

**Declining Competition in Telecommunications:
Could This Have Been Predicted?**

By P.H. Longstaff ¹

Abstract

This paper is an interdisciplinary work that looks at the forces of intraindustry competition and how they are similar to intraspecies competition. In both systems competition is seen in two different modes: the scramble and the contest. Recognizing which mode is important to predicting the future of the system and any attempts to regulate it. The paper concludes with a discussion of the implications of these similarities on competition policy and how they can be seen in the 2001 Report on Competition Policy by the European Commission.

The paper is an expansion and refinement of some of the work done in the author's new book² and includes a list of possible overlaps in biology and business, with examples from the communications sector. This can serve as a list of possible research projects to test the validity of these ideas.

The author believes the ideas in this paper can be used to analyze any situation in which two or more entities must either compete or cooperate to get a scarce resource. Scenarios for business planning and regulation can be developed with these ideas, even in complex systems where competitive and cooperative behavior cannot not always be predicted. The author hopes that this work will stimulate interest in an interdisciplinary and international study of the fundamentals of competition and cooperation.

JEL CODE: K21

Key Words: Competition Policy

¹ The author was a communications attorney for twenty years and is now Associate Professor in the Television Radio and Film Department of the S.I. Newhouse School of Public Communications at Syracuse University, Syracuse, New York. She is also a Research Associate at the Program on Information Resources Policy, Harvard University. She can be reached at phlongst@syr.edu

² P. H. Longstaff, *The Communications Toolkit: How To Build and Regulate Any Communications Business*, Cambridge, Mass.: MIT Press (2002).

1. Introduction

Just when it looked like almost everyone (from business leaders to academics to politicians) had reached some agreement that more competition could bring real benefits to telecommunications firms and their customers, the rules seemed to change. Many countries attempted to “open up” their communications sector to two levels of competition: *intraindustry* and *interindustry*. Governments encouraged the formation of new telephone companies and new services to compete with the incumbents (intraindustry competition). They also encouraged formerly distinct industries to compete with each other; cable would compete with telephone and wireless would compete with wires, etc. (interindustry competition). While everyone was busy promoting *competition*, a wave of *consolidation* began that resulted in the highest level of *cooperation* the communications sector has ever seen. The more governments try to promote competition, the more cooperation seems to take place.

Competition did appear in some of the communication industries, and, while many predicted that not all the new firms would survive, few predicted the development of giant, multinational entities in which many large communications companies would merge to make even larger ones. Telephone companies would become some of the largest owners of cable companies. Internet companies would gobble up “old” communications media companies, while broadcast and print companies around the world would undergo unprecedented consolidation of ownership. The communications sector began to look as if it might evolve into several large organizations, with much multinational and interlocking ownership that enables vertical and horizontal integration. The result left many wondering what had gone wrong and whether it was possible for competition in the communications marketplace to be predicted (or governed) at all.

Governments have often seen consolidation in the communications sector as more dangerous than similar tendencies in other important sectors such as manufacturing because communication plays such an important role in the operation of all industrial sectors and in the economic and political systems of every country. Without an efficient, fast and cost effective communications system, information about the availability of goods and services, data about current prices, and intelligence about the costs of other factors of production could not speed around the world, making globalization possible. Any concentration of economic and political power in the communications sector will seem dangerous to many in both the private and public sectors. Larger, more powerful communications companies will not be welcomed by their

customers, their smaller competitors, or by governments that see them as a threat to the current political balance of power or even national sovereignty.

Current political ideas about industrial competition and cooperation are rooted in the two modes of human behavior that, to some extent, have shaped all of the world's cultures. All societies (consciously or unconsciously) seek the right blend of cooperation and competition. After much experimentation, it has become clear that human societies must balance these two modes of operation if they hope to achieve some level of political and economic stability.

Both cooperation and competition found champions, the former in Karl Marx, and the latter in Adam Smith. The followers in each group promised utopia and characterized the other group as evil. But, in fact, no society (and no economic entity) has ever been entirely one or the other. Wherever there is a scarce resource there is competition and wherever two or more people work together to get that scarce resource, there is cooperation. Competition and cooperation exist together in any environment. It is their *interaction* that forms the economic structures we observe.

Fortunately, competition and cooperation are not unique to human systems. Both of them operate in all biological systems, and, when you take a close look, biology is analogous to business in many ways. The competition between jellyfish and barnacles is surprisingly similar to the competition between different industries. The cooperation within wolf packs is similar to the cooperative behavior within and among companies. It may seem like a long way from economics, but the pathways between biology and business have already been blazed.

Here are two of the surprising insights that we get by looking at competition and cooperation from this broader vantage point:

- **An increase in either competition or cooperation will precipitate an increase in the other.** A new competitor in a system can cause the individuals in the system to band together to fend off the new competitor. In a stable system with no immediate outside threats, new cooperation among some of the individuals will increase the level of competition for the scarce resource in question. For business strategists and policy makers this means that keeping an industry free of government protectionism or regulation may encourage *more competition* in the short term (by lowering barriers to entry, for example), but experience has shown that competition is expensive and competitors will try to reduce it by *more cooperation*, perhaps by dividing up territories or markets. Governments have expended considerable effort to stop this kind of cooperation, but with limited success and often with confusing theoretical and political justification. If policy makers had a deeper understanding of the *process* we call “competition” they might have been able to predict that introducing

new competition into the communications sector would elevate the level of cooperation in the form of vertical and horizontal consolidation.

- **An economic entity cannot both compete and cooperate for the *same scarce resource at the same time*.** It is possible, however, to cooperate with regard to one resource and compete with regard to another, or to cooperate at one time and compete at another time. This idea has important implications for a public policy or a business strategy that assumes competitors will cooperate with one another with regard to a scarce resource, such as channel capacity. For example, it appears to be unlikely that companies both compete for customers and cooperate with regard to the price paid by *those same customers* for access to network infrastructure. Any outside authority (like a government) will have little success mandating such behavior in the long term. The Commission’s 2001 Report on Competition³ notes that it is exercising new “caution” in mandating access to delivery networks as a remedy in competition cases.⁴ The European Commission Directorate-General for Competition recognized that competitors might compete and cooperate with regard to the same resources at *different times*. In the “paper” cases⁵ the commission noted that these large firms might coordinate their slow down of production to maintain prices during times of low demand and then compete fully in times of high demand.

2. From Biology to Business

Some of the most interesting analogues for a broader consideration of cooperation and competition come from the branch of biology known as *ecology*. The word “ecology” was coined in 1866 to denote the study of the “economy of nature.” It attempts to explain, in general terms, the interactions among individuals of one species (*intraspecies*) and among different species (*interspecies*). Ecology takes into account many other fields, including physics, chemistry, mathematics, climatology, as well as the many other branches of biology. Sociobiology, which applies ecological ideas to human activities, has been controversial in some circles, usually in relation to the debate on whether “nature or nurture” is the preeminent force in human behavior.

³ *European Union Competition Policy: 2001 Report on Competition Policy*, European Commission Directorate-General for Competition. Luxembourg: Office for Official Publications of the European Communities, 2002. See, also, <http://europa.eu.int>

⁴ *Id.* At p. 68.

⁵ UPM-Kymmene/Haindl, COM/M. 2498, 21.11.2001, and Norske Skog/Parenco/Walsum, COM/M. 2499, 21.11.2001.

The biological concept of *evolution* or *natural selection* has been widely misunderstood (and abused) in popular literature and political discourse concerning competition. It is *not* “survival of the fittest individuals.” Evolution operates only by differential reproductive success, which is to say, by how many new members are added to the population in each generation. The ability of particular individuals to survive (perhaps because of better strength or speed) is important only if it affects the number of surviving progeny. Natural selection should not be thought of as “dog eat dog” or “the race goes to the swiftest.” An adaptation that makes individuals aggressive or fast may be helpful in some environments but could be counterproductive if their environment changed so that more cooperative and deliberative individuals left more survivors. The concept of natural selection does not support judging some species or individuals “fitter” than others on an evolutionary time scale, because no one can predict what challenges an individual or a species may encounter in the future. Fitness is a moving target for all individuals and all species as well as for all firms and all industries.

A reader relatively familiar with economics will be wondering how some of these biological concepts translate into a business context, that is, when does an industry or a firm have greater fitness? The term *fitness* is used here to refer to the ability of the industry (actually, its individual firms) to, over time, leave more value for shareholders. This would seem a fairly noncontroversial way to measure success in the long term. If a firm is providing lower rates of return on its investors’ capital, it is certainly seen as less fit. Increased fitness may or may not mean an increased marketshare or larger work force. Similarly, it may or may not mean being more aggressive, faster to get new product to market, having more assets, or having a bigger (perhaps international) territory. Any of these factors, however, would increase fitness in certain economic environments. Fitness changes over time, particularly in times of rapid change in the industry’s environment (new regulation, new technology, etc.). What once was a very fit telecommunications company could be doomed to extinction in a highly competitive world unless it can find a new type of food to eat (new sources of revenue). And many of them did. They found investors who gave them cash for the “digital revolution” that they were going to start. Unfortunately, that food source dried up.

The term *adaptation* is used here to mean any characteristic that comes with the firm when it is sold or when its management changes, such as its technology or distribution system. These adaptations will increase or decrease the fitness of the firm or industry in a given economic environment. *Environment* means all the forces that have an impact on the industry—government, suppliers, customers, and macro economic forces, such as inflation and interest rates.

A common misconception about adaptation is that it necessarily leads to changes in the individual or the species that are the best or the most efficient. Some adaptations may be merely *efficient enough* to allow more reproduction by those that adopt it, but not the *best possible* solution to a problem. Adaptation often survives solely because it appeared at the right time and place. In economic and technological systems, adaptation can become “locked in” even when it is not the best answer to a problem, such as the QWERTY keyboard layout. In most cases, an evolutionary process will lead to improvement because it represents adaptation to change in the environment. But adaptation to the current environment can lead to a disastrous outcome if the environment changes too rapidly. If natural selection always led to the best *long-term* answer, dinosaurs would still rule. They were well adapted to their environment, but when that environment changed too rapidly for them to adapt by natural selection (over many generations) they became extinct.

The concept of equilibrium is found in both economics and biology. Debate is increasing in both fields about whether economic and biological systems ever reach a state where forces exactly match each other to bring the system to some kind of rest. For purposes of this tool, *equilibrium* is a situation in which the system moves within a narrow range and is not in a period of wild fluctuation. Many things can throw a system out of equilibrium. One of the most common is a reduction in a critical resource. In a stable system, where allocation of scarce resource has evolved to equilibrium, a reduction in one or more of these resources will cause former cooperators to compete or former competitors to cooperate, or both. In the business world, when a resource such as customers becomes scarcer and firms or industries cannot find substitute customers, the scarcity will drive firms that had cooperated with respect to that resource (e.g., through territory allocation) to compete. A reduction in resources can also drive those that had formerly competed for it to cooperate (e.g., through collective buying or coordinated government relations).

The concept of *scarcity* becomes a broader concept here than many communications executives and policy analysts have granted it in the past. Scarcity has generally been discussed in terms of channel capacity. For example the electromagnetic spectrum is said to be a scarce resource because not everyone can be assigned a frequency of his or her own. Telephone and cable systems were said to scarce resources because the cost to build them often made them “natural” monopolies. This concept of scarcity became the theoretical underpinning for the allocation of access to communications channels by government. The explosion of technologies such as new wireless systems and the Internet increased the number of channels while the capacity of each channel was increased by innovations such as fiber optics and signal

compression. This new abundance of channels and channel capacity threatened an important equilibrium assumed in many business and regulatory strategies.

Another important group of scarce resources (maybe the most important in many situations) is the time, attention and money of customers for point-to-point and point-to-multipoint communications services. These resources are not unlimited, and the allocation of consumer time and money by the market (that is, by competition and cooperation) will be the primary focus of business strategy and competition policy in the foreseeable future.

In much of the literature that compares biology to business, the “unit” that adapts to changes in the economic environment is said to be the institution or the *firm*.⁶ A firm is thus regarded as an individual member of its industrial species. Successful adaptations by individual firms will mean more of them will survive.

It is important to acknowledge that any similarities between biological and human systems will always be imperfect, because human beings can look into the future and, on the basis of assumptions about future events, they can change their behavior. This capacity accounts for the behavior of such human systems as the stock market. It allows human beings to change habits and other characteristics that would be more stable and thus more predictable in other organisms. Human beings also exhibit more complex resource requirements than other species. For example, given an opportunity to maximize their economic gain, some human beings may forgo it for the sake of serving other needs (such as ego gratification), a characteristic other animals appear not to have.

Biological systems exhibit a variety of modes of interaction between different species (interspecies) and between individuals of the same species (intraspecies). There are no examples in nature where two or more of these interactions exist simultaneously as between two individuals or populations. For instance, two individuals will not compete and have a parasitic relationship to each other. Similarly, there is no evidence that individuals or groups ever compete and cooperate at the same time and the same place for the same resource. Thus, cooperation and competition appear to be different modes of behavior and not two ends of a spectrum where any particular behavior could be characterized as “somewhat cooperative” or “extremely competitive.”

3. Two Kinds of Competition: The Scramble and the Contest

Ecologists define *competition* as an interaction between individuals or species, brought about by a shared requirement for a resource in limited supply, and leading to a reduction in the

⁶ See, e.g., Hodgson, Geoffrey M., (1996) *Economics and Evolution: Bringing Life Back to Economics*, Ann Arbor, Mich.: University of Michigan Press.

survivorship, growth and/or reproduction of the competing individuals concerned.⁷ This is seen in two different modes: the Scramble and the Contest.

In the *Scramble* one species or individual uses up resources to the detriment of other species or individuals without a direct response from those displaced. For example, a plant species might colonize all the available sunny spots in a forest clearing or a herd of buffalo might eat all the available grass in a grazing area. In both cases they are depriving other species of a critical scarce resource and driving them off the territory or into extinction. Interspecies competition often takes this form.

In the *Contest* a species or individual responds directly to attempts to displace it or to appropriate a resource it uses. This situation can be observed in contests over territory or in dominance hierarchies, and it can take many forms, including siege, harassment, and actual battle. This strategy is observed where the resource in contention is large enough to spend energy defending but small enough to be surveyable and controllable. An individual panther might actively defend a part of a forest that is large enough to support itself and its juvenile offspring but the territory must be small enough that the panther can detect intruders. A group of animals who live together in a dominance hierarchy would defend a “kill” they have made against other species or other groups and fight among themselves for who gets to eat first.

4. A Closer Look at Intraspecies Competition

Intraspecies competition takes place when two or more individuals of one species compete against each other for a limited resource. *Intraspecies* competition has the effect of controlling the number of individuals (the population) of that species, while *interspecies* competition can control the number of species in an environment. Increased competition between individuals does not increase the number of surviving individuals – it decreases them.

Intraspecies competition is always more intense than interspecies because individuals in the population use exactly the same resources for survival. As the population grows it uses more of those resources, and, at some point, when the resources no longer support the large population, individuals begin to compete for its use with individuals who look exactly like themselves.

⁷ The biological foundations for this paper can be found in many textbooks. The author has consulted several including:

Begon, Harper, and Townsend. 1990. *Ecology: Individuals, Populations, and Communities*, 2nd Edition, Cambridge, Mass.: Blackwell.

Ernst Mayer. 1997. *This is Biology: The Science of the Living World*, Cambridge, Mass.: Harvard University Press.

For additional references, see,

P.H. Longstaff. 2001. *The Communications Toolkit: How to Build Or Regulate Any Communications Business*. Cambridge, Mass.: MIT Press. (pp. 246-251)

Competition is a zero sum game so a gain for one is a loss for others and some individuals will not survive. The population will decline until it reaches a level the resource can support. Since competition is expensive many species have evolved strategies to reduce highly aggressive behavior.

As in interspecies competition, there are limits to the usefulness of aggressive behavior in competition with one's own species. Animals generally prefer ritualized combat or bluff to actual fighting, because above a certain level, aggression actually lowers fitness levels. The individual who spends a lot of energy fighting would not have enough left for things like courtship, nest building, and the feeding and rearing of offspring. For this reason, they won't reproduce more quickly than their neighbors, and, in the long term, very aggressive individuals will be selected against. In addition, very aggressive individuals who direct violent behavior against relatives lower the replacement rate for genes shared by the aggressor and the relative.

In most animal species, aggressive competition between individuals is reduced by two methods: territoriality and dominance hierarchies. Some species use primarily one or the other, while others use both. Wolf packs have a territory they defend and a hierarchy within the pack. Many animals set up dominance hierarchies while individuals are still in infancy. In most species that raise young in groups, or "litters," the development of dominant siblings occurs very early, perhaps as early as the first hours of life. This hierarchy reduces aggressive behavior and makes survival of at least one of the offspring more likely by giving it first call on the available food. A rare form of intraspecies competition is cannibalism. It usually occurs where there are significant differences in the size (or other fitness criteria) among individuals in the population.

Intraspecies competition is seen in the same two modes discussed above:

The Scramble. Individuals do not interact directly with each other but use up more resources than others of the same species. Individual success is influenced by many things that give individuals a competitive advantage; things like the individual's location (more sunlight or prey are available) or relative size (larger bushes cover more ground and get more sun).

The Contest. Individuals interact directly to prevent another from using a resource. This can be seen in animals that defend territories from others of the same species.

Size is a competitive advantage for individuals in a scramble or a contest when smaller individuals are more vulnerable to environmental fluctuations or extreme conditions. In a contest, being the biggest can help bluff opponents or win actual battles. But being big is not always the best fitness criterion. Sometimes being able to run faster will let you avoid predators better and enable you to live long enough to mate. Sometimes keen eyesight and hearing will serve you better. It depends on the problems and opportunities your current environment presents you with.

Like other forms of intraspecies competition, the establishment of territories also controls the size of the population. Since there are a limited number of territories and only one individual (or mating pair) can occupy each, the population size will remain stable over time. A territory is contested when a new individual tries to kill the incumbent or push them off the contested turf.

The size of the territories is not without limits. Defending and patrolling a territory costs energy that could be used for reproductive functions. It makes no sense to defend a territory larger than necessary to support the needs of the incumbent. If the resource is abundant the territory will be small, but if it is more widely distributed a larger territory will need to be defended.

5. From Intraspecies to Intraindustry Competition

Intraindustry competition takes place between firms in the same industry. The goal of intraindustry competitive strategy, according to one business scholar, is to find a position in the industry where the company can best defend itself against competitive forces or can influence them in its favor.⁸ This sounds a lot like one of the intraspecies competitive strategies: find a territory or a grouping of resources and defend from competitors. Establishing a territory allows the firm to avoid using too much of the aggressive behavior that will rob them of energy for other survival tasks. The best competitive strategy is one that lets you avoid competition as much as possible.

Intraindustry competition takes place between firms that look alike (e.g., between telephone companies or between television networks). This competition between firms tends to be fiercer than interindustry competition because firms in the same industry compete for the same resources (customers, production inputs, etc.). Competition between TV stations is fiercer than between stations and newspapers because all the local stations hunt for the same advertisers while newspapers hunt for only some of those sought by broadcast and they have some that broadcasters don't go after at all. Their niches overlap to some extent but not 100 percent because they have different competitive advantages. However, if TV stations and newspapers both begin to distribute information, entertainment and advertising on the Internet, they will start to "look like" each other. If this happens the competition between them is likely to look more like intraindustry competition – it would become more fierce and they will develop tactics to keep firms that look like them off their territory.

Like intraspecies competition, intraindustry competition can act to control the population of firms in an industry. Increased competition is unlikely to mean that more firms survive to

⁸ Porter, Michael E., (1998) *Competitive Strategy: Techniques for Analyzing Industries and Competitors: With a New Introduction*. Boston, Mass.: Harvard Business School Press.

compete – it means there is likely to be *fewer* of them. There will be winners and losers. The territory (or market) being fought over need not be geographic; it can be a resource niche or a market segment. When the current territory of a firm is invaded by a similar firm, the battle can be intense because the fight may be “to the death” because of the competitive exclusion principle – if they both try to use the same resources at the same time one of them is likely to end up in bankruptcy or to leave the market.

A firm may become vulnerable in a scramble or a contest because of a reduction in a critical resource (e.g., fewer radio listeners) or because more individuals are trying to use the resource (e.g., government grants more radio licenses). In both cases, the number of firms will decline until it reaches a level the resources in the environment can support. Winners will manage to get enough of the critical resources to stay alive. Losers will not and will go bankrupt or sell out to a stronger competitor. Thus, the net effect of increasing the competition in an industry with dwindling access to a limited resource will be either to “cull” the weakest competitors or force some of the competitors to cooperate. Cooperation will reduce competition and can take the form of mergers and acquisitions but can also include less formal (or public) arrangements such as agreements to allocate customers or establish new territories. The “failing firm defense” is recognized by the EC and in these cases mergers that result in lower competition are allowed. In the *Kali+Salz* case⁹ established three criteria for this exception: 1) the acquired firm would have been forced out of the market without the acquisition by a competitor, 2) there was no alternative purchaser who would have maintained the level of competition, and 3) if the acquired firm had been forced out of the market (by bankruptcy, for example) the acquiring firm is likely to pick up its market share.

The same forces that sometimes favor large individual organisms in the biological world also act on business firms. In the face of increased competition, larger firms are often better at a scramble because they use up more of the limited resources that would have been available to smaller competitors. They are also better at a contest because they can use more resources to aggressively push smaller competitors off the turf. An ability to accumulate resources and maintain some internal diversity will also make larger firms less vulnerable to environmental fluctuations (e.g., changes in technology or business practices) and extreme conditions (e.g., economic recessions) than the small firms are. This may mean that, to some extent, the large firm is actually a benefit to the consumers it serves because it will be more likely to have access to resources and continue service without interruption in times of crisis or extreme conditions.

⁹ Commission Decision 94/449/EEC in Case IV/M.308- *Kali+Salz/MDK/Treuhand* (OJ L 186, 21.7.1994).

Individual firms in most communications industries have relied on territoriality to gain and maintain access to resources. They have used resources at their disposal to become very “fit” for their environment, i.e., they were able to give good returns to their owners, even though they were not particularly fast or aggressive or efficient. Unlike incumbents in biological territories, most of these firms in many communications industries did not need to defend their territory—governments did that for them. But as these government defenses fall to the forces for liberalization, and new technology breaks down other barriers that protected the old territories, individual firms may be expected to try to gain new territory that they can defend.

When things go up for grabs the competing firms are faced by the same choices available in the biological world:

- *Find a new resource on your present turf.* This might mean using present infrastructure or expertise to sell other services to present customers, thus finding new resources to make up for those taken away by the new competitor. Unless the service is totally new and not a replacement of another currently available in the market, a firm should prepare to fight current providers of that service on their turf. If the firm is a telephone company that serves everyone on its turf, it may find itself competing with some of its own best customers (e.g., mass media firms who use a lot of telecommunications services) as it tries to find new ways to use its assets.
- *Move to a territory you can defend.* If the invader whose forces are massed at your border looks unbeatable, you may want to avoid a fight and just move on. This may mean moving to a smaller territory (one you have enough resources to defend) or it may mean aggressively taking a territory where the incumbent is weaker than you are. Maybe you take the resources you’ve stored up and try your luck in another industry where you may have a competitive advantage over other individuals.
- *Stay and fight, but make the competition expensive for the other side.* The firm could let it be known that it will fight to the death and that any invaders can expect to take so many casualties they will be unable to defend the territory even if they win. The firm could also set up a “spite” situation (e.g., selling below cost) that will hurt them but it will hurt the other side more. Or one firm could make the other’s access to a critical resource more expensive than theirs (such as, making sure suppliers give them a better deal).
- *Get bigger.* Larger firms may gain access to increased resources, which will permit them to put up a better (and longer) fight and make them appear more formidable in either a scramble or a contest; as a result, smaller competitors will not even try to challenge the turf. An organism or firm can increase in size by forming permanent coalitions (mergers) or

temporary ones (joint ventures, alliances) or buying up dying firms to make sure they don't become a problem.

Some of these options are legal in most countries and others generally are not. They are, however, very predictable reactions to increased intraindustry competition and regulators should not be surprised when they happen. Several of these options involve some form of cooperation. As we have seen in both biological and business systems, cooperation is a typical response to increased competition.

Intraindustry cooperation can also take the form of forgoing competition for overlapping customers or developing product niches that would act as mutually recognized territories. Geographic territories emerge in this way, but these territories are not necessarily the product of intentional cooperation. They can evolve because competition is expensive and firms will avoid situations where the prize (a group of customers) is not worth the price it would take to get them. A firm will tend to concentrate more energy where competition is lower, until, over time, it finds itself selling more to certain markets or in certain geographic areas. Their dominance in these markets will then make other firms wary of coming into a market with a powerful, established competitor. Thus, the European Commission's former focus on the dominance of firms seeking permission to merge was probably not without merit, it has for other reasons decided to adopt the "substantial lessening of competition" standard used in the US, Canada and Australia.

Intentional cooperation is obvious where competitors unite to obtain or defend a resource that no single member of the group could get on its own. For example, two competitors might make a joint bid on a contract that is too large for either alone to fill, or they might band together to induce customers, through, say, bid-rigging, to pay higher than market rates. Competitors have been known to band together to get a lower price for a commodity that all of them then use in their production process. Competing firms in an industry also form coalitions to fight off another industry that threatens to take their customers or to fight government activities that threaten their resources. Perhaps the most visible form of intraindustry (and sometimes interindustry) cooperation in the late twentieth century was joint efforts in research and development. Joint R&D, which granted each participant access to the same technology, was said to be *precompetitive*. Participants then used the new technology to compete with one another on price, features, and service. In these cases, the firms involved are not cooperating and competing at the same time for the same resource. The two modes are separated either by time or by the resource in question.

Firms in the same industry that would be expected to be intense competitors, sometimes come together in order to facilitate competition with a much larger firm or a new industry by offering their customers a substitute product. This kind of cooperation generally takes the form of sharing technical information, combining political strength, coordinating purchasing to get a better price, and cooperating in advertising and common signage. But small firms that continue to compete on the basis of quality and price at the retail level seem to assume that the increased fitness of the group confronting a large rival will not decrease individual fitness of each competing against the others within the group. This cooperation represents a sophisticated form of mutual restraint in a situation where an all-out contest would leave small firms vulnerable to the large one.

5. Implications for Regulation of Competition and Cooperation in the EU

Some policy makers and business leaders have occasionally asserted that competition and cooperation are natural processes, and therefore governments should not interfere with the natural selection of industry. It is difficult, however, to foresee a time when the industrial sectors of all countries would actually allow complete noninterference by government, because it would make many industries forgo the government protection from competition that they rely on. This protection can be active (as in forbidding entry by competitors) or more passive (as in aiding some firms with government subsidies). The EC has clearly recognized that government aid to firms can have an effect on the level of competition in an industry. It has indicated that it will take particular notice of aid to public broadcasting, “that cannot be justified by the need to perform the public service obligation,” and national firm production to prevent “undue distortions of competition within the European Union.”¹⁰

Industries and firms can be expected to try to avoid competition through cooperation because competition will take resources away from activities for long-term fitness and reduce short-term return to owners. But some competition seems necessary to keep a firm or industry from settling too deeply into an equilibrium – a balance of forces from which it can’t break free when new competitors appear. Thus competition has long-term benefits to firms (and to society) when it is active at a level that does not weaken the firm so much that it cannot survive new competitors or other changes in the environment.

The real winners of a competitive *contest* in the short to medium term are those peripheral to the competitors—that is, customers or suppliers—because *they* will be the scarce resource that is competed for. Any costs for this competition (lower prices to customers or higher

payments to suppliers) must be paid for out of funds that otherwise would have been used for long-term activities and stockholder equity. Customers and suppliers are also potent political forces in most democracies (especially customers for consumer goods) and will have a large say in how much effort government puts into forcing competition that will benefit them. Indeed, the EC has identified the interests of consumers as its primary focus.

Our objective is to ensure that competition is undistorted, so as to permit wider consumer choice, technological innovation and price competition. This is achieved if companies compete rather than collude and if market power is not abused....we undertake to work for the benefit of the European Citizen.¹¹

However, governments often ask firms to work together for other public purposes such as security and these conflicting public goals will create some of the hardest case for all competition regulators.

But asking whether competition laws or ownership limits should be employed to stimulate competition is almost a purely academic question. They will be. The broader picture of competition and cooperation developed here can offer guidance for the policy course corrections that will almost certainly be necessary in the twenty-first century. For example, in a time when the established borders between industries are breaking down, a more useful definition of what constitutes a “market” will be critical in situations where interindustry competition begins to look like intraindustry competition. If several industries or several firms try to use the *exact same resource* only one will survive, particularly in networked industries.¹² The definition of a communications “market” could thus be expanded to take into account all the industries that use the relevant scarce resource(s), such as the time and money of consumers for a particular type of communication product or service. This broader view will give policy makers a better chance to determine the probable rate of survival of all those industries. The “entertainment” market would then include film, video, TV, cable, satellite, print, and all other industries that compete for consumers’ entertainment time and money. This would be consistent with the European Court’s 2002 decision in the *Airtours* case that took a broader view of the market for tourism.

A recurring policy debate in many nations centers on the definition of “competition.” Does it only mean an actual *contest* between two or more firms for customers? Or does the meaning include situations in which a contest is only theoretically possible (“contestable markets”) if government restraints and other barriers to entry are removed? The EC has

¹⁰ EC 2001 Report on Competition Policy (see note 4), at pp.79-80.

¹¹ *Id.*, at p.3

¹² For an extended discussion, see, Chapters 3 and 4 of *Communications Toolkit* (note 2)

recognized this principle and takes into account all existing and potential competitors in geographic and product markets.¹³

But often the definition of competition used by regulators does not take into account the subtle (but often crucial) competition that resembles the *scramble*, when competitors weaken one another by using up critical resources but don't actively contest markets. Thus a firm could do its competition serious harm by buying up all the suppliers of a critical raw material or other input. The EC has taken note of this principle in its oversight of access to such things as television programming – especially sports.¹⁴

Although biologists do not have one single definition of competition, most would include the following: (1) an interaction or active demand (2) for a shared requirement (3) that is a scarce resource, (4) leading to a reduction in the survival of one group of competitors. The fourth requirement is the most debatable: does competition require *losers*? If so, that means that real competition is only a fleeting loss of equilibrium until the losers are pushed out and the winners take over the contested resource. Some governments may decide to focus their energies on finding ways to foster a stable, or sustainable competitive situations in which only a part of a firm's resources would be contested, thus making the survival more firms likely. Either government carrots (aide) or sticks (divestiture) could be used to build firms that do not overlap 100% with their competition.

The more two firms look like each other (that is, use the same resources), the more fiercely they will compete. Over time, the firm that can garner more of the scarce resource(s) will return more resources to its owners and attract more investment. The firms that attract fewer resources will be seen as less fit and will not survive. The result of intraindustry competition is the culling of less fit firms. But competitors may try to increase their chances of winning by engaging in “spite” that will lower the fitness of all competitors until the weakest competitors die or leave the battle, through predatory pricing for example. Regulators are not always concerned about (or aware of) “spite” phenomena at the intraindustry level, even when it is undertaken intentionally. An established firm may do something that decreases its own fitness (such as put a supplier out of business) if the decrease in fitness would hurt their competitors more, particularly competitors who depend on that supplier for a greater percentage of their total resources. Regulators seeking to maintain competition may want to be careful in regulating all firms in an industry (or of several competing industries) in the same way in cases where that action would

¹³ See, e.g., *SCA/Metsa/Tissue*, COMP/M.2097, 31.1.2001 (OJ L 57, 27.2.2002).

¹⁴ See, 2001 Report, pp. 48-50.

disproportionately decrease (or increase) the fitness of the individual firms and give others a competitive advantage that will eventually allow them to push others out of the market.

Firms that become engaged in fierce competition might also be inclined to do what some biological organisms do—allocate the resource in question by cooperation, rather than competition. They might agree to starve out another competitor by agreeing between themselves to deny it access to critical resources such as programming. They might also try to avoid competition by “signaling” their desire to end hostilities or just by avoiding overlapping customers. These strategies may or may not be intentional but they are likely to get the attention of regulators if they become apparent.

Regulators concerned about competition for residential services may want to consider that *contests* over territories occur only where a resource occurs in concentrations sufficiently large to make the territories worth defending. Telephone and cable companies are finding individual households extremely expensive to hang on to, and business services are more likely to be the locus of intense competition unless households can find a way to aggregate their demand in order to attract competing firms.

6. Conclusion

The forgoing has demonstrated that there are tantalizing similarities between competition in biological and business systems and these similarities can be used to develop comprehensive, robust and sustainable competition regulation. These ideas do not have a political or economic bias and can be applied regardless of the current political leadership of a government. They could (and should) be applied differently in different countries because the circumstances are not the same. But they need a diligent and thorough investigation. The investigators need not be (and probably should not be) biologists. All this project needs is smart people who know how to think and put lots of information together. The following is a list of possible research papers that could test two apparently similar processes.

**Mechanisms of Competition and Cooperation Drawn from Biology and Applied to
Businesses in the Communications Sector**

| Biological Systems | Business Systems |
|--|---|
| Competition exists when more than one species or individual seeks to use a scarce resource, i.e., a resource not available in sufficient quantity to satisfy all users. The resource may be anything needed for survival or reproduction: food, safety, appropriate environmental conditions, etc. | Competition exists when more than one industry or firm seeks to use a scarce resource, i.e., one not available in sufficient quantity to satisfy all users. The resource may be anything needed for survival of the business: customers, production input, labor input, capital, etc. |
| Over time, competition results in a greater reproductive success for one species while the competing species declines in number. | Competition results in winners and losers. Over time, losers will suffer displacement (loss) of investment and jobs. |
| Competition can be <i>active</i> , as in a contest (e.g., physical attack on members of the other species in order to appropriate the resources it has under its control), or <i>passive</i> , as in a scramble (e.g., use more of the resource so not enough is left for the other users). | Competition can be <i>active</i> , as in a contest (e.g., seeking another's current or potential customers through marketing, price competition, etc.), or it can be <i>passive</i> , as in a scramble (e.g., use more of a resource such as bandwidth, power, consumer time, so not enough is left for others to use). |
| Competition is expensive. Time and energy spent on competitive activities reduce the time and energy available for other critical activities, such as reproduction or food (resource) gathering. | Competition is expensive. Time and resources spent on competitive activities reduce the time and resources available for other critical activities, such as long-term investment in plant, equipment, and employee training. It also reduces fitness in the short term by lowering returns to investors. |
| When two groups or species compete for the <i>same resource</i> for an indefinite time, one group will become extinct or abandon its use of the resource. This is known as the <i>Competitive Exclusion Principle</i> . If both groups use the resource as <i>one of several</i> to support their needs, both groups can survive and use the resource at a level of equilibrium. | When two firms or industries compete for the <i>same resource</i> (e.g., customers for recorded video) for an indefinite time, one of them eventually will go out of business or change its strategy to target a new market (e.g., Betamax). If the firms use customers as <i>one of several markets</i> for the product, both firms may survive at a level of equilibrium (e.g., if both firms market the product to business and home users). |
| Cooperative behavior allows the allocation or acquisition of the scarce resource without expensive competition. | Cooperative behavior, such as territory or customer allocations and group purchasing or R&D, allows the allocation or acquisition of resources without expensive competition. |
| Cooperative behavior can be exhibited in situations of <i>interspecies</i> and <i>intraspecies</i> competition. But cooperation and competition are different modes, and no species or individual exhibits both <i>in the same space and time with respect to the same resource</i> . | Cooperative behavior can be seen in <i>interindustry</i> and <i>intra-industry</i> competition, e.g., at the <i>precompetitive</i> stage or when competitors mutually agree to suspend competition for a time. Examples include R&D consortia or national emergencies. But no firm or industry will compete and cooperate <i>at the same time or in the same market with respect to the same resource</i> . |

| | |
|--|--|
| <p><i>Intraspecies</i> competition tends to be fiercer, because individuals are competing for the same resources. As two species come to “look like” each other, they will compete more fiercely.</p> | <p><i>Intraindustry</i> competition tends to be fiercer, because firms compete for the same customers, e.g., competition between TV networks is fiercer than between networks and newspapers, because networks hunt for the same national advertisers while newspapers (sometimes) hunt for slightly different ones. If networks and newspapers begin to publish on the Internet, they will look more like each other and will hunt for the same advertisers.</p> |
| <p>Cooperative behavior can evolve (i.e., be selected for over many generations) in populations of competitors if it enhances the reproductive success of individuals exhibiting it, i.e., makes them fitter.</p> | <p>Cooperative behavior can evolve without conscious intent by firms when they tend (over time) to concentrate on certain customers more easily sold to and leave other customers to the competition, e.g., if it is easier to sell DBS services in rural areas, companies are likely to concentrate there while cable companies back away. Over time, a de facto market split occurs without overt attempts to cooperate, because the behavior makes both industries fitter.</p> |
| <p>Systems that have a reliable amount of a resource (even if the resource is limited) will tend to be more stable, because this situation allows for allocation of the resource to evolve toward equilibrium.</p> | <p>Economies that have a reliable (even if not unlimited) amount of the resources needed by firms (capital, labor, raw materials) tend to be more stable, because the situation allows allocation of the resources to evolve toward equilibrium. Economies with unreliable access to critical resources (such as oil) will endure industrial “shocks,” which upset allocations and destabilize the economy.</p> |
| <p>A stable system will support more diverse groups as each finds a relatively secure <i>niche</i>. A system destabilized by the unreliability of a resource forces groups to look to other niches for the resource in times of scarcity and, over time, to reduce the number of groups that survive.</p> | <p>An economy supports more diverse industries if each industry finds a relatively secure <i>market niche</i> not in danger of invasion by other industries. If one industry loses access to a critical resource (capital, labor, customers), it may look to resources used by others and reduce the number of industries or firms that can use it. If an industry begins to lose access to capital because of market saturation (thus, limited growth potential), it may try to invade the turf of closely related industries, using up some of the limited customers for that good or service and reducing the number of firms that can survive.</p> |
| <p>The introduction of scarcity into a stable system (where allocation of the resource has evolved into equilibrium) may cause former cooperators to compete or former competitors to cooperate, or both.</p> | <p>If a resource becomes scarcer than formerly (e.g., customers) and firms cannot find substitutes, the scarcity will drive firms that had cooperated with respect to that resource (e.g., through territory allocation) to compete, or it will drive those that had formerly competed for it to cooperate (e.g., through collective buying).</p> |
| <p>Within species, an individual that “learns” adaptive behavior will cooperate with other members of the group with respect to a scarce resource if cooperation increases the individual’s access to other critical resources. For example, an individual may share food if that will allow it to gain safety from predators.</p> | <p>A firm may be expected to cooperate with respect to a scarce resource if cooperation will give it access to resources it could not otherwise obtain, e.g., cable firms may cooperate with respect to programming and production if it will gain them access to more local cable systems.</p> |
| <p>Cooperation may be exhibited by a species</p> | <p>Firms may be expected to cooperate with respect to a</p> |

| | |
|--|---|
| <p>when the availability of a resource is unreliable because of random distribution and because of the greater access some individuals have simply owing to luck (e.g., predators have large hunting territories).</p> | <p>resource, such as copper wire, when availability depends on political conditions in other countries. This allows all to stay in business when supplies are cut off.</p> |
| <p>Individuals cooperate in sharing resources only when <i>on average</i> they obtain more of the resource by being part of a group than they could obtain by acting alone.</p> | <p>Firms would not be expected to cooperate with respect to a resource if <i>on average</i> they could locate more by themselves. Thus, firms would not cooperate to produce entertainment programming if each could expect to locate enough acceptable programming to fill its needs.</p> |
| <p>There is a limit to the size of a group. If a group is too large, the individual's "share" is not enough to ensure survival, and the individual is better off taking the risk of seeking the resource alone or in a smaller group.</p> | <p>Firms would not be expected to cooperate or form larger organizations if the larger group could not gain access to sufficient resources to support all divisions or participating firms. In this case, each firm would be better off running the risk of finding its own resources. If a cooperative group (e.g., a trade association) were to lose access to certain suppliers (e.g., paper suppliers) and did not have enough of the scarce resource to supply all members, the strongest members of the cooperative group could be expected to leave and seek the resource on their own, even if their departure would decrease the fitness of the remaining members.</p> |
| <p>Individuals and groups are more likely to adopt cooperative behavior if there is an ongoing relationship (e.g., kinship, occupation of the same territory) and encounters between the individuals or groups. This allows a "tit-for-tat" strategy that rewards cooperative behavior while punishing noncooperation.</p> | <p>Firms or industries are more likely to cooperate if they have an ongoing relationship (e.g., long-term contracts or "sharing" customers through complementary products) and a tit-for-tat relationship can develop, building trust and shared expectations.</p> |
| <p>"Induced" cooperation (i.e., an individual or group surrenders a resource in response to force or a "trick") or competition (i.e., individuals or groups fight for a resource they do not need or that is not scarce, in response to force or a trick) is exhibited only for as long as the inducement exists.</p> | <p>Cooperation between firms or industries induced by government incentives (e.g., tax credits) or government threats (e.g., civil or criminal penalties) will only be effective only as long as the benefit is useful or the threat is real. If the firms have few profits to tax or if they know government cannot possibly investigate all price increases, they will ignore the incentives or threats.</p> |

DBS = Direct Broadcast Satellite
R&D = research and development