Disaster-preparedness and recovery: a priority for telecom regulatory agencies in liberalized environments

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Abstract
Telecom infrastructure is assigned a special position in policy because of its important role in the everyday functioning of society. In addition to the direct effects of loss of service, telecom failures cripple coordination capabilities, hindering rescue and recovery operations. Effective disaster-preparedness and recovery is a socio-political objective that any government must attend to. In the case of government- or private-monopoly provision, the government may issue general directives to the management, directly intervene in management functions under ‘emergency’ conditions, and assume all or the bulk of disaster recovery costs. In the ‘new’ order of private provision of telecom services, a different response is required.

Disaster-preparedness and recovery by private operators cannot be ensured through licenses or concessions alone. The impossibility of making long-term contracts that address all contingencies applies with amplified force to disaster-related provisions. Therefore, independent regulatory agencies are a part of the solution.

This paper addresses the theory and practice of regulatory intervention in disaster-preparedness and recovery drawing from a pilot study conducted by the Telecom Regulatory Commission of Sri Lanka with the support of ICO Global Communications in 1998/99. The elements of effective design of appropriate legislative and license provisions are discussed. Issues of cost containment of disaster-preparedness and recovery measures and the allocation of responsibilities and risks are delineated and the benefits of competitive markets and new technologies for effective use of telecommunications in disaster management are identified.
Introduction

Telecommunications infrastructure is assigned a special position in policy partly because of its important role in the everyday functioning of society. The best way to appreciate that role is to experience or imagine the effects of a disaster that partially or completely affects the telecom infrastructure. In addition to the direct effects of loss of service, the failure of the telecom infrastructure cripples coordination capabilities and significantly hinders rescue-and-recovery operations. Repairs to other infrastructure facilities, usually also affected by disasters, are difficult to conduct in the absence of a working telecom system.

Governments and international organizations have always assigned importance to infrastructure development. The failure, in most parts of the developing world, of efforts to build up universally available and reliable telecom infrastructure within a framework of government monopoly led to a focus on private participation in infrastructure development in the past few decades. The present period is one in which a ‘paradigm shift’ away from government-monopoly supply has been completed in telecom. For example, 98 countries privatized their government-owned telecom sectors in the past decade (ITU 2001). Institutional reforms usually include three components, implemented simultaneously or in staggered order: (1) organizational reform of incumbent operator, including privatization; (2) introduction of competition in entirety, or more commonly in parts, of the sector; and (3) the creation of independent, or at least separate, sector-specific regulatory agencies to oversee the reformed sector. The primary purpose of these new agencies, especially in developing countries, is to provide stability and certainty to the new private investors against arbitrary takings by the government (Levy and Spiller 1994). However, all regulatory agencies are assigned multiple functions that fall under the broad headings of regulation to create and maintain conditions for competition, regulation of oligopoly/mo-nopoly, and regulation to achieve social-political objectives (Prosser 1997).

Disaster-preparedness and recovery is an important socio-political objective, which has a significant effect on other regulatory functions. This paper examines the theory and practice of regulatory intervention in disaster-preparedness and recovery. It seeks to identify the elements of effective regulatory responses to disaster-preparedness and recovery by analysing the findings of a pilot study on the use of telecommunications in disaster and emergency situations in Sri Lanka. The study was conducted in 1998/99 by the TRSCL (Telecommu-
Disaster-preparedness and recovery

The rationale for disaster-preparedness/recovery regulation

Effective disaster-preparedness and recovery, especially of telecom, is a socio-political objective that any government must attend to, under any industrial structure. In the case of government-monopoly supply, the government may issue general directives to the management, directly intervene in management functions under ‘emergency’ conditions, and assume all or the bulk of disaster recovery costs. In ideal circumstances, there would be no need for additional oversight to ensure proper disaster-preparedness or recovery behaviour by the management, because they implement the will of the government. However, in reality and as postulated in public-policy theory, the government, the ‘principal’, has difficulty in ensuring the implementation of its wishes by the management of the monopoly, the ‘agent’. Monopoly managers are subject to multiple incentives and may neglect their disaster-preparedness and recovery mandates, which, after all, are rarely noticed in normal times. Therefore, even in countries that are under the ‘old’ order, there may be a need for ‘regulatory’ oversight of infrastructure operators from special emergency managers or legislative committees, if not from formal regulatory agencies.

In the ‘new’ order, no single operator can be expected to prepare for, and recover from, disasters. In addition, all operators, including the former monopolist, will now claim that they are driven by the ‘bottom line’, and cannot expend resources on activities that do not contribute to profit. They will also resist presumed interference in management by the government. It is possible to envisage market pressures yielding adequate disaster-preparedness and recovery in competitive conditions (consumers with complete information and easy exit and entry). As customers value reliable service, including adequate levels of disaster-preparedness and recovery, they can be expected to factor this element into their service-purchasing decisions. They will have enough information about these service qualities, will be able to exit from under-performing suppliers at little or no cost, and will have alternative suppliers to turn to. However, these assumptions do not hold in infrastructure sectors. In addition, the significant negative externalities of infrastructure failure justify gov-
ernment action. Therefore, regulation of infrastructure providers in terms of disaster-preparedness and recovery is justified even after liberalization.

**Disaster-preparedness/recovery regulation under liberalization**

Explicit statement of expectations, non-discrimination, and fair and consistent treatment are key elements of a stable environment for private investment in infrastructure. If government informs all potential investors of its expectations including specified levels of disaster-preparedness and recovery capabilities, prior to the investment being made, that can be incorporated into investment decisions. If all competitors are obliged to meet more or less similar standards, there can be no complaint, in that disaster-preparedness and recovery costs become part of the conditions of that market. If the problem can be solved with only these two actions, disaster-preparedness and recovery by private operators can be ensured through licences or concessions alone. However, the impossibility of making long-term concession agreements that address all possible contingencies applies with amplified force to disaster-related provisions. After all, a disaster is, in most cases, an unpredictable and indeterminate event.

Therefore, it is necessary to apply the solution of the independent regulatory agency to the problem of disaster-preparedness and recovery. The concession, licence, public law or regulation should contain general statements of government expectations regarding disaster-preparedness and recovery by private operators. The regulatory agency should have the power to interpret and apply those general principles to specific circumstances. This power cannot be unconstrained because that would lay open investors to arbitrary takings. The power must be exercised in a fair and consistent manner, adhering as much as possible to regulatory best practice that includes reliance on expertise, transparency, the public interest, and the communications thereof (Samarajiva 2000a). The qualification, ‘as much as possible’, is merited because the exigencies of disasters may not allow for ideal forms of consultative decision-making.

It has been observed that the responsiveness of government to disasters is an element in the general legitimacy of government. In the same way, a regulatory agency’s responsiveness to a disaster can be critical in gaining much-needed legitimacy. Disaster management is a regulatory activity that extends benefits beyond the relatively privileged minorities that have access to telecom networks in most developing countries, as pointed out by the Sri Lankan Minister of Telecom.
The use of telecommunications in disaster management is an effective way of leveraging its potential beyond those who can directly afford it. A disaster team that is properly equipped can help not only the affluent person carrying a cell phone in his briefcase, but also the not-so-affluent person who does not have a phone in her home (Samaraweera 1998).

In this context, it is surprising that disaster management does not appear as a regulatory priority in telecom as evidenced, for example, by its absence in the comprehensive list produced at the first ITU (International Telecommunication Union) Development Symposium for Regulators (ITU 2000).

**Case of the Sri Lankan telecom sector**

*Pre-reform disaster management*

The pre-reform period may be seen as made up of two parts. Prior to 1991, a government department supplied telecom services, under the Telecommunications Ordinance, the administrative and financial regulations of the government applicable to all departments, and the directives of the minister and the cabinet. There was less than one telephone per hundred inhabitants; service quality was atrocious; and waiting time for new connections, for those unable to bypass the waiting list, exceeded 10 years. There were no specific mechanisms for disaster-preparedness and recovery. Normal engineering calculations were used in dimensioning the system, which included certain redundancy factors. In fact, given the department’s lethargy, around 35% of exchange capacity was perennially unused. In the event of a disaster, the department responded in normal government fashion: it purchased replacement equipment outside normal procurement rules; threw practically unlimited labour resources at the problem; and restored service as quickly as necessary. The intensity of the response was modulated by the degree of political concern. Not much attention was paid to costs, which were absorbed by the opaque government financial system.

The preliminary phase of sector reforms began in 1991 with a new Act. A regulatory authority, still a government department, was separated from the Department of Telecommunications, which was corporatized and renamed SLT (Sri Lanka Telecom). In its first year of existence, the badly under-resourced authority issued three licences, the second being to SLT. The licences were extremely detailed, extending to 16 pages of single-spaced small-font print. There were 38 conditions that spelled out the obligations of the licensee with regard to matters such as anti-competitive practices, numbering
plans, itemized billing and confidentiality of customer information. They were modified versions of the early licences issued by the Office of Telecommunications, the UK telecom regulator (Samarajiva 1997). These three licences (and most subsequent ones) included several conditions pertinent to disaster management including

- a condition requiring the licensee to provide public emergency call services to emergency organizations;
- one mandating the provision of maritime and aeronautical emergency services for the safety of life;
- a requirement that the licensee make plans for rapid restoration of services during public emergencies, after necessary consultations with relevant agencies, and implement them; and
- an obligation to provide priority fault repair service to emergency organizations.

The authority did not enforce these conditions. The incumbent operator’s compliance actually declined in this period as a result of the discontinuance of the short-number emergency dialling capability.

Post-reform disaster management

The Sri Lankan telecom sector entered a major phase of reform in 1996/97. In 1996, two fixed operators were licenced to compete with the incumbent in all markets except international. The incumbent was converted from a government corporation to a company named SLTL (Sri Lanka Telecom Ltd). In the face of imminent competition, SLTL increased rollout significantly. At the same time, a previously licenced fourth mobile operator entered the market, igniting rapid growth in the mobile market. In 1997, 35% of SLTL was sold to Nippon Telegraph and Telecom Corporation, which was also contracted to manage the company. An amendment to the law in 1996 (implemented in 1997) made the regulatory agency more independent and gave it adequate resources (Samarajiva 2000b). A new director-general (the author of this paper) was appointed and the professional staff was doubled in 1998.

At this time, the commission sought to enforce licence conditions, including those relevant to disaster management. It was found that all parties, including the regulatory agency, had ignored most of the licence conditions since the issue of licences. In the face of a massive enforcement problem, the commission adopted a multi-pronged approach that included tough enforcement of some licence conditions (to the point of forcing the incumbent to compensate customers a total of around 1 million dollars) and educational/persuasive efforts on others. Given the availability of external resources in the form of a
Disaster-preparedness and recovery

grant of around 12 000 dollars from ICO Global Communications and the need to prepare for Sri Lanka's accession to the Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations, a pilot study was undertaken (TRCSL 1999a). The study included surveys of operators and emergency-related organizations, multiple meetings with operators including a national workshop and media activity. This initiative was loosely articulated with the ongoing preparations to meet the Y2K problem, which was described in commission documents as a disaster of uncertain proportions but with a date certain.

The intense interactions with operators in the context of a broad programme of disaster-awareness raising were quite educative. Much of the discussion referred to Sri Lanka's endemic man-made disaster of terrorism, which included a series of deadly suicide bombing attacks on the capital city. The correlation between bomb attacks and telecom network failures was so strong that some inferred an attack had occurred whenever the network failed. Some even believed that the government shut down the telecom network to control news and rumours in the aftermath of an attack. Investigation showed that neither the government nor the security forces nor the incumbent operator were organized enough to shut down the network in such a manner. Operators coping with average annual growth rates of around 50% (higher in some switching centres) were eating into the capacity margins normally set aside to handle sudden surges in use (TRCSL 1999a, p. 32). As a result, when the natural surge in use caused by the first news of an attack began, the entire system would crash. There were no load-shedding mechanisms in place to prevent network failure. The other option of establishing a priority system, wherein the network would be shut down except for a subset of priority numbers belonging to disaster-response organizations, was also not implemented. The only thing that worked was crude redundancy. Organizations that subscribed to multiple telecom providers (Sri Lanka had three fixed-access and four mobile-access providers at this time) found that some networks functioned in post-attack situations. However, it was possible only to make intra-network calls at these times because of congestion and failure in other networks and at interconnection points. One remedy that was implemented as a result of the study was the equipping of the ambulances of the major trauma hospital that treated bomb-attack victims with radio-communication capabilities, using a non-interconnected trunk-radio system (TRCSL 1999b). Several critical government offices subscribed to multiple telecom providers, perhaps as a result of the dissemination of these findings.
The study process and the related activities that led to the installation of the trunk-radio communications in the ambulances also pointed to little-noticed vulnerability in mobile networks. Because the hospital’s service area was well served by multiple mobile networks, the commission’s staff on the emergency taskforce investigated the possibilities of providing fixed mobile phones to the ambulances. However, it was then realized that mobile base stations can get overloaded very easily and that it was almost certain that bases stations close to disasters would be overloaded by increased calling attempts in the area, even if the overall network was unaffected by the disaster. In the absence of an effective priority system or a load-shedding mechanism, a mobile network would be quite ineffective in a disaster area (Anderson and Gow 2001).

As could be expected in a liberalized environment, operators raised concerns about the costs of the various disaster-management actions proposed during the consultations. In the context of the need to upgrade emergency maritime services to maintain adherence to international treaty obligations, the incumbent also made extravagant claims for compensation by the government for functions clearly covered by the licence. While pointing out the clear obligations specified in the licences, the Final Report left open the possibilities of utilizing a portion of the licence fees collected by the commission for disaster-management purposes and of imposing a direct ‘emergency management levy’ on all customer bills.

**Problems identified**

Several regulatory problems may be identified from the analysis of pre-reform and post-reform disaster management in the Sri Lankan telecom sector. The first is the difficulty of implementing proper emergency management policies in the larger context of semi-functional regulation. It is not possible to assign blame for non-enforcement of disaster-related licence conditions when practically all the licence conditions were not being enforced.

On their face, the licence conditions were highly detailed. But the detail masked weaknesses. The licence conditions were rife with ambiguity. To actually enforce these licence conditions on recalcitrant operators, it would first be necessary to go through some form of public proceeding to establish the precise nature of the obligations set out in the license conditions. It would also be necessary to ensure that the various actions required of government agencies, including the regulatory agency, were duly taken.

The problem may be illustrated by the analysis of the licence condition on special arrangements for emergencies, which is central to disaster recovery.
8.1 The operator shall, after consultation with the authorities, be responsible for emergency organizations and such government departments as the authority may from time to time determine and whose names are notified to the operator by the authority for the purpose, shall make plans and other arrangements for the provision or, as the case may be, the rapid restoration of such telecommunication services as are practicable and may reasonably be required in public emergencies.

8.2 The operator shall, on request by any such person as is designated for the purpose in the relevant plans and arrangements, implement those plans or arrangements in so far as it is reasonable and practicable to do so.

8.3 Nothing in this condition precludes the operator from

8.3.1 recovering the costs which it incurs in making or implementing any such plans or arrangements from those, on behalf of or in consultation with whom the plans or arrangements are made; or

8.3.2 making the implementation of any plan or arrangement conditional upon the person or persons for whom or on whose behalf that plan or arrangement is to be implemented indemnifying the operator for all costs incurred as a consequence of the implementation.

8.4 Nothing in this condition shall restrain the person or persons referred to in paragraphs 8.3.1 or 8.3.2 from the right to obtain the services referred to in this condition on a competitive basis conditional to compliance of the requirements stipulated by the operator (TRCSL 1997).

However detailed the language is, the obligations of the operator are not clear-cut. For example, if the regulatory agency does not notify the operator of the relevant emergency authority and departments, the operator has an excuse for not consulting with them; in the absence of consultations for whatever reason, it has an excuse for not making plans and arrangements, and so on. The language does not allow the regulatory agency, which more than any other entity in the government has expertise in telecom, to be directly involved in disaster-preparedness activities. There is far too much ambiguity in the phrases 'as are practicable' and 'may be reasonably required in public emergencies.' Even the implementation of restoration plans is conditional on action by an entity other than the operator and gives the operator leeway through the phrase 'in so far as it is reasonable and practicable to do so.'

The language in the licence conditions will work with an administrative relationship such as that between a government corporation
and the ministry that it reports to. In such a setting, the senior civil
servant in the ministry can interpret the language and issue direc-
tives. The operator may grumble, but will obey. The problem is that
the language is not specific enough to be effective in a liberalized en-
vironment where the relationship between the operator, now a pri-
ivate company, and the regulatory agency, no longer having general
administrative authority over the operator, is somewhat adversarial.

The ambiguities in the mandatory language may be reduced by
holding a public hearing to specify the obligations and by ensuring
that specified actions by entities other than the operator are taken at
the appropriate times. However, the cost-recovery provisions in sub-
condition 8.3 create the conditions for protracted disputes after im-
plementation. Because the operator would have the best information
on costs of implementation (as well as of alternative and less costly
methods), it would be extremely difficult to prevent extortion of
emergency organizations by an opportunistic operator. What was also
discovered in the course of the pilot project was that the payments
had to be made by emergency authorities, not the regulatory agency.
At least in the Sri Lankan conditions of 1998/99, the emergency au-
thorities (e.g., the Ministry of Social Services) were quite impov-
ished compared to the regulatory agency.

In sum, the analysis of emergency conditions in the Sri Lankan li-
cences shows that inadequate thought had been given to the practical
problems of enforcement in a liberalized environment where opera-
tors are focused on their bottom lines and in maximizing their power
differentials in relation to the regulatory agency. Language such as
that found in sub-condition 8.4 shows confusion on the part of the
drafters: an appreciation of the value of competition in preventing
extortion by a monopolist combined with a lack of understanding of
what it takes to restore a failed telecom network. It is likely that these
problems exist in other countries as well.

The pilot study revealed several other regulatory problems. It is
clear that for telecom networks of any kind to be usable in disaster
situations, the problem of congestion and network failure due to the
spike in use that usually accompanies the onset of a sudden disaster
must be addressed. The crude solution is that of load-shedding; ir-
respective of their nature, the network will automatically shed calls that
are beyond its ability to handle. This solution does not necessarily re-
quire regulatory intervention, in that operators can simply imple-
ment it as part of network management. However, where operators
do not implement load-shedding but allow the network to crash,
there may be cause for regulatory intervention.

Load-shedding reduces the time that the network is effectively un-
usable. Without it, more time would be taken to restore the network
to normal operation. However, load-shedding does not assist but actually hinders disaster-management. The instrument that will both prevent network overload and assist disaster-management personnel is a priority call system. Here the network does not blindly shed any and all calls; it blocks calls that are not identified as priority calls in order to enable those with priority to use the network for disaster-management purposes. The mechanical aspects of implementing a priority system on a fixed network are well known. The difficulty here is the regulatory task of creating and maintaining an accurate priority list and ensuring that the operators strictly abide by the stated rules. Given the desire to be able to communicate in a crisis situation, it is possible that persons unconnected to disaster management will get on the list, unless it is carefully managed. The Sri Lankan operators expressed concern that the existence of a priority system in one network and not in another could be used as a low-profile marketing tool against the former, because most consumers would not like the idea of being dropped from the network in a disaster situation.

It appears that not enough is known about the implementation of priority systems in mobile networks. Unlike in fixed networks where a particular number is permanently attached to a specific switch, the relationship between call originating instruments and the switches is much more fluid in mobile networks. According to Anderson and Gow’s (2001) research in Canada, this poses serious difficulties for the effective implementation of priority systems.

The above problems associated with priority systems are difficult, but solutions can be found. Anderson and Gow (2001) have identified a problem with priority systems that lacks an easy solution. Priority systems assume that the disaster managers can be identified beforehand. However, it is not possible to assume that those who require communication capabilities for disaster management are the political leadership, the police, fire fighters and such personnel; in many cases, ad hoc emergency managers emerge from the community and play the most critical roles.

**Solutions**

In one view, a disaster cannot be prepared for. It is a *force majeure*, an act outside human control. However, it is possible to mitigate the effects of disasters. For example, the accurate weather predictions and warnings that preceded India’s Orissa super cyclone of 1999 enabled a major evacuation from the coastal areas and reduced what was still a massive death toll (*Free Press Journal* 1999). It is possible to reduce the vulnerability of infrastructure to damage, to minimize the damage and to build in redundancy so that services can be restored quickly. In a liberalized environment, it may be argued that these de-
cisions are managerial, and generally outside the scope of regulatory intervention. However, the regulatory agency can provide incentives for actions that will achieve the desired socio-political objectives at reasonable cost, without infringing on managerial autonomy.

If, for example, the *de jure* or *de facto* practice is for the government, international agencies or the consumer to bear the full costs of disaster recovery, there would be no incentive for a private or corporatized operator to design and operate an infrastructure in a way that would minimize damage from disaster. In the absence of penalties for system failure and slow recovery caused by inadequate preparation for disaster, there are no incentives to design resilient systems and procedures for quick restoration of services. The Sri Lankan case shows the weakness of relying on licence conditions and mandates alone, without effective incentives in the form of clear allocation of responsibilities for costs of disaster-preparedness and recovery.

Insurance may be seen as a logical solution. It is a good method of managing risk, but it is not a cure-all. If the insurance scheme is not properly designed, it can shift all the costs to consumers (many of whom may not even experience the disaster) without creating incentives for the company to set in place systems and procedures to minimize the vulnerability of the system to disaster. Regulators will have to closely supervise the arrangements that operators make with insurers, especially in cost-plus type environments.

The weakness of the Sri Lankan licence conditions shows the value of creating general rules regarding disaster-preparedness. General rules applicable to all operators are more appropriate for a competitive environment. Of course, proper disaster management and telecom expertise would have to be applied to the design of these rules. The regulatory agency and policy makers should, however, be aware of the danger of too many escape clauses being inserted into the rules by operator representatives, as can be seen from the Sri Lankan licences.

Disaster recovery takes short- and long-term forms. The short-term solutions lie in the making and implementation of effective contingency plans. The Sri Lankan study found that a declaration of a state of disaster (as is found in the US) is a very useful mechanism for triggering exceptional responses on the part of the operator, the regulatory agency, and other parties. A clearly demarcated 'period of exception' would allow quick and flexible responses without having to abandon normal procedural safeguards across the board, thereby minimizing damage to the investment climate.

Sri Lanka's experience showed the value of redundancy, especially in under-developed countries: where one network failed, a competi-
tive network survived. Regulatory agencies can study ways of incorporating this strength through the design of appropriate interconnection and tariff policies that would encourage important social organizations to obtain infrastructure services from more than one supplier. With the increasing importance of wireless (both mobile and fixed) in the telecom sector, it may be necessary to develop procedures for reserve capacity and sharing procedures on antenna towers, which are the most vulnerable elements of these networks.

The long-term solution to disaster recovery lies in the proper allocation of risk beforehand (preferably before new investors enter the market) so that the incentives are properly aligned. Obviously, the investor has to bear some part of the costs of recovery. Otherwise there would be no incentive to build and maintain robust systems. As the investor in a regulated market does not have an easy option of exit, it is also reasonable for the consumers to bear part of the risk. As both the government and the general population have an interest in the prompt restoration of vital services, it is also reasonable to allocate part of the risk to the government. What is important is that these decisions must be taken before the disaster occurs and that they must be part of the knowledge base of the investor. Ad hoc solutions in the aftermath of a disaster are necessary in some cases, but detract from the creation of certainty necessary for investment.

In terms of optimizing the value of the network for disaster management, it is essential that regulatory agencies develop policies and procedures for the establishment and maintenance of priority systems. Given its sensitivity, it may be wise to develop only the broad policy framework through consultation, delegating the development of procedures and implementation to a small low-profile group. In the interim, steps should be taken to ensure that at least load-shedding is in place. Of course, it is necessary to ensure that the regulatory agency has necessary powers either in the enabling legislation or in the licences.

What the Sri Lankan pilot study does not directly highlight are the special advantages and challenges of truly disaster-resistant infrastructure supply. Satellite-based telephone service or GMPCS (Global Mobile Personal Communication by Satellite) is a classic example of a disaster-resistant (except for energy replenishment) infrastructure. Except in the few countries that host the ground stations, the entire infrastructure sits high above the earth and is impervious to most forms of disasters. This service has lost much of its lustre due to the bankruptcies of Iridium and ICO. However, it is still worthwhile for regulatory and disaster management agencies to explore the possibilities of incorporating this technology in their disaster manage-
ment plans especially in the light of the emergence of more tightly focused GMPCS operators after the industry’s reorganization.

In the course of a public-notice proceeding it conducted on GMPCS licensing, the TRCSL faced objections from the recently privatized incumbent that any grant of a GMPCS licence would violate its ‘monopoly’ over international telephone services. The actual language of the privatization agreement, also incorporated into the licence, was that ‘no other license . . . for the provision of international telephonic services in and from Sri Lanka prior to 5 August 2002.’ The final decision of the commission held that GMPCS services that did not involve the use of earth stations in Sri Lanka did not require system licenses under Sri Lankan law (TRCSL 1999c). Objections such as those raised by the Sri Lankan incumbent neglect the broader social ramifications of introducing competing and socially beneficent technologies, in their shortsighted preoccupation with ambiguous exclusivities. While the Telecom Regulatory Commission found no grounds for these objections in the course of the multi-round public proceeding conducted in 1998/99, it appears that implementation of the announced progressive policy on GMPCS has been stalled since 2000.

Conclusion

A comprehensive view of regulation under liberalization should include a focus on disaster-preparedness and recovery. This is important not only for its intrinsic importance, but also for enhancing the stable conditions necessary for investment and because of its contribution to building the legitimacy of the regulatory process. This paper has highlighted several important lessons that may be learned from examination of the theory and practice of regulation related to disaster-preparedness and recovery. More regulatory resources must be devoted to this subject, but a pre-condition is the recognition by the knowledge communities in the field of telecom policy and regulation that the subject is an important one.

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