications services is provided over the network of the TelCo for which the TelCo is licensed to licence its retail customers in turn, the Category A or B TelCo is not required to retain the location information. The question however is whether the Category A or B TelCo is required to retain the location information, which includes location identifiers, if it does use the location information to provide the third party OTT content and communications services to which the device is connected. As described above, the telecommunications infrastructure does use the LCS functionality and retrieves the location information and location identifiers from the device or the network and delivers it to the application that requires it. The infrastructure does therefore use the location information to provide the service. The law is not clear on how it defines “used” in this context. Is it “used” when the TelCo issues the location identifiers to identify the device and to issue an invoice to the customer, or is it the fact that the network uses the identifiers to send the location estimates from the LCS server to the device across the network, or both, as described in Figure 1?



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With regard to OTT content and communications services, which are instant messaging and social networking services, such as WhatsApp, Facebook and Twitter accessed via the public Internet by the individual customer over the IP network of the Category A, B, C TelCo, these TelCos are not compelled by law to retain and disclose any location information and location identifiers in this respect, as per the exceptions above, unless the TelCo has the information available. The Free and Invoiced Content and Communications Service Provider that does not have a carrier licence issued by the ACMA, and is not an ISP or a CSP, is not required by law to retain location information and location identifiers in respect of OTT content and communications services. The Free and Invoiced Content and Communications Service Providers are also not required to disclose the information to the Agencies ("*TIA Act 1979 (Cth)*," Section 187A(3)(b)(i) and (ii)).

The Free Content and Communications Service Provider would therefore also not be required to assist the agencies by disclosing location information it happens to possess. The Free Content and Communications Service Provider must be an ACMA-licensed TelCo to be compelled to provide assistance to the agencies ("*Telecommunications Act 1997 (Cth)*," Section 313(7)(d) and (e)). However, Free Content and Communications Service Providers and law enforcement agencies in most jurisdictions may enjoy good voluntary cooperation of sharing information sought by the agencies (Participant, 2016).

## The Service Provider-Retention-Disclosure Obligation Relationship Table

Table 1 demonstrates the relationship between the type of service, the control of the network, the third party OTT content and communications service providers and the obligation of the TelCo to retain and disclose location information and location identifiers.



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**Table 1: The Service Provider-Retention-Disclosure Obligation Relationship Table**

| | **Relevant Legislation** |
|---|---|
| **Control of Infrastructure** | [Section 187A(3)(b) and (c) of the *TIA Act 1979 (Cth)]* |
| **Service Provided** | [Section 187A(4)(c) of the *TIA Act 1979 (TIA Act 1979)]* |
| **Uses or does not use the location information** | [Section 187A(4)(e) of the *TIA Act 1979 (Cth)]* |
| **Retention Obligation** | [Sections 187A(1), 187AA(1) and 187A(4)(b), (c) and (e) of the *TIA Act 1979 (Cth)]* |
| **Disclosure Obligation** | [Sections 276, 278, 280, 313(3) and (7) of the *Telecommunications Act 1997 (Cth)* and sections *172-183 of the TIA Act 1979 (Cth)]* |
| **Power of agencies to access and use the information** | [Sections 276, 278, 280, 313(3) and (7) of the *Telecommunications Act 1997 (Cth)* and sections 172-184 of the *TIA Act 1979 (Cth)]* |

| **Service Provider** | **The Category A TelCo** |
|---|---|
| **Control of Infrastructure** | Owns and controls the telecommunications infrastructure (access and core network). |
| **Service Provided** | Third-party licensed OTT content and communications service, e.g. Blackberry application. |
| **Uses or does not use the location information** | The network and the device uses the LCS functionality (location information and location identifiers) to provide the service the device is connected to.<br>The TelCo may use some location identifiers to invoice the customer. |
| **Retention Obligation** | The TelCo is not obliged to retain location information nor the location identifiers. The TelCo may choose to retain location information and the location identifiers. |
| **Disclosure Obligation** | The TelCo is required to disclose the location information and location identifiers if it has the information available, under an authorisation issued by the agencies.<br>The only URI the TelCo is not required to retain nor disclose without a warrant to the agencies, which appears to be considered content, is the URL. |
| **Power of agencies to access and use the information** | The law enforcement and national security agencies may authorise the TelCo to disclose the location information and location identifiers if the TelCo has the information available.<br>The only URI the TelCo is not required to retain nor disclose without a warrant to the agencies, which appears to be considered content, is the URL. |



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| **Service Provider** | **The Category B TelCo** |
|---|---|
| Control of Infrastructure | Leases the telecommunications infrastructure (access and/or core network) from the Category A TelCo. |
| Service Provided | Third-party licensed OTT content and communications services, e.g. Blackberry application. |
| Uses or does not use the location information | The network and the device uses the LCS functionality (location information and location identifiers) to provide the service the device is connected to.<br>The TelCo may use some location identifiers to invoice the customer. |
| Retention Obligation | The TelCo is not obliged to retain location information nor the location identifiers. The TelCo may choose to retain location information and the location identifiers. |
| Disclosure Obligation | The TelCo is required to disclose the location information and location identifiers if it has the information available, under an authorisation issued by the agencies.<br>The only URI the TelCo is not required to retain nor disclose without a warrant to the agencies, which appears to be considered content, is the URL. |
| Power of agencies to access and use the information | The law enforcement and national security agencies may authorise the TelCo to disclose the location information and location identifiers if the TelCo has the information available.<br>The only URI the TelCo is not required to retain nor disclose without a warrant to the agencies, which appears to be considered content, is the URL. |



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| **Service Provider** | **The Category C TelCo** |
|---|---|
| **Control of Infrastructure** | Owns or leases the telecommunications infrastructure (access and/or core network). |
| **Service Provided** | No third party operating the OTT content and communications service. |
| **Uses or does not use the location information** | The network and the device uses the LCS functionality (location information and location identifiers) to provide the service the device is connected to.<br><br>The TelCo may use some location identifiers to invoice the customer. |
| **Retention Obligation** | The TelCo is obliged to retain the location information and location identifiers, because it uses the information to provide the service the device is connected to and/or there is no third party operator involved. |
| **Disclosure Obligation** | The TelCo is required to disclose the retained location information and retained location identifiers, if an authorisation is issued by the agencies. The only URI the TelCo is not required to retain nor disclose without a warrant to the agencies, which appears to be considered content, is the URL. |
| **Power of agencies to access and use the information** | The law enforcement and national security agencies may authorise the TelCo to disclose the location information and location identifiers |



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| **Service Provider** | **The Category A, B and C TelCo** |
|---|---|
| **Control of Infrastructure** | Owns or leases the telecommunications infrastructure (access and/or core network). |
| **Service Provided** | Access to the public Internet |
| **Uses or does not use the location information** | The network and the device uses the LCS functionality (location information and location identifiers) to provide the service the device is connected to.<br>The TelCo may use some location identifiers to invoice the customer. |
| **Retention Obligation** | The TelCo is not obliged to retain the location information and location identifiers in respect of an address to which a communication was sent on the Internet, from a telecommunications device and was obtained by the TelCo only as a result of providing access to the public Internet -<br>The only URI the TelCo is not required to retain, which appears to be considered content, is the URL.<br>However, the TelCo is required to retain location information and location identifiers that states an address from which a communication |
| **Disclosure Obligation** | The only URI the TelCo is not required to disclose without a warrant to the agencies, which appears to be considered content, is the URL.<br>TelCo is required to retain location information and location identifiers that states an address from which a communication was received from on the Internet, from a telecommunications device, using an Internet access service provided by the TelCo and was obtained by the TelCo as a result of providing OTT content and communications services, if an authorisation is issued by the agencies. |
| **Power of agencies to access and use the information** | The law enforcement and national security agencies may authorise the TelCo to disclose the URL with a warrant.<br>TelCo is required to disclose location information and location identifiers that states an address from which a communication was received from on the Internet, from a telecommunications device, using an Internet access service provided by the TelCo and was obtained by the TelCo as a result of providing OTT content and communications services, if an authorisation is issued by the agencies. |



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| Service Provider | Invoiced Content and Communications Service Provider |
|---|---|
| Control of Infrastructure | The service is invoiced and used via the public Internet. The Internet is accessed via the network of the Category A and B TelCo |
| Service Provided | Licensed OTT content and communications services. |
| Uses or does not use the location information | The network and the device uses the location information to provide the service the device is connected to. The TelCo may use the location information and location identifiers to invoice the customer. |
| Retention Obligation | The provider is not obliged to retain the location information and the location identifiers |
| Disclosure Obligation | The provider is not obliged to disclose location information and location identifiers. |
| Power of agencies to access and use the information | The law enforcement and national security agencies request assistance from the provider to disclose information related to the device.<br>The AFP announced that it will access and use geo-location information from social networking websites. |

| Service Provider | Free Content and Communications Service Provider |
|---|---|
| Control of Infrastructure | The service is provided and used for free via the public Internet. The Internet is accessed via the network of the Category A and B TelCo. |
| Service Provided | Free online OTT content and communications services, e.g. Twitter, Facebook, Instagram, Gmail and YouTube etc. |
| Uses or does not use the location information | The network and the device uses the location information to provide the service the device is connected to but the TelCo does not use the location information and location identifiers to invoice the customer because the service is free to the user |
| Retention Obligation | The provider is not obliged to retain the location information and the location identifiers |
| Disclosure Obligation | The provider is not obliged to disclose location information and location identifiers. |
| Power of agencies to access and use the information | The law enforcement and national security agencies request assistance from the provider to disclose information related to the device.<br>The AFP announced that it will access and use geo-location information from social networking websites. |

## What the law gives, policy takes away

The limitations discussed above create a gap, whether deliberate or otherwise, in respect of the location information and location identifiers that could potentially be retained and



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disclosed. This gap serves as an accidental privacy protection mechanism, although it may not have been deliberate, but it may be complemented with an undefined regime that exists in parallel to the Regime. This parallel regime creates the opportunity for the agencies to harvest location information from online social networks and using Big Data analytics to extract location information that could be used for law enforcement activities (Minister for Justice, 2016) and (Participant, 2016).

Funding was announced for the Australian Federal Police (AFP) for Big Data analysis of the data collected from social networking sites, as per the precedent set by the US Federal Bureau of Investigation (FBI) (Minister for Justice, 2016):

> Big data used in a law enforcement context provides a substantial mechanism to revealing threats and unlocking criminal plans hidden within *data-rich environments such as social media* or news reporting.
>
> The Coalition Government is funding this technology so our law enforcement agencies can engage the latest tools to overlay big data information with existing intelligence. ' (Minister for Justice, 2016: p. 1) (emphasis added).
>
> And
>
> *Open source social media provides a large data set* – subsequently providing linkages and other in depth intelligence on terrorist groups from their members (Minister for Justice, 2016: p. 1) (emphasis added).
>
> And:
>
> The sheer volume of associated data from the IS online onslaught has created a windfall of intelligence, and gives tremendous insight into terrorist organisations and also insight into operational activity from *geo-location*, to unintentionally leaked plans or photos, (Minister for Justice, 2016: p. 1) (emphasis added).

The reference to social media and insight into the geo-location of targets is a reference to the LCS functionality used in social network applications that are provided OTT. The legal exceptions discussed above places limitations on the TelCo to retain location information and location identifiers in respect of OTT content and communications services. The location information may not be sourced directly from the Category A or B TelCo, as social networking applications are OTT content and communications services provided by a third party, and therefore would be excluded from the retention obligations. The TelCo may therefore be unable to disclose the information the agencies seek. The law enforcement agency announced its intention to access location information directly from social media



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posts instead. The law enforcement agency is accessing the information directly from the social networking content uploaded by the individual or by directly approaching the social networking website for assistance (Minister for Justice, 2016) and (Participant, 2016). The location information obtained from social networking websites may be used to complement the location information and location identifiers collected from the TelCo or to fill the gap. The question is whether this action requires a standardised governance framework, as is the case in respect of the TelCo.

The justification is that the information is OSINT. The individual may choose to disclose his/her location online. However, it is concerning that the law sends the message about data minimisation, by not requiring the retention of location information in respect of third party online applications on the one hand, but then does not address the harvesting of location information directly from the websites that is an OTT content and communications service. The user intends to only disclose its location to friends and family and may not accept to be trolled, even by law enforcement agencies without a judicial warrant.

The ASIO on the other hand, is adamant it is not trawling through data for security purposes. The ASIO stated to the Parliamentary Joint Committee on Intelligence and Security (PJCIS) during the *Data Retention Bill 2014 (Cth)* hearings:

> We can only ever legislatively look for material, seek data, when we believe there is a nexus to security. We do not have the resources, ability, time, energy or inclination to be trawling. These are selective. We are looking at individuals of security concern. The concern expressed by some in the public — that we monitor communications of all Australians and that we are seeking to do that and that this would provide that — is erroneous. (Hartland, 2014).

Furthermore, the AFP requested the disclosure of MAC addresses directly from Apple (AFP, 2016: p. 18). This is because the TelCo may not have visibility of the MAC address (Participant, 2016). Apple is not a licensed carrier or a CSP and is therefore not subject to the Regime. Apple may be a Free Content and Communications Service Provider or an Invoiced Content and Communications Service Provider. Despite this, the law enforcement agency is requesting location identifiers from Apple.

It appears there may not be procedures in respect of obtaining assistance outside the realm of the Regime as set out in the *TIA 1979 (Cth)* and the *Telecommunications Act 1997 (Cth)*. It is not clear if the location information and location identifiers obtained are also restricted to the start and end of the communication, or whether the location information may even be sought during idle mode. This restriction is put in place to minimise the location information



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accessed and used, and to prevent real world and cyber world tracking, as is the case in respect of the ACMA licensed TelCo.

The Big Data analytics announcement comes at a time when the uptake of OTT communications services has been skyrocketing the past four years:

> At May 2015, 65 per cent of adults had used social networking communications services and 42 per cent of adult Australians had used instant messaging in the previous six months, an increase of four percentage points on the same period last year (ACMA, 2015: p. 50).

## Conclusions and Recommendations

Whereas the locally-licensed and locally-based TelCo is subject to retention and disclosure obligations, the Free and Invoiced Content and Communications Service Providers are not regulated. This situation is a cause for alarm to the industry:

> This is a real tension in our telecommunications regime, because, the metadata retention obligation is only applied to carriers and carriage service providers. You have to be 'a service for carrying communications or enabling communications carried by means of guided or unguided electromagnetic energy or both'. So, if you are an OTT provider, no metadata, unless you happen to be a service sold by a carrier or a CSP (Fair, 2016).

However it does not appear as if they are practically exempt. The agencies still request and obtain assistance from Free and Invoiced Content and Communications Service Providers and device manufacturers such as Apple. The social networking sites cooperate with law enforcement agencies and disclose information requested, even without the legal obligation to do so.

Whereas the law does not impose retention obligations in respect of third party OTT content and communications services on the TelCo, there is still a mandatory warrantless disclosure obligation attached in respect of the same location information and location identifiers, in the event the TelCo happens to possess the information.

The collection and analyses of location information from social networking websites undermines the legal exemptions that provide privacy protection, personal information protection and data minimisation.

The TelCo is not prohibited from retaining location information and location identifiers in respect of third OTT content and communications services. The duties set out the minimum limits and by doing so grants the TelCo the discretion to act beyond the minimum



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requirements. No additional safeguards are provided for in respect of access to location information and location identifiers that is not required to be stored in the first place, such as a requirement to only disclose it with a judicial warrant. The lack of such a safeguards and the assistance by Free and Invoiced OTT Content and Communications Service Providers, undermine general privacy safeguards and is the OSINT lacuna in the law that may require addressing.

What the law gives with one hand, the operational activities of the law enforcement agencies take away with the other. It would appear that all the so-called privacy protections are seen simply as gaps to be filled by means of accessing location information from social networking websites, the regulation of which is not publicly known. What remains to be announced are the governance measures regarding the ethical access and use of location information from online social networking websites, and the internal and external *ex post and ex ante* oversight mechanisms.

The manner an individual chooses to access and use OTT content and communications services, or the manner the TelCo chooses to develop, acquire or distribute the service clearly dictates the power of access granted to the law enforcement agencies. It creates the power the agencies possess to access and use location information and location identifiers. It also dictates the level of privacy and personal information protection. The forum the individual uses to access and use a service, or the platform via which the service is provided, or the category of TelCo that provides the service, should not solely dictate privacy protections. In doing so, the Regime does not properly consider the full range of services, the infrastructure platforms used, the role players and the impact of reducing protections and increasing the powers of the agencies, in a contradictory manner.

The various formats of accessing and using communications need to be fully considered and the appropriate levels of protections, disclosure guidelines, discretionary retention by the TelCo and the open access by the agencies to information that would otherwise be restricted by law may need to be fully aligned to the Regime.

## Acknowledgements

Thanks to Mr. John Stanton, CEO of the Communications Alliance; Mr. Patrick Fair, in his personal capacity, a telecommunications legal expert; and the Technical Expert Participant for providing great insight during the research interviews.

Thanks to UNSW, SEIT (ACCS, UNSW Law, D2D CRC) and to my individual Ph.D. supervisors.

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