

Telecom Industry: Competition, Interconnection Requirements, and the Need for Regulations

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INTRODUCTION

The word 'competition' in economic terminology means the independence of business actions opted by different sellers of the same product. However, in context of the telecom industry, the same word has opposite connotation—interdependence among competing service providers. The reason is that "the telecom system must work as a single system [because] users desire end to end services within an apparently 'seamless' communication network. They want connectedness and connectability" [Melody (1997), p. 53]. Therefore, to attract users, a new entrant in the industry, while intending to compete with the incumbent monopoly operator, has to ensure interconnection arrangements with the latter.

Another unique characteristic of this industry in a competitive set-up is that, initially, a new entrant always has a weaker bargaining position for an interconnection agreement with the incumbent operator. It is so because, in the first place, it is expensive and also inadvisable for the new entrant to build a parallel infrastructure up front. To test the market, the entrant may better pay for access privileges to the Public Switched Telephone Network (PSTN) and rent trunk lines from the incumbent Public Telecommunication Operator (PTO). Even if the new entrant builds a parallel infrastructure before he starts the service, he still has to go to the incumbent for interconnection privileges to attract subscribers for its service. If the incumbent operator simply denies interconnection, then most of the potential subscribers will most likely choose the incumbent operator, because they want to have access to more people on telephone.

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For these reasons, free competition in the telecom industry may not bring in the desired results. Some sort of regulations or policy directives have to be there to ameliorate the inherited bargaining edge of the incumbent operator and also to resolve any possible disputes over the normal course of business.

Furthermore, interconnection is not a problem that can be solved once and for all. Rather, "Interconnection arrangements must be modified periodically to reflect changing conditions, including technical arrangement relating to new technologies and upgrading the network, the costs of equipment and other resources, the growth of demand, new service development and the structure of the evolving market" [Melody (1997), p. 55]. This aspect further strengthens the need for regulating a competitive telecom industry.

The purpose of this paper is to illustrate those factors that have caused a transition from monopoly to competitive market structure in the telecom industry and to discuss the structure and elements of an interconnection agreement, and finally suggest some guidelines and policy options to facilitate negotiations for an interconnection agreement.

TRANSITION TOWARDS COMPETITION IN THE TELECOM INDUSTRY

There is a general consensus that the telecom industry is a decreasing cost industry. It means that launching of a telecom service afresh by an operator requires a huge up front capital investment whereas, extending an already launched service to additional subscribers requires a little extra cost. In economic terminology, this phenomenon is described as the fixed cost in this industry is very high, while the marginal cost is almost zero. Moreover, in addition to the economic significance of this industry, it has cultural and social consequences too. That is, growth in this industry means that more people can interact with one another on telemedia and, thus, promote their business by teletransactions and enrich their scholarship by browsing a vast body of literature that is accessible on telemedia. This industry also plays a crucial role in national security and public governance system because most of the 'command and control' messages are passed on through telemedia.

On these grounds, the telecom industry can be termed as a natural monopoly that should be ideally run either as a public monopoly or as a regulated private monopoly. This industry had actually been monopoly-run in most of the countries until the first half of this century. However, recently the trend has changed for the following reasons:

- Having no threat of a competitor in a monopoly market posture, productive inefficiencies crept in this industry in varying degrees almost everywhere in the world. According to a careful estimate "in many developing countries [where telecom industries are still run as

monopolies], capital costs range from US\$ 3,500 to US\$ 4,000 per telephone line, compared with achievable costs [in a competitive set-up] of about US\$ 1,000 to US \$ 1,500" [Smith (1995), p. 1].

The facts and figures show that teledensity has been higher in those countries which have opted for a competitive structure in their telecom industry, while waiting lists for telephone lines have been much longer in those countries that have still allowed their telecom industry to be run as a monopoly [See International Telecommunication Union (1997)]. In a monopoly run telecom industry, there are fewer economic incentives for research and development (R and D), because, by controlling the price, a monopolist can realise abnormal profits. Hence, a monopolist is not hard pressed to strive for cost-effective technological developments. As a result, the technological level of monopoly run telecom industries is far inferior to the levels achieved by industries that are operating in a competitive set-up.

Besides, downfall of USSR, conversion of many centrally planned Central Asian and Eastern European economies to market ones, and gradual privatisation in Chinese economy are some of the historical facts that have paved way for competitive market structure all around the globe. Many developed countries like USA, UK, and Japan and some of the developing countries including Pakistan have already undertaken/allowed privatisation and divestiture of inherited monopolies and experimented/approved competition in their respective telecom industries.

However, transition towards competition in the telecom industry has given way to some new problems that were very well taken care of in a monopoly set-up. These problems include interconnection arrangements among competing service providers, fulfilment of universal service obligation and security standards, and subsidisation of some essential telecom services like local calling to give a boost to penetration rate of basic telephony for the benefit of all subscribers. Since the nature of these problems is like a zero-sum game on the negotiating table, therefore, the contending parties may not come to an amicable solution on their own. Hence, there is a pressing need of having a regulatory body, which can co-ordinate interconnect negotiations, provide guidelines on policy issues and settle any disputes in this regard.

Going along the trend towards competition, Government of Pakistan promulgated the Pakistan Telecommunication (Re-Organisation) Act 1996 (Act) which allows competition in selected telecom services such as card payphones, cellular mobile phone, data communication, digital radio paging, electronic mail, internet, trunk radio and voice mail. Presently 30 private operators are providing these services to general public [See PTA's Annual Report (1997)]. The same Act also provided for the establishment of Pakistan Telecommunication Authority (PTA). The PTA is authorised to grant licenses to private service providers, watch

their operations, safeguard the interests of end-users of telecommunication services, and ensure a rapid growth in the telecom sector.

TYPES OF INTERCONNECTION

There are two main types of interconnection arrangements, co-operative and competitive, which require different levels of involvement of the regulatory body.

Co-operative Competition

Co-operative interconnection involves zero opportunity cost to each party. That is, no party loses its subscribers to the other due to establishment of interconnection relations, rather both parties may gain after the enforcement of interconnection agreement, because subscribers of each party can have access to a wider circle of telecom users and to additional telecom services.

There are four possible situations that fall in this category:

1. Interconnection between two Geographic Telecom Monopolies

As mentioned above, generally a subscriber of any network wants to have access to subscribers of all other networks. Therefore, it is in the interest of any two national, regional or local telecom monopolies operating in different areas to develop interconnection relations between themselves. In such a situation, neither of the monopoly firms would be afraid of losing its subscribers to the other.

2. Interconnection/Attachment of Customer Premises Equipment (CPE) to the PSTN

A customer should be free to purchase his own telephone set, fax machine, and modem, etc; provided that, it does not damage the telephone line and the attached equipment on the other end, and the user also pays, if required, for the right of using additional equipment. Since such customers usually have no intention to further market any telecom service, the incumbent PTO grants interconnection link with little hesitation.

3. Interconnection of Private (Corporate) Networks to the PSTN

Private networks that lay down their own wires and transmission systems, or operate through lines leased from an incumbent PTO, usually demand access privileges to other networks, so that their members can gain access to more people. Since such private networks offer membership to selected people for specific purposes and have no ambition to operate their networks for commercial purposes, the incumbent PTO feels no threat of losing its subscribers to these networks.

4. Interconnection of Value-added Networks (VANS) to the PSTN

These networks provide differentiated products like electronic mail, audio text, database access services, and on-line information, etc. All these services are not a close substitute of basic telephony. Therefore, an incumbent PTO does not hesitate to grant interconnection privileges to VANS.

In all the above four situations, an applicant for interconnection privileges does not compete for the core business of the incumbent. Therefore, the 'applied for' interconnection privileges are readily granted by the incumbent PTO with minimal involvement of the regulatory body in the negotiation process.

Competitive Interconnection

Competitive interconnection involves positive opportunity cost to the incumbent PTO. That is, the incumbent PTO loses or may lose some of its business to the new entrant as soon as the latter starts offering its service. Therefore, by economic rationality, the incumbent PTO tries to deny the interconnection privileges, if possible within legal limits; otherwise it tries to prolong interconnection negotiations and impose as many restrictions on the new entrant as possible. There are two possible situations that fall in this category.

Interconnection of New Local or Long-distance Networks to the PSTN

When a new entrant intends to provide exactly the same service in the same area where the incumbent PTO does, the former poses a great threat to the latter. It is, therefore, expected that the incumbent PTO on its own would not sign a reasonable interconnection agreement unless there is some regulatory pressure on it to do so.

Interconnection of Wireless and Satellite Systems to the PSTN

Apparently the clientele of fixed and mobile (both wireless and satellite) telephony are different. People who move around a lot and have no permanent place of work, office, or residence would prefer to have a mobile telephone, while those who have a fixed place of work, service, or residence would prefer a fixed telephone service. However, if the tariff structure of both types of telephone services is not much different, a mobile phone would be more preferable to all customers because it works equally good as a fixed phone too. Therefore, with such applicants, the incumbent PTO would reluctantly sign the interconnection agreement probably with a number of restrictions to safeguard its own interests. For example, the incumbent PTO would like to fix the highest possible interconnection fee, PSTN charges and

leased line rent so that the resulting feasible charges to a mobile subscriber turn out to be much higher than the PSTN charges. Thus, the incumbent PTO minimises the chance of losing its customers to mobile operators. In this regard, the incumbent PTO can also approach the regulatory body for fixation of a minimum-calling rate on a mobile phone and suggest that this minimum calling rate be much higher than the PSTN call rate. On the other hand, both the mobile operators who want to compete for wireline subscribers and the regulators who have to protect the interests of end users, would be reluctant to accept/fix very high rates for mobile phone service. In such situations, achievement of a fair deal becomes an uphill task that would require a deep involvement of the regulatory body. Moreover, this involvement should not end after signing the contract but should continue to facilitate periodical revisions of the contract in light of new technological and market developments.

ELEMENTS OF AN INTERCONNECTION AGREEMENT

An interconnection agreement should be a comprehensive document that covers all possible aspects of the inter-relationship between the two parties and contingencies. With accelerated growth in the telecom industry, new interconnection agreements should encompass more possibilities and expected outcomes. Just to have an idea of the complexity of an interconnection agreement, its main aspects are discussed hereunder:

Physical Interconnection

It is the first issue that both parties must resolve to ensure interoperability of the two networks. Both parties must decide about the number and location of points of interconnection for local and long distance services, whether they should be co-located or separately located. They should also have an agreement in very clear terms on call routing, level of compression for transmission of nation wide calls and numbering plan. It has been observed, particularly in case of Pakistan, that any vagueness about these terms later on creates a lot of confusion between the two parties. For example, the cellular service providers in Pakistan want to hand over a long distance mobile-PSTN call to that Data Terminating Exchange (DTE) of PTCL which is closest to the termination point and, thus, save long distance charges. On the other hand, PTCL wants them to hand over such calls to that DTE which is closest to the originating point. Similarly, the cellular providers want to use maximum possible compression levels to transmit their long distance calls through PSTN and, thus, reduce their per call (chargeable) calling units whereas, PTCL does not want them to use any compression technique at all. Also, the cellular service providers allow their subscribers, by using dual numbering plan, to have inter-city access at local call charges, which creates a comparative disadvantage for PSTN subscribers. Hence, to avoid any subsequent confusion, all such points should be decided in detail and up front.

Rights and Responsibilities

Each party should be well aware of its rights and responsibilities, particularly about service responsibilities at co-located points of interconnection, and about associated services like billing, customer service, directory information, upgrading of the system, maintenance and data reporting, etc. Any ambiguity about any of these terms may prove troublesome later on. For example, the cellular providers in Pakistan want PTCL to issue itemised billing of PSTN charges whereas, PTCL insists on providing abridged billing to save its billing cost.

Sharing of Cost and Revenue

It is the most difficult part of an interconnection agreement mainly because of various concepts of cost. It should be decided at the very beginning as to who would bear the cost of additional equipment meant for interconnection, maintenance, upgrading and development of the combined system; what will be the cost of availing access to the PSTN and leased lines; and what should be the basis of cost assessment? First of all, it has to be decided whether various charges to the new entrant should be arbitrary (commercial) or cost based? If they are to be cost-based, then should they be based on average fixed cost, marginal cost, or average fixed cost/marginal cost plus opportunity cost? Should the cost be accounted at book value, replacement value, or market value? Also, the estimation of marginal cost is problematic for two reasons; one, the new investment in the telecom industry is mostly lump sum and the other, it is mostly for bundled services. Similarly, the estimation of opportunity cost involves a sufficient degree of subjective judgement. Moreover, the average total cost has some debatable points; i.e., should incomparable operating expenses be included or excluded, and should capital investment on partially utilised projects be counted in full or according to the proportion of utilisation?

For all these reasons, configuration of a reasonable cost and revenue sharing scheme is quite a job. Anyhow, it should be worked out in advance to avoid any possibility of conflict between the two contenders. Just to illustrate the intriguing nature of this issue and the delicate role of the regulatory body to resolve such issues, the protracted contention between PTCL and the cellular operators in Pakistan may be referred to. The cellular providers have been demanding more and more discount on PSTN charges and leased lines' rent since the beginning of this service in 1990 whereas, PTCL has been resisting such demands with full force. Consequently, this issue still remains unresolved.

Sharing of Social Obligations

As mentioned above, the telecom industry has social, cultural and security consequences too. Therefore, different governments set different constraints for

service providers to promote and safeguard well-defined social, cultural and security interests. For example, many governments do not allow local call charges to cross a certain benchmark because they want to provide local telephone service to all residents at affordable prices. Similarly, some governments do not allow dissemination of undesirable literature on the telemedia even if it may fetch a lot of money to them or to service providers. Yet some other governments reserve the right of terminating any telecom service when it becomes a security hazard. For example, for security purposes, the Government of Pakistan banned cellular phone service in Sindh for a year and a half in 1995. This closure of the service caused huge financial losses to the service providers for which government had to compensate them later on.

All such restrictions are usually not justified on economic grounds, yet they are imposed in varying forms almost in all countries. It is, therefore, advisable to make it clear in the contract as to who would bear such costs and to what extent?

Sharing of Information

Since the telecom industry is one of the fastest growing industries world wide, there are frequent technological innovations and the consequent development of respective telecommunication system of each party of an interconnection agreement. It is, therefore, advisable to agree upon an information-sharing formula about any development in either party's system. Without such an agreement, new developments in one party's system may pose a technical danger or financial loss to another party's system. On the other hand, if both parties know ahead of time about new development in each other's system, then both can amend their systems accordingly and thus avoid possible losses to a great extent.

GUIDELINES AND POLICY OPTIONS TO FACILITATE AN INTERCONNECTION AGREEMENT

"Experience has shown that technical interconnection [physical interconnection, division of rights and responsibilities and sharing of information] is not a significant problem in modern telecom systems as technical issues can be readily resolved" [Melody (1997), p. 59].

However, the settlement of economic issues, sharing of costs and revenues and sharing of social, cultural and security obligations, have been the real tasks before the contending parties and the regulatory body. To facilitate an amicable settlement, the regulatory body should first of all issue some guidelines to the contending parties to come to a consensus on their own and then lay down the decision-making process at its own level if the contending parties approach it for intervention.

Regarding the guidelines, the regulatory body should clarify whether the various charges; such as, interconnection fee, radio spectrum fee, if applicable;

PSTN charges; and leased line rent, etc; should be cost based or should be at the discretion of the incumbent PTO. If they are to be cost-based then the type of cost should be clearly mentioned. That is, whether it should be average total cost, marginal cost, or average total/marginal cost plus opportunity cost? Similarly, it should also be clarified whether the selected cost-type should be accounted at book value, replacement value, or at market value? It is also desirable that the regulatory body itemises the selected cost-type, specifies acceptable limits of its various components, and prescribes a uniform accounting procedure for all the concerned parties. For example, the regulatory body should clarify whether loans to employees should be considered as a component of operating cost or of fixed capital expenditures or should not be accounted at all? If they are to be included what should be the maximum acceptable limit, say 10 percent of total operating cost or fixed capital expenditures. What should be the acceptable debt to equity ratio, foreign to domestic loans ratio, long to short term debt ratio, and general expenses to operating cost ratio, etc. In spite of all these specifications, if the contending parties cannot come to an agreement then the regulatory body should first check their accounts in the light of policy guidelines and then give its decision that must be binding on both parties.

Of course, the regulatory body should have professional staff on its payroll to formulate policy guidelines and to evaluate the conflicting views and come up with a just determination. There is, however, a strong possibility that has actually happened in some specific cases that some regulators may perform their task not in the 'public interest' but in the 'captured' or 'vested' interest. The term 'captured interest' means that, consciously, regulators do perform in the 'public' interest but due to having close contacts with any one party, their opinion, knowingly or unknowingly, becomes biased in favour of that party. To minimise the probability of 'captured' and 'vested' interests, policy guidelines and decisions taken by the regulatory body should be discussed in open forums where they can be corrected by unbiased experts.

It is evident that the task of a regulatory body becomes more tedious with the growth of competition in the telecom market. Therefore, bureaucratic red tapism may also creep in. To control this possibility, the regulatory body should set up reasonable target dates for resolution of each task by looking at the nature of different tasks in hand, and then penalise itself if it falls behind the set targets.

CONCLUSIONS AND POLICY RECOMMENDATIONS

There is ample empirical evidence, which proves that growth in the telecom industry is a catalyst for overall economic growth of a country. The reason is the familiar Keynesian multiplier effect and more importantly the spill over benefits to many other industries that specially generate technological progress in respective fields. For example, a student having access to telemedia will probably be more informative than a fellow student who does not have such access. Similarly, a bank

having access to teledia can process a customer's portfolio and transfer his funds to another place, if requested, in much lesser time than that taken by a bank that does not have access to teledia.

Realising this fact in a regime of 'growth phobia', every country wants to develop its telecom sector in the shortest possible time. Prolonged experimentation with monopoly-run telecom industry almost all over the world has resulted in productive inefficiencies and sluggish technological growth in this sector. As a result, some developed countries took the risk to experiment with a competitive market structure for this industry and expectedly found the results quite rewarding. The phenomenal growth of telecom industry in a competitive atmosphere and persuasion of world agencies to this end spurred interest in the whole world for encouragement of competition in this industry.

However, competition in this industry has not proven so simple because of the interconnection requirements among competing telecom systems. This requirement is very complex and continuously in the nature of a zero-sum game, which justifies the establishment of a strong regulatory body. The main responsibility of the regulatory body should be facilitation of such interconnection agreements among competing service providers that ensure a reasonable rate of return to all service providers, protect the interests of end-users, and create incentives for further growth of this industry. To achieve these objectives the regulatory body must hire experienced professionals who have the state of the art knowledge of this industry and are capable of formulating appropriate guidelines for the concerned circles.

Being human, the attention of regulators may be diluted from the so-called 'public interest' to 'captured or vested interests'. To minimise this probability, there should be an advisory body on top of the regulatory body. Another option is to arrange open forums on regular basis to evaluate and improve on the guidelines and determinations given by the regulatory body.

When a majority of policy-makers everywhere has a strong desire for competition in the telecom industry, probably it is the best time to warn them that a casual transition towards competition may not be a panacea in itself. On the other hand, the sheer strength of the incumbent PTO can easily defeat the forces of competition. To achieve the desired results from competition in this market, reliance has to be placed in some other powerful agency and it is in this background that the importance of a strong regulatory body can hardly be undermined. In fact, it is not only the monopoly structure but also the diversion of focus of monopoly operators/regulators from 'public interest' to 'vested' interests that has deprived the world from enjoying itself with advanced and productive telecom services for a long period.

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