The impact of technological convergence on the regulation of ICT industries

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Introduction

This is a policy paper that aims to fulfill two objectives. The first is to contribute to the understanding of the way that regulators adapt to changes in the marketplace. This is accomplished by outlining the factors that other scholars have identified in the way institutions and organizations change. The second objective is to provide policy recommendations regarding the way the current regulatory institutions could be modified to better respond to convergence.

The paper is organized into six sections. The first makes a distinction between the different types of convergence. The second and third explain the opportunities that technology has brought to the market and the challenges that regulators are likely to face as a result. The fourth analyzes the work that has been done on institutional change and the factors that are likely to affect it. The fifth presents the different models that are likely to arise as a result of those forces. The last section offers conclusions.

Convergence defined

A number of authors have defined the term convergence. It has been defined as a trend in the evolution of technology services and industry structures (Blackman, 1998) and as the coming together of previously separate industry-based regulations into a single legal and regulatory framework. Regulators need to consider different levels of and objectives for regulating sectors as well as overcome inconsistencies in regulation that result from traditional separation. These can result in regulatory arbitrage as companies try to choose the laws and bodies that most benefit them. Regulators also must deal with technological uncertainty and competition policies. There are five alternatives for regulating converging industries: status quo regulator, multi-sector regulator, ICT regulator, coordination among regulators, and minimal regulation. Each of these represents different degrees of change that can be chosen based on circumstances including: competition, path dependency, perceptions about the environment, knowledge, and power.

Abstract

The objective of this paper is to identify alternative models of regulation that address the problems and opportunities brought about by convergence. Regulatory convergence involves bringing together previously separate industry-based regulations into a single legal and regulatory framework. Regulators need to consider different levels of and objectives for regulating sectors as well as overcome inconsistencies in regulation that result from traditional separation. These can result in regulatory arbitrage as companies try to choose the laws and bodies that most benefit them. Regulators also must deal with technological uncertainty and competition policies. There are five alternatives for regulating converging industries: status quo regulator, multi-sector regulator, ICT regulator, coordination among regulators, and minimal regulation. Each of these represents different degrees of change that can be chosen based on circumstances including: competition, path dependency, perceptions about the environment, knowledge, and power.

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segments. Instead convergence is the result of the expansion of services in traditional industries (Grover and Vaswani, 2000). One can attribute this need to find new markets to competition and technological advances that have allowed the entry of new players in many segments of the industry value chain (Greenstein and Khanna, 1997). Although the initial attempts in the U.S. for companies to merge were not actually crystallized, there were mergers in Europe that concerned regulators and prompted vigilance of horizontal takeovers. Some examples cited by Marsden (1997) are Holland Media Group’s merger with HMG (1996), CLT’s merger with Bertelsmann (1996), Nordic Satellite Distribution (1996), Canal+/NetHold (1997). Even though there have been vertical mergers, the majority have occurred within the same industry segments. Most of the convergence has resulted from expansion of services.

When discussing convergence in the context of information and communication technologies (ICTs) it is important to realize that convergence is happening in several areas. Convergence is occurring in technologies, industries, regulation, and government agencies. In this paper, we focus solely on the regulatory and agency convergence that has happened due to technological and market changes. It is important to clarify that agency and regulatory convergence are not a precondition for taking advantage of the opportunities provided by convergence. This paper aims to identify the difficulties of having separate uncoordinated regulators and suggests regulatory agency arrangements that can help governments in their efforts to solve these difficulties.

Regulatory convergence refers to the confluence of previously separate industry-based laws and regulations into a single legal and regulatory framework. Traditionally the telecommunications, broadcasting, content, and computer industries were regulated by a different set of laws or none at all. The computer industry has, for the most part, remained virtually unregulated except for general laws that apply to all industrial or commercial activities. In contrast, telecommunications and broadcasting have been regulated for many years but for different reasons. Telecommunications regulations have been seen as necessary due to strong demand and supply-side increasing returns effects. Telecommunications was thought to be a natural monopoly that should be subject to rate regulation and universal service objectives. Broadcasting has been subject to regulation both because of spectrum scarcity and because of content concerns, including pornography and political debate.

Closely associated with the concept of regulatory convergence is the issue of agency convergence. In the same way that regulation has been separated due to different laws and regulations, countries have also created different regulatory authorities for these industries. Telecommunications and broadcasting are sometimes brought under the control of a single agency while another body regulates content. Other nations have created a regulatory agency for both broadcasting and content separately from the agency that regulates telecommunications. Thus, convergence of regulatory agencies has been defined by Garcia-Murillo and MacInnes (2001, p. 432) as “the increasing centralization of regulatory authority towards a system based on functional units instead of industry divisions.” This means that once service providers offer not just voice related services or cable TV related services but provide all information and communications technology (ICT) services, it no longer makes sense to regulate based on outdated industry divisions. A better approach is to regulate based on market and consumer issues such as tariffs and quality of service.

The opportunities brought about by convergence

Convergence is occurring and leading to numerous combinations. Figure 1 represents some of the types of services or products that are made possible by convergence.

The evolution of technology in the computer, telecommunications, and media industries allows for many combinations and each results in a different basket of services.
Computers and telecommunications

The integration of technologies in these two industries has led to the development of computer telephony integration (CTI) commonly used by business call centers. CTI enables a call center employee to view accounts from the moment that customers key in numbers using a phone keypad. It also allows companies to classify their customers by telephone number so their calls may be transferred to the most appropriate agent. IP telephony is a more advanced version of CTI. IP phones are highly customizable small computers from which people are able to connect to voice or data networks such as the Internet. In the telecommunications industry, operators need computers to provide services such as voice mail, local number portability, call forwarding, and voice dialing. These and more advanced capabilities have been known as intelligent networks, which have been made possible by the convergence of computers and telecommunications.

Telecommunications and media

Telecommunication operators have tried to expand their markets by taking advantage of their networks to deliver entertainment. With the advent of competition, telecommunications companies were looking for new services that could help them diversify their offerings and obtain additional sources of revenue. Video on demand was an early initiative. There were several trials in the late 1980s and early 1990s. In 1995, Telekom Malaysia set up a trial among 50 users using asynchronous transfer mode (ATM) technology. In the same year, Singapore Telecom (SingTel) launched a video on demand trial among 300 households. In 1996, Telenor conducted a trial in Oslo that offered a range of programming including video and educational material to be selected by customers. These trials had limited success because the technology could not handle such demanding applications. Advances in technology are making these services not only technically feasible but also more affordable.

Computers and media

Thanks to fast processing power and inexpensive storage media, the software industry began to develop products that were able to collect vast amounts of information. CDs containing entire encyclopedias as well as more sophisticated learning programs began to appear in the late 1980s and early 1990s. The merging of computers and media has recently led to the development of virtual reality applications. In computer-generated environments users can visually merge into an abstract space, enabling them to perceive surroundings, interact with, and navigate in an artificial world. One early adopter, the oil and gas exploration industry, has used these technologies to provide computer models capable of displaying the elements of exploration and production operations across a worldwide network.

Computers, telecommunications and media

The merging of technologies in these three areas enables a wide range of services. The main feature of the combination of these services is the use of multiple media applications that allow interaction with computers as well as other individuals connected elsewhere in the network. Some of the applications include multi-player online games, which are demanding in terms of processing speed and bandwidth. Some experts have argued that this type of application has contributed to the large penetration of broadband in South Korea. Another new multimedia device allows people to record the television programs of their choice on a computer that is connected to a telephone line, which allows the multimedia device to obtain programming listings and schedules so that the user only has to write the name of the program for the machine to record it automatically. TiVo is a pioneer in this application. Television and radio programming content on the Internet is another example of a new service made possible by merged technologies.

The challenges of convergence for regulators

Convergence of telecommunications, computers, and media has given rise to regulatory challenges. This section explores several reasons why convergence has become problematic for regulators.

Different levels of regulation for each industry

Historically, there has been relatively little government intervention in the computer industry (Ypsilanti and Xavier, 1998). The production and sales of components and computer related products have generally been left to market forces, with only minimal general product regulation such as consumer safety. In marked contrast, both telecommunications and media have been subject to significant sector specific regulation. Both sectors have faced ownership restrictions. The telecommunications sector, in addition, has been subject to rate regulation, quality of service requirements and universal service obligations. The broadcast sector has faced content guidelines, if not control (Blackman, 1998). The advent of the convergence of these three sectors raises questions about the regulatory regime the converged industry will face. Will new legislation or regulations for the converged industry take the light-handed approach, as with the computer industry, or the more interventionist method, as with the telecommunications and media industries?

Different objectives for regulation of the sectors

With some exceptions governments have found little reason to regulate...
quality or prices in the highly competitive computer sector. In contrast, telecommunications services have been provided by monopolies. The objective of regulation has been to guard against operators reducing output to increase prices on low quality services (Blackman, 1998). Another objective has been to ensure that both urban and rural populations are provided with access to communications services. Broadcasting has been subject to regulation because of content concerns and the scarcity of radio spectrum. In some countries, such as the United States, spectrum allocation rights have tied compliance with content regulation. In others, content regulation is related to the promotion of societal values and the elimination of harmful material. The convergence of these three industries makes regulation more difficult as there is a need to determine which objectives to pursue and how to accomplish them now that several industries provide multiple services.

Inconsistencies in regulation resulting from traditional separation

As the European Commission (1997) identified, new converging services are facing a regulatory vacuum. When none of the existing government agencies has issued regulations on the new services, the new regulations could fall under the jurisdiction of two or more agencies, which could lead to jurisdictional conflicts once they start issuing their own rules. In the UK, for example, wired television was under the jurisdiction of Oftel while the Independent Television Commission (ITC) regulated wireless television. When a service such as British Interactive Broadcasting emerged conflicts arose (Collins, 1998). This type of problem eventually led to the creation of the converged regulator Ofcom.

In Germany, where the provinces (land) regulate broadcasting and media services and the federal government regulates telecommunications, communications, and information services, critics argue that this jurisdictional separation prevents a “one stop shop” and has created multiple windows (Cowie and Marsden, 1998). Similarly, the German federal government considers Internet regulation to concern primarily commerce and telecommunications, for which it has jurisdiction: “[t]he states on the other hand regard the Internet largely as a new means of broadcasting for which they hold the power to legislate. Therefore, Germany now has two parallel sets of rules governing services offered over the Internet” (Koenig and Röder, 1998, p. 1). This can lead to friction and inefficiencies in the legal system regulating ICTs. The courts have eventually dealt with these inconsistencies but such solutions delay the introduction of services and potentially hamper competition.

At the regional level, the European Union has engaged in discussions to accommodate convergence. Specifically, governments have attempted to accommodate their regulation in areas such as licensing, including spectrum, media pluralism, programming and content concerns, treatment of new services, as well as vertical integration and access problems (Marsden, 1997; European Union, 1997; Clemens, 1998; Ypsilanti and Xavier, 1998). There are many examples of services for which regulation has not been specified. These include video on demand offered by a telecommunications provider. Video on demand service providers could be subject to inconsistent and contradictory regulations issued by separate broadcasting and telecommunications authorities. Likewise, it may not be clear whether certain services, such as broadcasting over the Internet, should be regulated as broadcasting or not regulated at all because they are computer based. Inconsistencies also arise when pre-convergence classifications, such as the difference between basic and enhanced as well as cable and common carrier regulation, lead to similar services with differing regulatory treatments (Garcia-Murillo and Maclnnnes, 2001).

Differences in regulation at the regional level are of particular concern to European Union regulators, who believe that inconsistencies in the treatment of similar services can hamper investment. This fragmentation of ICT markets could reduce the region’s competitive advantage.

Regulatory arbitrage

When there are multiple regulators, companies can select the ones that advance their interest the most. This could mean selecting, for example, the most lenient regulator or take advantage of the rules that most benefit them. This is problematic when regulation does not yet exist for emerging convergent services that could fall under the supervision of more than one regulator. In the presence of these alternatives they can choose the one that would entail the least regulation, which may not necessarily be the best option for society or the industry as a whole.

It could be argued that multiple regulators are desirable because they can foster institutional learning by eliminating obsolete legal models and expanding desirable ones. This argument, although theoretically feasible, may not be practically possible. This is because the interests of companies are not aligned with those of the government. Companies want to maximize profits while governments aim to maximize societal welfare. The rules that companies may wish to have applied to them do not necessarily lead to benefits for society.

Uncertainty

A great challenge for regulators is their inability to reliably forecast the future due to rapidly changing technology, which has given rise to unforeseen new products and services. Without knowing how technology is going to evolve, regulators can only issue rules for the problems faced today, but it is always
possible that these rules will cause problems when new technologies become available. An example is trunking, where spectrum was allocated at very low prices and in some cases for free. The limited capabilities of the analog version provided the rationale for this decision. When digital trunking emerged it was possible to dial another handset in a manner similar to cellular telephony. This caused great concern among cellular operators who had paid considerably more for their spectrum and were then faced with a new competitor that paid very little. When a situation like this one happens the regulator has to choose whether to do nothing, as occurred in Peru, or change the rules to the detriment of one of the parties. Because of this continuous innovation, regulators need to find regulatory frameworks that allow them to better cope with uncertainty.

**Competition policy**

Many convergence opportunities come from mergers of companies that have traditionally been separated, such as telecommunications and cable TV. Although integration of these two industries can result in the provision of innovative services, it also creates difficulties for regulators who see fewer companies, which could lead to reduced competition. Similarly, once both types of companies start providing these services, regulators have to decide if the cable infrastructure should be treated similarly to that of telecommunications with respect to interconnection for competitive access (Larouche, 1998). Furthermore, once transmission and content are integrated into a single organization, regulators may be concerned with issues of access to other content providers that do not have network affiliates. In the presence of these difficulties, greater coordination between regulators can be an alternative in their decision making process (Nihoul, 1998).

**Theoretical context**

To understand the way regulators adapt to the changes occurring in ICTs, we need to determine the factors that lead to changes in institutions. In this paper we define institutions not as organizations but as the rules that govern organizations and eventually lead to their change. North (1990, p. 3) defines them as the “rules of the game in a society or, more formally, the humanly devised constraints that shape human interactions.” In this paper we focus on the way regulatory agencies structure themselves and the rules/institutions that bind them together. In general, institutions are stable because they help individuals form expectations. As stated by Gordon (1980, p. 24) “[w]e have to have institutions (social organizations and rules) in order to avoid chaos, in order to have civilization.” Because the market is better able to function when there is stability, institutions do not change rapidly. Although stability is desirable, it can also impede innovation. Habits and rules help people cope with the complexities of life by removing several courses of action from conscious deliberation, but habits can also lead to problems because “mechanical habits can remove important actions from the due exercise of deliberation and creative skill” (Hodgson 1988, p. 128).

Much of the research on institutional change is historical in nature and the focus is particular to the event studied. Of these works some have attempted to make a broader generalization about the factors that influence change. These are North (1995) and Bush (1988). Both of these articles provide multiple factors. This paper also uses Coriat and Dosi (2001), who suggested two other variables, power and control, be used as a basis of analysis.

When North describes the factors affecting institutional change, he proposes a dynamic process by which organizations behave according to the opportunities that the existing institutions and environment provide them. Based on these environmental influences, organizations adjust their behavior, thus leading to gradual changes. According to North, institutional change is influenced by the presence of:

(a) existing institutions;
(b) interaction between institutions and organizations;
(c) competition;
(d) perceptions about the social context; and
(e) path dependency.

It is beyond the scope of this paper to assess the impact of existing institutions and the interaction between companies and the government. Thus, we selected the last three areas for this analysis.

Paul Bush (1988) is concerned with the ability of a society to embrace new technologies. He argues that the factors that will determine the way institutions change are:

(a) the availability of knowledge or capacity of a society to adapt to new technology;
(b) the capacity for understanding and adaptation; and
(c) the principle of minimal dislocation.

In Bush’s framework, the availability of knowledge and the capacity for adaptation are closely related ideas. For this reason we combine them into one called knowledge and adaptation.

In a recent book, Coriat and Dosi (2001) analyzed works from the field and determined that these papers have generally failed to include power and control in their explanations. We have thus decided to include them in our analysis.

The works outlined above, therefore, identify a number of factors including:

(1) competition,
(2) path dependency,
(3) perceptions about the environment,
(4) knowledge and adaptation, and
(5) power and control.
Table 1: Factors that can lead to changes in regulation and regulatory structure

<table>
<thead>
<tr>
<th>Factor</th>
<th>Explanation</th>
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<tbody>
<tr>
<td>Competition</td>
<td>It is assumed that in countries where there is more competition there is also faster technological evolution and introduction of services. The contention between markets and regulation will require government agencies to make adjustments.</td>
</tr>
<tr>
<td>Path dependency</td>
<td>The rules that govern the market and the rules that govern organizations are constrained by previous choices. We would thus expect regulatory agencies to make gradual modifications to their structure and the rules governing the market.</td>
</tr>
<tr>
<td>Perceptions</td>
<td>Like companies, regulatory agencies develop constructs about the way the market is evolving. If they believe that great changes have occurred they may feel the need to adapt as well.</td>
</tr>
<tr>
<td>Knowledge and adaptation</td>
<td>In societies that adapt faster to the evolution of the market and technology, the rules that govern these industries are more likely to be outdated rapidly, thus making necessary changes in the way agencies regulate these markets.</td>
</tr>
<tr>
<td>Power and control</td>
<td>While change is taking place in the market, government organizations and rules may lag behind because of vested interests that prevent changes.</td>
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Table 1 links these factors to the way regulatory agencies change.

Table 1 suggests that changes taking place in the market can lead to changes in both government agencies and regulation. In general, regulatory changes are deemed necessary when existing rules limit technological development and the introduction of new services or competitors. It may thus be desirable to have the same government agencies developing new rules that are able to accommodate changes in the market. Changes of structure in regulators are not always necessary and these can occur when conflict, contradictions, overlapping jurisdictions, and inconsistencies in rulings create inefficiency and uncertainty in the market.

We can use the factors outlined in Table 1 to predict the way that regulatory agencies change. Path dependency will result in the tendency of institutions to exhibit similar traits as they evolve while competition is thought to generate more radical change. The effects on regulatory agencies of the variables “perceptions about the environment” and “knowledge adaptation” will depend on circumstances. As Bush (1988) states, societies that have greater access to knowledge and exposure to similar technologies are more likely to embrace change than those in different circumstances. This means that governments will behave differently depending on their circumstances. These in turn shape perceptions in society. If a regulator, for example, perceives that convergence is imminent and the current status is creating problems in the market, the agency is more likely to make modifications.

Power and control is a variable with an unpredictable outcome. The willingness of organizations to change depends on the way that they are structured, how consensus is achieved, and the method by which coalitions and power are shaped. There are multiple ways in which regulators can react to market convergence. The outcomes depend on the factors outlined above. Table 2 briefly identifies the alternatives available to regulators. Figure 2 shows these alternatives with respect to the degree of change that each requires. Although presented as a continuum, it should be noted that regulatory agencies do not evolve in this manner. These are unique alternatives: any of these arrangements is possible and each has advantages and disadvantages.

The status quo and formal coordination are the easiest to accomplish because there is little or no modification to the way laws and regulators are currently set up. The market alternative was positioned at the center because it only requires one type of action, which is to identify departments in the organization, as well as elements in the law that need to be eliminated. The ICT regulator is the most difficult to achieve because it requires major restructuring of both the law and the regulators to be merged. The next section presents greater detail about the proposed alternatives for regulators.

Prototype convergence of regulatory institutions

As a result of the different economic, social, and technological circumstances of countries, it is difficult to advocate a single model that addresses convergence. Because governments have adopted different models in the restructuring of telecommunications, each has to decide on the structure that would best fit its case. This section presents some of the institutional regulatory alternatives to the problem of convergence and identifies the major advantages and disadvantages of each.

Maintaining the status quo

If competition is only in its incipient stages this may mean that technological advances may be relatively slow. For this reason, a government may not wish to transform its regulatory structure and laws to address convergence. There may also be institutional path dependency. Likewise, regulators may also have considerable power and control to prevent change.

As was outlined above, there are several reasons why a regulator may want to make modifications to laws and administrative structures in regulation. The perception about the level of penetration of new technologies and the number of players in the market may make
it difficult for regulators to justify changes to law or regulatory processes. Each government needs to evaluate its own telecommunications, media, and computer industries to determine if convergence is occurring and if it is leading to problems in the way emerging services are being regulated. Similarly if legislators perceive that change will be difficult and are not able to determine the risks and opportunities associated with the emerging communications field, they may decide to wait until a clearer picture emerges before they engage in costly and unproven structural and legal changes. This outcome is also likely for those regulators that have had long histories and strong traditions. Path dependency in this case will pull them towards the status quo. Although this is the easiest of the alternatives, the main disadvantage is that regulators run the risk of fitting new services into old regulatory boxes. The status quo could also be the best alternative as existing rules become irrelevant. Although it is possible that some rules may simply be ignored, for the most part rules do not disappear. Even though they are obsolete they may continue to impose limitations or require compliance. For this reason, the status quo may not be the best solution. This regulatory possibility is most likely in countries with recently liberalized telecommunications industries that have not been subject to major changes in the market.

Multi-sector regulator

The factors that lead to the status quo are similar to those that lead to the multi-sector regulator. This is because many countries originally organized their regulator to supervise all utilities. There are still some countries that are organized within this framework, such as Costa Rica, Panama, and Latvia. Because most countries now have a separate telecommunications regulator the move to a multi-sector regulator can be difficult. In this case the factors are more like those that lead to an ICT regulator (see Table 3).

The multi-sector regulator is the traditional administrative body that oversees all utilities. This model has been used for a number of years and has been gaining greater attention due to convergence. Because it is the oldest model, several experts (e.g., Intven, 2002) have identified its advantages and disadvantages.

For some countries, a multi-sector regulator represents the status quo, as utilities were originally set up under a single government agency. With the privatization and liberalization of ICTs, some governments decided to create a specialized telecommunications regulator. For countries with multiple agencies, establishing a multi-sector regulator is difficult to achieve because of path dependency and potential power struggles.
Advocates of a multi-sector regulator argue that this model leads to reduced costs in activities common to the supervision of all of these industries. These include people such as lawyers, accountants, and economists. Although this could be possible, it is also true that telecommunications is a field with great diversity of technologies. The economics of the industry are also complex due to the obsolescence of technologies, the continuous introduction of new products, and network externalities. Other utilities such as water, gas, and electricity have evolved at a slower pace. Because of these differences, there is a need for greater technical and economic expertise in the field of telecommunications than in the other utilities. This type of argument assumes, nonetheless, that an expert in water that is knowledgeable about impurities and chemical components related to purification can also understand the technical aspects of telecommunications. It is thus not clear that the savings will actually be realized. If the expectations for cost savings are high this could lead regulators to adopt this model.

Other than cost, a multi-sector regulator can reduce waste, such as when the infrastructure of a given utility is set up in coordination with the other services that require rights of way. A single regulator could potentially result in greater consistency of the regulation. The major disadvantages are that generalists may make decisions without fully understanding the complex problems of each sub-sector. Mismanagement would affect all industries. Because of the complexity of the tasks that this type of regulator faces, integration of laws is unlikely to occur and decisions can be slow to make.

**Formal Regulatory Coordination**

Under this alternative it is typical to see competition established and changes in the industry beginning to occur. Regulators may perceive technological changes and realize that regulatory methods may also require modification. Power and control issues may nonetheless prevent them from making radical changes. But it may also be the case that changes in current laws are not necessary.

Under these circumstances the establishment of formal coordination procedures could be possible. This would allow the exchange of information and collaboration when decisions affecting more than one sector need to be made. For this model to work it is necessary to create a centralized body that gathers representatives from the different regulatory authorities. This organization can have representatives from the economy, cultural, and competition ministries aside from the ICT regulators. This inter-agency board does not need to have a permanent status but instead has a formalized meeting schedule where decisions that affect more than one sector can be discussed.

The European Commission (1997) has suggested that a single regulator has the advantage of consistency in the decisions made. This benefit can also be achieved by having separate organizations report to each other the decisions they have made through the course of their activities. This can eliminate regulatory arbitrage, which means that companies will not make a special effort to choose the rule or regulator that most benefits them because the regulators communicate with each other. This is an appropriate transition model for governments that wish to merge their regulators. This type of arrangement has, for example, been used in Peru, where regulators including the competition and economic agencies have established formal links to assess problems that can potentially involve all of them (Crom and Petrazzini, 2001).

One challenge of setting up this type of organizational structure is to determine who is going to serve in the centralized decision making body. Another is the potential confusion that can exist among companies with respect to which regulator to consult when they are concerned about the regulation of a converged service. Maintaining several regulators causes a multiple window problem. Furthermore, separation of regulators is more likely to result in industry capture than a unified approach.

**ICT regulator**

This type of arrangement in the agencies responsible for regulating information and communication industries is more likely to occur in those economies where great competition exists, leading to the rapid introduction of new services and changes in the structure of the industry. Under these circumstances, the perception on the part of regulators is that great changes are happening in the market and that changes in regulation may also be necessary. Society in turn is embracing these technologies. Issues such as path dependency, power, and control are able to be overcome to the point that higher level government officials realized that, in addition to modifications in the law, regulatory methods also need to be changed. Examples of countries that have made these transformations are Malaysia, Singapore, South Africa, and the UK. Other countries such as India are also considering the alternative.

An information and communications technologies regulator encompasses the media, telecommunications, and computer sectors. Establishing this organizational structure requires great effort. Path dependency can impede such initiatives. For those countries where broadcasting, content, and telecommunications is regulated by different government agencies, issues of power and control could determine whether the merger of regulators would occur. The greater the power struggle is, the less likely this outcome will be.
The advantages and disadvantages of having an ICT regulator are similar to those of the traditional multi-sector regulator, particularly with respect to the agglomeration of tasks, from which regulators can obtain expertise at a reduced cost. The greatest difference between the multi-sector regulator and an ICT regulator is the inclusion of content as well as information technologies. Unlike the multi-sector case, where regulators may not have expertise in diverse utilities, ICT expertise is more likely to be shared and complementary. An agglomeration of broadcast, telecommunications, and IT personnel can foster understanding of the converging industry and thus result in more coherent regulation. It can also lead to an adequate treatment for converging services and the development of creative decisions regarding the promotion of all sectors. A great challenge in the implementation of this model is the decision of which regulator will be the one to absorb the activities of the other. Power and control issues may lead to resistance. The challenge is to merge the cultures, objectives, and regulation of these industries.

IT related industries may object to having a regulator but regulators are more frequently facing problems that encompass IT. Two examples are the regulation of IP telephony and interconnection issues with Internet service providers (Ono and Aoki, 1998).

Including media/content industries within a single regulator is also controversial. The main problem is that content is an important tool in the formation of public opinion. While some governments prefer to leave this primarily to the market, others want some control over the provision of content to the public. In the United States and the United Kingdom, for example, the allocation of spectrum licenses for broadcasting of radio and television has had content requirements. Supporters of this idea argue that the spectrum is a public good and, for this reason, broadcasters should be subject to some social requirements. This argument, nonetheless, is not generally made when the allocation of spectrum is for wireless communication. It could be argued that the money that broadcasters pay for the license compensates society sufficiently.

Although the purpose of this paper is not to provide a review of content regulation, it is important to note that even in content industries there are elements that are common to the provision of other services, including telecommunications. In the provision of cable and satellite television, for example, issues include access to buildings for the installation of infrastructure. Similarly, regulations on harmful, misleading, or offensive content can be applied to the Internet and other new communication media. Similarly, the concentration of companies in this industry is often seen as having a negative impact on diversity of programming.

Another example of the problems that are beginning to emerge in the combination of IT and media industries is mass advertising sent to e-mail addresses, commonly known as spam. In the U.S. there has been an effort to regulate this type of advertising to ensure that this type of mailing is clearly marked so that people can recognize it easily. It is important to note that both the multi-sector as well as the ICT regulator, which require considerable changes, also entail great risks. Government efforts to align regulation with the market may be so ambitious that it may not be realistic to achieve the goals set. The process can be counterproductive and slow. It is thus not surprising to see countries such as the UK maintain previous rules with only minor modifications to each of the laws to solve overlapping and contradictory rulings.

The Market Option

Table 3 states that both the ICT regulator and the market experience the same circumstances for each factor. In both cases there is great competition, rapid adoption, and a perception of the need for change but yet these are two quite different alternatives. One explanation of the difference in approaches is the prevalent ideology of its leaders. Some governments prefer free markets to intervention. New Zealand, for example, does not have a sector regulator and instead the Ministry of Economic Development is in charge of overseeing these industries. Other governments perceive a need for specialized agencies dealing with ICTs.

There are several factors that could lead a government to choose the market option. If the existing regulator has been weak and there is a perception that robust competition exists, a government can decide to eliminate it and reduce regulation. Lawmakers might also believe that previous regulations are inadequate and act to change these.

Many telecommunications, computer, and content firms operate in an environment of competition. If regulation is seen as a substitute for competition, then it should begin to retreat once the there is a competitive market (Ypsilanti and Xavier, 1998). Under the market option, industry-based regulators are eliminated and substituted instead by general government agencies such as the competition, economic, and education ministries, as well as the courts. The market option has acquired greater support because of the Internet, which allows people to access content from anywhere. In the presence of national jurisdictions the content laws of any given country have little effect on the behavior of individuals or institutions in other countries. For this reason, people have argued that it is a losing battle to try to regulate content and it might as well be left to the market.

The main advantage of this model, as stated by supporters of markets, is the reduction of administrative costs that results from the elimination of regula-
Table 3: Summary of the influence of change factors on regulatory agency possibilities

<table>
<thead>
<tr>
<th>Factor</th>
<th>Status quo</th>
<th>Multi-sector regulator*</th>
<th>Formal coordination</th>
<th>ICT regulator</th>
<th>The market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitiveness</td>
<td>Medium</td>
<td>High</td>
<td>Normal</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Path dependency</td>
<td>Strong</td>
<td>Limited</td>
<td>Normal</td>
<td>Limited</td>
<td>Limited</td>
</tr>
<tr>
<td>Perceptions about change</td>
<td>Not much change</td>
<td>Much change</td>
<td>Some Change</td>
<td>Much change</td>
<td>Much change</td>
</tr>
<tr>
<td>Knowledge and adaptation</td>
<td>Limited</td>
<td>Rapid</td>
<td>Moderate</td>
<td>Rapid</td>
<td>Rapid</td>
</tr>
<tr>
<td>Power and control</td>
<td>High</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

Note: This table should be read as: “If (factor) is (descriptor) then (regulatory situation).”

* The multi-sector regulator case is for when a country is moving toward a multi-sector regulator from another structure. The status quo multi-sector regulator is represented in the “Status quo” column.

tors. The main disadvantage is that general purpose regulators such as economic and competition authorities are unlikely to have a deep understanding of these industries, which could lead to unresolved market failures and inadequate decisions. There could also be some social goals that are not pursued because of the lack of specialized ICT personnel in these agencies. Under this alternative, the competition authority would generally be responsible for monitoring and enforcing rules regarding market power abuses and uncompetitive behavior. It is important to note that the process of deregulation has often led to the introduction of substantial new regulation.

Table 3 summarizes the five regulatory possibilities described above.

Changes in the structure of regulators should generally be accompanied by changes in regulation. It does not help to relieve the uncertainty in the market if the regulator changes its structure but the laws and regulations remain inadequate. Thus, one could argue that regulatory adjustments are more important than agency adjustments. The latter avoid conflicts, contradictions, or vacuums in regulation when multiple government agencies have jurisdiction over ICTs. Appropriate regulations are necessary to accommodate new services and changes in the structure of the market.

**Conclusion**

While none of the models presented here is without risk, law-makers can select the one that best fits their economic, social, regulatory, and technological circumstances, being aware of the potential drawbacks of the selected model. They should then work to establish mechanisms that can help overcome the deficiencies of the chosen model, whether it be to maintain the status quo, establish a multi-sector or ICT regulator, have formal coordination mechanisms, or eliminate specialized regulators altogether. They will consider factors such as competition, path dependency, the environment, knowledge, and power. This will enable them to face challenges such as different levels of and objectives for regulating different sectors, inconsistencies, regulatory arbitrage, uncertainty, and promotion of competition.

The alternative models of regulation that this paper has identified should be examined in greater detail in future work. A particularly fruitful approach would be to undertake case studies of different countries. For example, India has a complex system of government that could impede radical change in the way that telecommunications is regulated. It may be obliged to continue with the status quo. The barriers to change and experimentation are much lower, on the other hand, in countries such as Malaysia. Differences such as these explain why governments approach regulatory convergence in contrasting ways.

**Endnotes**

1 While governments have not generally intervened in pricing, equipment certification, or quality requirements in the computer industry, concerns over market power resulting from network effects, have prompted governments in the U.S. and Europe to scrutinize some companies for antitrust violations. Examples include IBM in the 1970s and Microsoft in the 1990s. Disputes between software developers regarding compatibility eventually led to case law that currently allows for greater competition between applications and mix and match of computer components.

2 We thank an anonymous reviewer for this observation.

3 We thank an anonymous reviewer for this observation.
References


