

**TURNING THE CABLES:
ECONOMIC AND STRATEGIC ANALYSIS OF
CABLE ENTRY INTO TELECOMMUNICATIONS***

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Abstract

This paper explains cable television's entry into telecommunications in the U.S. and elsewhere. Technical advances now offer scope economies between video and telephony services while regulatory initiatives have removed many legal barriers separating the two industries. Together with favorable market conditions, these developments make cable telephony a lucrative opportunity at a time when video markets have come under attack from several new competitors. To predict whether this opportunity is exploited through direct entry, acquisition or joint venture, we assess the strategic merits of each entry mode. Key strategic factors include whether the cable operator can make credible and effective threats to follow an alternative entry path, and the extent to which incumbent providers have made sunk investments. We conclude by examining some implications of policies toward entry mode choice and find they may have unintended consequences, such as when a ban on acquisition results in uneconomic direct entry or no entry whatsoever.

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I. INTRODUCTION

Since its beginning, cable television has been separated physically and legally from the telephone industry. Aside from the fact that both deliver electronic signals to the same homes and businesses, the two industries supply vastly different services. Telephone companies provide switched, two-way voice services to residential and commercial customers, whereas cable operators broadcast one-way multi-channel entertainment video to home viewers. The gap between the industries has begun to close in recent years as local telephone companies attempt to deliver video programming over their phone networks. Cable operators are moving closer to telecommunications as they develop switched, interactive video services of their own. The excitement over these events, however, has taken attention away from what may be the next significant step toward convergence: cable television's foray into local telecommunications.

Cable's initial target was high-capacity, unswitched services for large business customers. Soon afterwards, cable companies began to venture into ordinary local phone services, again approaching business customers before turning to the residential market. Recently cable has set its sights on the exploding markets in high-speed data connections to homes and businesses, further expanding its portfolio of telecommunications services.

The record contains a diverse array of scenarios describing how cable operators have made their way into these markets. On occasion they have purchased established telecommunications carriers outright. Other times they have chosen to enter directly by upgrading their networks to enable two-way transmission, or by building new, stand-alone facilities inside or outside of their franchise territories. Nor have cable companies been immune from the alliance fever, as they enter into business associations of all kinds to exploit multimedia opportunities.

The purpose of this paper is to identify the economic causes for cable's entry into telecommunications at this time. It further seeks to understand why cable operators choose particular "entry modes" to penetrate these markets.

Cable diversification into local telephony is a low-cost, high-return proposition. Dramatic advances in transmission technology, aided by gradual liberalization of the markets, make cable telephony profitable. And compared to other information and communications services, telephone service is also a safe bet. While market conditions and regulatory policy may explain why the cable industry's foray into telecommunications, strategic analysis is needed to understand whether a particular cable company enters directly, through acquisition, or by alliance. The merits of an entry mode depends on how it will alter a cable entrant's competitive position relative to incumbent providers and other potential entrants. The outcome of strategic interaction among the various players depends, in part, on regulation governing permissible forms of cable ownership and control. In particular, structural restrictions change the likelihood of a particular outcome by altering the strategic balance among competitors, and hence the ranking of the different entry options.

The next section documents the history of cable diversification into telecommunications up through the flurry of activity that is presently underway. Section III then examines technological, regulatory and market causes for cable telephony's current profitability. Section IV offers a strategic analysis of the cable operators' choice of an entry mode into these markets. Finally, Section V discusses a few of the implications of policies toward entry mode choice.

II. CABLE DIVERSIFICATION INTO TELECOMMUNICATIONS

Cable first ventured into telephony by offering high-capacity access and transport services, before moving into business and residential switched services. It is now in the midst of rolling out personal communications and online access services across the country. In each of these markets, cable operators followed several entry paths: direct entry, either through an upgrade of the existing network or new construction, acquisition of existing carriers, and alliances with one or more cable or non-cable partners.

1. Alternative Access and Transmission Services

In the early years of the cable industry, a few operators set aside a portion of the bandwidth on their coaxial cables to carry data transmissions.¹ These services were the precursors of what is today a significant industry: alternative access and transmission services. Typically these services provide one-way data paths that bypass local exchange carriers' (LECs) high-capacity access services. The bulk of the revenue derives from provision of circuits connecting business users directly to their long distance carriers. The suppliers of these services, Competitive Access Providers (CAPs), have consistently adopted "fiber ring" technology. These all-digital, all-fiber networks weave through underground conduits in urban subway tunnels or along water, gas and power lines.²

When this new industry emerged in the mid-1980s, the cable industry displayed only mild interest. Soon after, however, it began to take a significant ownership stake in alternative carriers. Today, about one-half of all operating CAP networks is owned in whole or in part by cable companies.³ This ownership interest was acquired through all of the different entry options:

Direct Entry The cable industry's initial foray into alternative local services took the direct route. Cable operators delivered high-speed services alongside video transmissions over hybrid fiber-coaxial (HFC) networks. In most cases operators used capacity on their existing networks; in a few instances, they built new networks outside their franchise territory.⁴ As their confidence in the benefits of telephony grows, cable operators turn to resale as a means to enter local phone markets. They may resell services of the local exchange company,⁵ a local electric or gas utility,⁶ or a long distance carrier. Cable operators have also leased unused circuits on their fiber backbones to end-users as well as to other carriers.⁷

Acquisition A more recent phenomenon has been the purchase of existing CAPs by cable concerns. By choosing this entry mode, cable companies gain fast entry into the phone business. Its popularity explains the rapid rise of cable's stake in alternative local services. Individual cable

companies, usually the large multiple system operators (MSOs), have bought several startup CAPs. On a few occasions, two or more cable companies have joined together to buy alternative carriers.⁸

Alliances Joint ventures have also formed specifically to provide alternative local services. In several cases cable networks have linked their networks to expand their reach beyond the individual serving territories.⁹ On other occasions cable companies have teamed up with non-cable partners, including local exchange companies,¹⁰ CAPs,¹¹ and interexchange carriers (IXCs).¹²

2. Local Telephone Service

Residential Exchange Services During the first three decades of its existence, the U.S. cable industry expressed little interest in traditional local telephony. Closed to cable for many years, this market now represents a lucrative profit opportunity. Cable's initial target has been the high-margin business customer. Some cable-owned CAPs have already exploited their location in central business districts by providing switched business services.¹³ Residential switched service is the logical extension of this strategy using the dense urban coverage of cable networks.

Currently many trials of integrated voice and video over hybrid-fiber-coax networks are in the field.¹⁴ In each case operators are experimenting with new equipment designed to transport and switch voice traffic alongside video and data transmissions. Nearly every cable equipment manufacturer has some prototype of a product of this kind.¹⁵

The United Kingdom has taken a different technological approach, one that may offer a glimpse of the future of cable telephony around the world. After a slow start, growth of the U.K. cable industry took off in the late 1980s and early 1990s at about the time operators began to offer phone service.¹⁶ The new networks deployed "Siamese cable" in which a separate coaxial cable and copper wire pair are bonded together to form a single cable. A full two-thirds of U.K. households subscribe to both cable and phone services where their cable operator offers both services.¹⁷

Currently, the revenue source experiencing the fastest growth for U.K. cable companies is business phone service.

Cable companies face much different conditions entering telephone markets in the U.S. , however. Their networks pass nearly all U.S. households, making new construction of a dual-purpose network unattractive. Instead, operators are exploring the option of carrying phone traffic on idle channels. This involves outfitting coaxial networks with upstream amplifiers, as well as adding switching capability and customer terminal equipment. With blueprints completed and equipment prototypes now available, many engineering and market trials of such systems are underway.¹⁸

Personal Communications Services New wireless phone services should greatly contribute to the growth in demand for cable telephony. In particular, Personal Communications Services (PCS) will require transmission services that cable operators are in a position to supply. PCS is designed to provide two-way mobile service from nearly any location throughout a metropolitan region. In the process it will generate enormous amounts of landline traffic as calls are transported among cell sites and switching offices. Cable networks' extensive coverage of residential neighborhoods and their broadband trunking capacity give them a distinct advantage to compete for this so-called "backhaul" service.

In PCS trials, cable has demonstrated its ability to provide end-user services as well.¹⁹ Cable operators have acquired the switching capacity and network intelligence needed to run a PCS network by teaming up with long distance²⁰ and cellular partners.²¹ Another natural partnership has occurred between cable companies and CAPs, especially when their serving territories are adjacent to one another. Typically, a cable operator is situated in a suburban residential area while the CAP is located in the central business district.²² In most cases federal and state regulators have given their blessings to cable entry into these services over the objections of telephone interests.²³

3. Data Services

Perhaps the telecommunication service having the greatest near-term profit potential for cable is data networking. Employing the abundant bandwidth on their coaxial cables, operators are able to provide connections to network services at speeds nearly two orders of magnitude faster than ISDN, the telephone companies' fastest residential offering. Demand for network services for home banking, electronic mail, online access, and possibly even video conferencing is still unknown. Nevertheless, prospects continue to improve as a growing number of homes and businesses purchase modem-equipped personal computers, and subscribe to online services or Internet access providers.

While coaxial networks have the bandwidth to deliver high-speed data services, they lack other components required to offer end users a complete service. This gap has been filled on occasion by computer companies who supply the hardware and software products needed to deliver the service.²⁴ Joint trials of online services by computer companies and cable networks are currently underway in several communities across the U.S.²⁵

III. PROFITABILITY OF CABLE TELEPHONY

What economic forces have driven the cable industry to enter local telephone markets? Conventional explanations for diversification—risk reduction, multi-market collusion, and organizational efficiencies²⁶—seek to explain how individual companies make their choice of a corporate portfolio. In comparison, cable telephony represents diversification by an entire industry into a new market. For this reason, we look to innovations that make cable telephony technically feasible and economically affordable, and regulatory developments that invite cable operators to capitalize on this profit opportunity to explain this industry-wide diversification.²⁷

1. Technical Change and Scope Economies

Through the 1980s, cable television systems built coaxial networks configured in a “tree-and-branch” arrangement. This architecture was perfectly suited to one-way broadcast of video signals to residential neighborhoods. A small portion of the network’s spectrum was set aside for upstream communication as well, but it was almost never used. This was due, in part, to the long chains of directional amplifiers that significantly degraded the quality of the “return channels.”

Beginning in the late 1980s, cable systems began to replace the coaxial trunks that run out to residential serving areas with optical fiber. In the process they migrated toward “star” and “ring” architectures more conducive to two-way communications. This investment also expanded the bandwidth available along the trunk routes, in addition to improving picture quality and reducing outages by eliminating many amplifiers and power sources. During this same period, digital compression and multiplexing techniques made available additional channels on the cable. While the primary purpose of all of these technologies was to deliver more video channels with clearer signals, they freed up plenty of bandwidth for two-way voice and data communications.

Given the high first-cost of network construction, cable operators logically added extra fiber strands when upgrading their networks. Many of these strands were left “dark” awaiting demand growth, or the arrival of more video programming, that would justify outlays for the electronics to power them. These “dark fibers” were then available for lease to customers willing to supply their own transmission equipment.

The technical advances in fiber optics and digital transmission have the overall effect of increasing the economies of scope in joint provision of video and telephony services. Digitalization reduces voice, data and video to indistinguishable bitstreams that can be commingled on the same lines. Fiber’s enormous bandwidth, combined with compression techniques, eliminates any effective capacity limit. Fiber and equipment embodying these technologies are shared inputs that give rise to multiproduct economies.

These advances do not, however, guarantee that scope economies are economically significant: the cost of two networks—one optimized to provide video and the other for telephony—could still be less than the cost of a single, integrated network. We can, nevertheless, safely assume that the new hybrid fiber-coax architectures significantly reduce the incremental cost of providing telephone services with a cable network.²⁸ As a byproduct, these technologies offer strong scope economies with as-yet-deployed video services, such as interactive television, video on demand and video conferencing.

How scope economies are best realized will depend on the extent of sunk investment. *Ex ante*, it may be cheaper to lay two separate lines, one for video and one for telephone service as has done in the U.K. Scope economies between the two services may still be significant if only because of the sharing of rights of way, construction costs, and billing and other overhead expenses. When extensive coaxial and fiber networks already exist, as is true in the U.S., integrating both services on the same cable appears to be cheaper than separate networks.²⁹

2. Relaxed Regulation and Reduced Entry Barriers

Regulatory constraints on both video and communications services affect the appeal of telecommunications markets to cable operators. Even today, many states bar cable systems from providing traditional switched local service. However, while state and local authorities have never welcomed cable delivery of telecommunications services, they have treated specific markets with considerable leniency. State commissions routinely decline to regulate specialized two-way services (*e.g.*, alarm services and local private lines) supplied by cable companies and electric power utilities. In many instances where state regulators have objected to cable entry, the FCC has exercised its powers of preemption.³⁰

Defranchising the Local Exchange In recent years, state and federal regulators have taken a series of steps that have opened the local exchange to competition. Competitive access carriers have been allowed into interstate access markets under permission extended to them as “nondominant

carriers.” Federal auctions of radio spectrum have given birth to a potent local service provider, the personal communications network. And now the Telecommunications Act of 1996 has thrown open the doors to competition from all corners of the industry. Each step in the defranchising of the local exchange reduces barriers to cable companies intent on entering these markets.

Cross-Ownership Ban Indirectly, a cable operator could participate in telephony by merging with a local telephone company. The federal cable-telco cross-ownership restrictions—first articulated by the FCC and later codified in the 1984 and 1992 Cable Acts—are the principal legal impediments to such mergers.³¹ Primarily, these restrictions prevent telephone companies from controlling video content by banning the purchase of cable operators. Certification of cable CAPs as common carriers has triggered challenges on the grounds that it violates cross-ownership restrictions. More often than not, the CAP is allowed to operate because it is judged to be a *nondominant specialized* carrier in its franchise territory. Regulators have not erected serious barriers to cable purchase of a *competitive* local telephone company, be it a CAP, a cellular provider, or some wireless company such as a PCS or Specialized Mobile Radio carrier. In one of the last rounds of that debate, the FCC permitted IXCs to purchase cable companies under the cross-ownership rules for the purpose of providing local service.³² The cross ownership rules have effectively been eliminated by the new Act.

Expanded Interconnection The ease with which cable operators can interconnect their networks with incumbent phone companies is an important determinant of their entry decision. In the U.S., state regulators took the initiative to encourage local exchange carriers to interconnect their networks with alternative carriers. At the federal level, the FCC requires LECs to extend collocation to CAPs for both special access and switched transport.³³ Now able to connect their cables at the LEC central offices, CAPs can collect traffic without the need to build a network that passes each customer, lowering barriers to entering local telephony.

Technical interconnection is only part of the story, however. Entrants such as cable companies must purchase local services needed as components of their final service, and to do so at

rates that allow them to earn a profit. The success of U.K. cable telephony is remarkable given that operators paid interconnection charges to long distance carriers that exceed half of the companies' gross telephone revenues.³⁴ Interconnection pricing in the U.K. is currently undergoing a major overhaul which should reduce these rates.³⁵ In the U.S., the FCC undertook a major restructuring of local transport and interconnection pricing to bring these rates more in line with costs.³⁶

Pricing of Local Services Prices for incumbent local services are crucial to the viability of cable telephony. Whereas tariffs for bulk services have fallen steadily over time, rates for local exchange service have been on the rise. Historically, long distance services have been the source of the subsidy needed to maintain low local prices. The pressures of competition, combined with the freedom of price cap regulation, work together to rebalance rates and make entry into local exchange services increasingly profitable. So far, most entry has taken place in business services; only recently have cable firms begun to show interest in residential services.

As described above, cable CAPs compete directly with regulated access services provided by LECs. CAPs quote fairly simple price schedules that are somewhat below LEC rates.³⁷ Unlike the LECs, they are not obliged to average their rates by geographic area, nor are they confined to specific regions. To the extent that regulations limit local exchange carriers rate reductions in response to competition, cable entrants are invited to "cream skim."³⁸

Cable Rate Regulation Prior to 1986, cable rates for basic services were regulated by local franchising authorities. In that year, the 1984 Cable Act deregulated rates for the vast majority of cable systems. With the passage of the 1992 Cable Act, the pendulum swung back again. The FCC's implementation of the Act has led to a significant rollback in basic cable rates, encouraging cable operators to look elsewhere for higher returns. Besides premium and enhanced video services, communications services are prime candidates. With passage of the new Telecommunications Act, cable rates will be deregulated once again, but not for several years in most cases.³⁹

Increasingly, cable operators are facing competition from new technologies. Direct broadcast satellite has finally emerged as a viable competitor, and “wireless cable” (known technically as MMDS) has surprised many with its ability to make in-roads against traditional cable service. LECs now threaten video markets through “video dialtone” service, and soon the new Act will unleash the full potential of the LEC threat. The combination of rate regulation and growing competition has significantly reduced the opportunity cost of deploying cable facilities for uses other than delivery of entertainment video, and this includes telecommunications services.⁴⁰

Number Portability and Dialing Parity A serious impediment facing all new entrants into local telephone markets is the additional cost for potential customers when attempting to communicate with parties on the incumbent network. This occurs in two ways. First, callers may have to dial a prefix to indicate that their call is destined for someone on another network. Second, new customers may have to forfeit their old phone numbers when switching to a new provider. Some progress toward achieving dialing parity⁴¹ and number portability⁴² has occurred, but until policies establish symmetry between incumbents and entrants, customers will be discouraged from buying their phone service from cable companies.

3. Role of Telephone and Video Market Conditions

Market conditions facing a cable entrant into telecommunications pose both opportunities and risks. First of all, local telephone markets are potentially very lucrative. A small percentage of the local exchange revenues will cover the costs of upgrading hybrid fiber-coax cable networks to deliver telephone service.⁴³ Compared to financial assessments of telephone company entry into video, one wonders why there is so little discussion about cable telephony.

On the cost side, first note that the technology of voice telephony is well understood and the equipment is readily available. We have also seen the technical advances that make phone service over cable networks feasible. The expense of upgrading the networks continues to fall steadily with the fall in prices of microelectronics and fiber optics, along with improvements in their capabilities.

Nevertheless, the cost of making all U.S. cable systems capable of providing local phone service to all of their subscribers would be measured in tens of billions of dollars.

Demand for local telephone service is also extremely stable, with revenues growing year after year at roughly 3%. Compare this to the uncertainty surrounding consumer acceptance of interactive television and video on demand. Moreover, local telephone services do not cannibalize a cable company's video revenues, but on the contrary, offer subscribers the benefits of a single carrier and a single bill. U.K. cable customers confirmed the preference for bundled services with high take rates for combined cable and phone service. The same should hold true if U.S. cable companies, as planned, bundle local service with long distance and cellular services.⁴⁴ Their poor reputation for customer service and network reliability will detract from such an offering, so they might capture the added value of bundling through a joint marketing arrangement with a non-cable partner.

Cable telephony faces many risks. First, there is the technological risk associated with delivering switched telephone service over a network optimized for broadcast video. Integrating voice, video and data on the same cable continues to present engineering challenges. There are the problems of powering a network that was not designed to be self powered. Besides signal leakage caused by antiquated equipment, cable networks must prepare for "ingress noise" as large amounts of phone traffic are pumped upstream. With voice and data traffic sharing the same physical wires, encryption methods are needed to ensure users that their transmissions are secure. Finally, until reliable, affordable cable modems appear on equipment markets, cable operators will be unable to capitalize on their ability to provide fast connections for online users.

Second, there is substantial regulatory risk as the FCC and the states grapple with difficult policy issues surrounding cable telephony. When will number portability and dialing parity become a reality, and what form will it take? What rates will be charged for interconnection with local phone companies, and will cable networks be required to open up to other carriers? The answers given to these questions are difficult to predict, and the time it will take to resolve the issues is also highly uncertain.

Lastly, cable companies will come up against many non-cable entrants besides the incumbent LEC as they venture into the local exchange. Cellular and personal communication services pose threats to any land-line carrier. Long distance companies are clearly eager to enter the local exchange through the wireless route (*e.g.*, AT&T's purchase of McCaw Cellular) and through construction of new networks (*e.g.*, the MCI Metro program⁴⁵). We have already witnessed how LECs can invade local exchanges outside their home territory.⁴⁶ In those instances, cable operators will face competition from no fewer than *two* local telephone companies.

* * * * *

To sum up, we have seen how technological developments, regulatory policies, and market conditions have led cable companies to venture into local telecommunications markets. None of these developments, however, points to one entry mode as the superior means to realize this profit potential. Strategic analysis is needed to assess the implications of factors specific for each cable company and for each geographic region.

IV. STRATEGIC ANALYSIS OF ENTRY MODE CHOICE

Upon recognizing the potential of local telecommunications, a cable operator must decide which services to supply, in which cities, and what technology to use. It must also choose a mode to enter those markets: direct entry, acquisition or alliance. We concentrate on this latter decision, aware that all of these decisions are made jointly.⁴⁷

1. The Strategic Approach

We begin by taking inventory of strategic conditions facing cable entrants, starting with the current structure of the local telecommunications industry. Every metropolitan area has several established telecommunications providers. There is a local exchange carrier along with several

wireless services, including two cellular carriers and up to seven PCS providers. There may also be any number of CAPs specializing in high-capacity services. Potentially, any one of several cable franchisees serving a metropolitan area could enter the market as well as the local electric utility. Note that all of these firms are not only potential competitors to cable franchisees, but also represent viable partners in a joint venture or strategic alliance.

Cable operators bring both strategic assets and liabilities to these markets. To begin with, they own an embedded network of cable headends, transmission equipment, coaxial and fiber cable, plus cable set top boxes and inside wiring. These investments are largely sunk, so that the opportunity cost of re-deploying them for communications services is just the forgone video revenues. Nevertheless as cable companies plow more investment into their networks, they jeopardize a competitive return should these facilities become “stranded.” Furthermore, the chief competitor of a cable telephony firm, the local exchange carrier, has sunk substantial amounts in its network, making it willing to compete aggressively on price to defend its market share.

Cable operators possess certain intangible property that will assist them in their bid for phone business. A crucial input to the provision of local phone service is network rights of way, including easements and zoning variances, utility pole attachment and conduit rights, even satellite transponder leases. In many large cities, these rights are available in limited supply, and the resulting scope economies among services allows a cable company to provide telephone services at low incremental cost.⁴⁸

Cable operators lack key resources needed to enter various telecommunications markets. Foremost among these are the switching and signaling equipment they need to route phone traffic, along with the expertise to install and maintain them. Also, cable operators do not have the authority to allocate phone numbers, and without that power their customers must incur costs of switching from the incumbent provider. Finally, the cable industry suffers from a proliferation of technical standards that makes it difficult to stitch together the patchwork of franchise territories that exist.

When considering how to break into telecommunications markets, cable companies select from among the following entry options:

- Enter directly by providing services over owned or leased facilities, either by:
 - building new facilities, or upgrading existing ones, or
 - reselling services supplied by another carrier,
- Acquire an established local carrier, or
- Negotiate a joint venture agreement to:
 - build a new facility, or
 - interconnect existing networks.

Finally, the cable operator could always choose to stay out altogether, or even put its network up for sale.

The kind of joint venture we have in mind results in a new entity under joint ownership and control of the partners, each one of which has committed tangible investment. In this way, a joint venture shares features with direct entry (because entry is *de novo*) and with acquisition (because partners invest in the new firm). However it must always be remembered that other potential competitors have many of these same entry options.⁴⁹ Their option to enter video or telecommunications markets at any time conditions the cable operator's decision whether and when to enter telephony.

Cable entrants must also be aware that incumbents will adjust their pre-entry actions to mitigate the competitive impact of entry, or to deter entry altogether. In turn, such adjustments affect an incumbent's willingness to negotiate for sale or lease of its facilities, or to enter into a joint agreement with the cable entrant. The greater the investment that the incumbent has sunk in telecommunications facilities, however, the less it has to lose from competition, and so the less it is inclined to preempt entrants by deploying advanced technologies, or entering other markets such as switched video.

In evaluating each entry mode, we can separate strategic and nonstrategic factors. Strategic factors affect the extent to which a cable entrant, by its actual or threatened choice of an entry mode, can improve its competitive position relative to other carriers. The likelihood that a mode will be chosen depends on how the remaining alternatives would impact the operator's potential competitors and partners. If it can threaten to enter using an alternative route, and the threat is credible and effective, then it is more likely the entry mode is chosen. A threat to enter some other way is more *credible* when, for instance, startup costs are small and construction lead times are short. A threat becomes more *effective* when alternative entry modes impose sizable losses on competitors.⁵⁰ For instance, when an operator supplies telecommunications over facilities that could easily be re-deployed to deliver video services, and when those facilities are also sunk (*e.g.*, dark fiber in its backbone network), the threat to enter directly is both credible and effective.

Nonstrategic factors also affect the profitability of each option based on the market conditions facing the cable operator. These include characteristics of the metropolitan area (population density, industry composition, availability of rights of way, state and local regulatory climate) as well as the current structure of local telecommunications markets (presence of other facilities-based carriers including other cable networks, financial health of incumbent LEC). While we will discuss nonstrategic aspects below, a strategic analysis of entry mode choice is our primary objective.

2. Conditions Favoring Direct Entry

When assessing the merits of direct entry, cable operators should anticipate how their entry will re-structure the local telecommunications industry. This amounts to a routine industrial organization exercise in which an entrant's advantages in terms of lower costs or superior products are balanced against the downward pressure on price its entry will cause. This comparison should also take account of entry costs. For instance, construction of new facilities is an attractive option when the out-of-pocket costs are low, startup time is brief, and existing facilities are unsuitable. Of course, should any portion of these investments be irreversible, the effective entry costs are that much

higher. If rights necessary to establish a telephony business are simply unavailable (*e.g.*, rights of way or spectrum rights), then entry costs are prohibitive.

If no established carrier serves the target market, then the acquisition alternative is necessarily ruled out. This happens, for instance, when no CAP or other carrier has entered a particular metropolitan area, and cable operators are barred from buying the local exchange company or a cellular provider.⁵¹ Less extreme is the case when incumbents' facilities are very similar to those of the cable operator so that natural complementarities are negligible. This occurs, for instance, when their networks follow the same route structure dictated by available rights of way, providing no additional network reliability or expanded coverage. *De novo* entry, in contrast, affords cable companies the freedom to choose the location and routing of their networks, and the technology they implement, avoiding costs of conforming to another carrier's services and technologies, as well as the high wages and restrictive rules of a target's unionized work force. Under these circumstances, *de novo* entry—either through internal expansion or joint venture—is preferred.

Turning to strategic considerations, direct entry is less attractive when it triggers retaliation by incumbents with high likelihood. Incumbents are more likely to respond aggressively to an interloper if they have excess capacity and possess upward and downward rate flexibility. A more drastic response to entry is for an established carrier like the LEC to buy out the cable entrant. This possibility could even entice a cable entrant to enter in the first place.⁵²

After entering the market, the cable entrant will view other subsequent entrants as competitive threats as it becomes one of the incumbent carriers. These competitors can be a curse or a blessing. On the negative side, entering firms will eat into profits of established firms, including the cable telephony providers. On the other hand, should latecomers decide not to follow the direct route, then early cable entrants may once again become a target for acquisition or a partner in a joint venture. In that event, cable investment appreciates as subsequent entrants bid up the value of their properties.⁵³

3. Conditions Favoring Acquisitions and Mergers⁵⁴

Acquisition is a close substitute for direct entry, if only because it offers an eager cable operator fast entry into local telecommunications markets. Fast entry offers many competitive advantages to a new entrant besides pushing up the date when profits begin to flow. These include the benefits of learning by doing: the only way to achieve the cost advantages of an established carrier may be to spend years in the industry, all the while competing at a disadvantage against more established carriers.

More generally, acquisition is attractive when the target firm possesses assets that are highly complementary with the cable operator's resources. In some extreme cases, purchase of an established carrier may be the only option available to a cable company. This happens if the incumbent owns rights to the bulk of some essential, scarce resource such as radio spectrum or rights of way, and to a lesser extent, switching and signaling equipment, and the expertise to operate it. The benefits of a merger may not be realized so quickly, however, if it takes a long time to meld the organizational structures of the two firms. The process may also be costly if the new entity must be organized in a way that compromises the strengths of the original firms.

Another strategic disadvantage of acquisition derives from the role of information. Purchase of an established carrier may drive the acquiring firm, especially if it is small, to turn to external financing. When it does, it often requires disclosure of sensitive information to competitors. Cable companies could alternatively expand internally, using their envious cash flow to finance construction (but not without further leveraging their asset balances).

The structure of the local phone industry at the time of acquisition will determine how profitable the purchase is likely to be. Acquisition of the local exchange carrier, for example, will be extremely valuable if it were to maintain its monopoly over local phone service. In contrast, direct entry creates a duopoly; the forgone profits can be sizable if duopoly competition is fierce—as is likely since the incumbent LEC has significant sunk investment. Over time, if the local telephone

market becomes populated with many new carriers, acquisition becomes increasingly more attractive relative to *de novo* entry whether through internal expansion or joint venture. Eventually, established carriers have more than sufficient capacity to meet demand, in which case another entrant will be unable to cover its costs.

4. Conditions Favoring Joint Ventures and Alliances

A major challenge facing a cable company attempting to diversify is how to acquire certain essential telephony components missing from its video network. Adding fiber is one step in this direction, but cable networks still lack broad coverage. Unable to survive on customers within their boundaries, cable operators must connect disjoint franchise areas. Franchisees with large business users located in outlying suburbs must interconnect with other networks located in the central city encompassing the major IXCs' points of presence.

Despite their incessant feuding and long history of separation, local exchange and cable industries have sound reasons to join forces. LECs lack cable's broadband facilities out to the customer premises while cable companies lack LECs' switching and advanced signaling capabilities. It is notable that two of the seven Regional Bell Operating Companies (RBOCs) plan to offer local service using cable networks they acquired outside their region; and two other RBOCs attempted to do the same before withdrawing their merger plans.⁵⁵

In strategic terms, joint ventures have features similar to both direct entry and acquisition. Through the creation of a new provider, an alliance is able to launch a greenfield operation without the restrictions imposed by an established carrier's network technology and organizational structure. By coordinating their investment, the joint venture partners avoid duplication of network investment. By pooling their collective resources, they take advantage of the complementarities among their unique assets, some of which may not be transferable across organizational boundaries either by arm's length sales or by contracting.⁵⁶ Finally, a joint venture eliminates, or at least severely diminishes, the likelihood that the partners will ever enter the market unilaterally, either directly or by acquisition.

In this way a joint venture works to suppress price competition because one firm enters whereas both partners might have entered independently.

V. THE DELICATE ROLE OF ENTRY POLICY

We have argued that the cable industry's diversification into telecommunications markets is the product of technical breakthroughs, regulatory initiatives and market pressures, whereas any single cable operator's choice of an entry mode is governed by strategic considerations. This new competition holds the promise of improved efficiency in the delivery of local phone services as it drives down prices and prods incumbent carriers to reduce their costs and adopt innovative technologies. As deregulation continues to sweep through the world's telecommunications sectors, the extent to which benefits of competition are realized depends on policies that govern if and how new firms enter these markets.

Regulatory history reveals an equivocal relationship between regulatory policy and technological change. Certainly in the case of the U.S. cable industry, policies have sometimes been proactive in their attempt to promote new technologies and new carriers, and other times they merely react to technological changes. Early on, the industry was prodded into delivery of two-way services by regulators.⁵⁷ Since then, they have been scrambling to rewrite policies to keep up with advances in technology. The new Telecom Act is the latest such example as it removes decades-old legal barriers to local telecommunications markets long after optical fiber and wireless technologies have made that competition possible.

Regulatory policy affects the equilibrium entry mode through the strategic linkage among entry alternatives. Ignoring these linkages can result in unintended consequences. For instance, preventing acquisition of a LEC by a cable company will eliminate the market discipline on the LEC's management that comes from a credible takeover attempt. In response, overall costs of local services can remain high, and cable operators may choose to enter directly, possibly resulting in uneconomic

investment. Alternatively they may not enter at all, forfeiting the efficiencies that would otherwise be realized from matching unique resources of cable and incumbent carriers.

Suppose, instead, that direct entry by cable operators is prohibited in an attempt to avoid unnecessary duplication of facilities or the crowding of public rights of way. It could then happen that entry by acquisition is blocked as well since the likelihood of acquisition depends on whether the acquiring firm had a credible threat to enter directly. The policy may be hailed as a success because, as intended, it avoids duplication and congestion. However, it may also squelch entry by acquisition that would put to use a cable entrant's special assets with minimal additional outlays.

In the past, sound analysis of telecommunications policy could stop after a careful assessment of its effect on the regulated firm's incentives. As the industry enters an era of unprecedented competition, policy must now consider its effects on strategic interactions among competitors. This is especially relevant for policies bearing upon new and potential entrants into these markets. Undoubtedly, vestiges of ownership restrictions will remain for years to come, and because entry mode decisions involve highly durable real and financial investments, these restrictions will have long-lasting consequences for efficient configuration of local telecommunications markets. A thorough analysis of this often overlooked aspect of telecommunications policy, however, must wait for another paper.

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ENDNOTES

1. As far back as 1974, Manhattan Cable offered private line data services over its New York City coaxial network. See TELECOMMUNICATIONS IN TRANSITION: THE STATUS OF COMPETITION IN THE TELECOMMUNICATIONS INDUSTRY, House Committee on Energy & Communications, 1981. Not long afterwards, Rogers Cable in Portland Oregon and American Cablevision in Kansas City used their coaxial cable for similar purposes. In the early 1980s, Cox Cable's subsidiary CommLine, Inc. provided private line service in Omaha, Nebraska. *Cable TV Firms Eye Local Telecommunications Markets*, NETWORK WORLD, July 25, 1988, 1-14.
2. See, for instance, Kraushaar (1995).
3. Michael Fahey, *Hunting the Hunter*, NETWORK WORLD, Sept. 6, 1993, 42-43 and Connecticut Research (1994).
4. Jones Lightwave Ltd., a subsidiary of Jones Intercable, illustrates many of the possibilities. The company owns alternative networks in several cities. In two cities the local Jones' affiliate provides access services alongside cable services. Their network in Atlanta is *not* associated with a cable franchise in that city.
5. For example, in Rochester, NY, Time Warner resells switched local service that it purchases from Frontier Corporation (formerly Rochester Telephone).
6. Jones Intercable's Lightwave subsidiary, for instance, has a facility sharing arrangement with Public Service Company of Colorado, the local power distributor in Denver.
7. Again in the Denver area, Mile High Cablevision provides rights of way to Teleport Denver, Ltd., now a part of the Intelcom Group, a nationwide CAP.
8. The largest such acquisition was the purchase of Teleport Communications Group, one of the first and largest CAPs. Four cable MSOs—Cox, TCI, Comcast and Continental—now share ownership of Teleport.
9. Continental Cable, Adelpia Communications, MacLean Hunter Cable and Comcast Corporation have formed a CAP to provide access services in several Florida cities. *Cable Surges Ahead in Alternative Access as Long-term Telecommunications Vision Takes Hold*, CABLE-TELCO REPORT, April 1992.
10. Besides its \$2.5 billion stake in Time Warner, owner of the country's second largest MSO, US West recently purchased two cable companies (Wometco and Georgia Cable TV) which, in turn, own the Atlanta CAP, Access Telecommunications Interconnect. See TELCO COMPETITION REPORT, 3:14, July 21, 1994. Subsequently, US West won permission from the Georgia PSC to provide telephony in the Atlanta metropolitan area through its Southern Multimedia Communications, Inc. subsidiary. *US West Wins Final OK to Challenge BellSouth*, MULTICHANNEL NEWS, 2:34, Oct. 23, 1995. Very recently, US West bid \$10.8 billion for Continental Cablevision, the third largest U.S. cable operator. *US West's Continental Ambitions*, N.Y. TIMES, Feb. 28, 1996 at C1. In 1994, another RBOC, SBC Communications, purchased Hauser Communications with cable systems situated in Bell Atlantic territory. SBC has suspended its petition to provide local service pending the Maryland Commission's decision on interconnection rates.
11. An example of a cable-CAP alliance is the network built in Omaha that is 65% owned by Cox Cable and 35% by Teleport and has operated since March 1993. *Telephone and Cable Firms Team to Widen Bypass Services*, NETWORK WORLD, June 14, 1993, 23-24.

12. Sprint has entered into a venture with three of the largest cable companies, TCI, Cox and Comcast (plus many smaller MSOs), for the purpose of providing a variety of local services. Its NewTelco subsidiary plans to offer local access to residential customers. It expects to spend \$8 billion to upgrade its partners' cable facilities to offer two-way telephony to the 30 million households passed by their networks. John Keller, *Sprint Puts Price Tag of up to \$8 Billion on Foray into Local Phone Markets*, WALL ST. JOURNAL, Mar. 30, 1995 at B6. Furthermore, with this purchase Sprint acquires a 40% ownership share in the one of the two largest CAPs, Teleport, immediately giving it local access and transport facilities in 25 major cities. David Rohde, *Bells Get a Wakeup Call*, NETWORK WORLD, Nov. 31, 1994 at 1 and 79 and Paula Bernier, *Sprint Ventures Into Partnership With Cable Company Trio*, TELEPHONY, Oct. 31, 1994 at 8-9. AT&T has indicated that it will use cable affiliates to supply access and transport as part of its re-entry to the local exchange business. Sallie Hofmeister, *Time Warner, AT&T Discuss Phone Service Joint Venture*, LOS ANGELES TIMES, May 17, 1995 at D1; *AT&T Picks Rochester, N.Y. for Re-entry into Local Exchange*, STATE TELEPHONE REGULATION REPORT, Jan. 12, 1995.

13. In one the first instances of its kind, Teleport was permitted by the Illinois Commerce Commission to offer its Chicago-area business customers a switched "intercom" service by reselling Illinois Bell local access. *Phone Firms Coming on Line*, CHICAGO TRIBUNE, September 17, 1992.

14. Time Warner will soon begin delivering landline dialtone service over its cable network to subscribers in Rochester, NY. See *Frontier Corporation Will Provide Operator Services to Time Warner Communications' Local Telephone Business*, PR NEWSWIRE, June 16, 1995. More recently, the Ohio Public Utility Commission authorized Time Warner Entertainment to provide phone service in 37 counties. *Ohio Regulator Upholds Time Warner*, MULTICHANNEL NEWS, Oct. 30, 1995. In other action, TCI and Teleport have cable telephony trials in Arlington Heights, IL and Brookhaven, NY; Cablevision has a trial underway in Yonkers, NY; NewChannels Cable in Syracuse, NY; Viacom in Castro Valley, CA; and Jones Intercable in Chicago, IL.

15. These products typically adopt a distributed approach by attaching rudimentary switching equipment to subscribers' premises. Brand name products include First Pacific Networks' *Personal eXchange*, Scientific-Atlanta's *CoAccess/CoAxiom*, Motorola's *CableComm*, Antec's *Cable Loop Carrier* and Tellabs' *CableSpan* systems. In September 1994, CableLabs, the cable industry's research consortium, issued a request for proposal for over \$2 billion in equipment that would deliver telephone service over traditional coaxial cable networks.

16. See Cornford and Gillespie (1993).

17. As of April 1995, 75 of the 85 cable franchises offered telephone service. The number of cable-provided access lines stood at 740,000, up 131% over the previous year. *ITC Records Strong Growth in Cable Telecommunications*, INDEPENDENT TELEVISION COMMISSION, May 15, 1995. Remarkably, 79% of all subscribers to cable service also opted for telephone service, up 47% from a year earlier. News Release, INDEPENDENT TELEVISION COMMISSION, June 6, 1995.

18. Scientific Atlanta's *CoAccess* system is currently being tested in a Chicago suburb, providing cable households with traditional phone service over a Jones Intercable coax network. TCI and Teleport are teaming up to test Motorola's *CableComm* in Arlington Heights, IL.

19. A commercial trial of such a system is being undertaken by Cox Cable in southern California. Cox holds a Pioneer's Preference license to provide PCS service in the San Diego area where in 1991 it demonstrated PCS over coaxial cable. Cox intends to invest \$1 billion to upgrade its network to provide cable telephony. *Cox Communications Sets Over \$1 Billion Spending*, REUTERS, Apr. 12, 1995.

20. A prime example of such an arrangement is Sprint's joint venture with TCI, Cox and Comcast. Through their WirelessCo venture, the partners have secured access to 182 million potential PCS users in the U.S. after paying

\$2.12 billion for PCS spectrum during the FCC's 1994 auctions. *See also* Nick Louth, *Sprint-led Group Sees National Network in Place in 1997*, RUETER BUSINESS REPORT, Mar. 20, 1995.

21. In an alliance that brought together the largest cable company and the largest cellular company, TCI and McCaw tested PCS in various markets. *Cellular, Cable TV Giants to Test New Wireless Service*, LOS ANGELES TIMES, May 23, 1991 at D1.

22. In 1992 Comcast provided PCS service bridging two of its franchises using the fiber network of Eastern Telelogic, a CAP owned by Comcast. In November 1993, Continental Cablevision and Time Warner tested PCS using two different cable operators with switching equipment supplied by Teleport, the CAP in which both cable operators are partial owners.

23. In February 1991 the FCC authorized Cox Cable (in New York and San Diego), Cablevision (on Long Island), and Continental Cable (in Boston, Stockton and Jacksonville) to build PCS networks. *Cable TV Phone Challenge*, N.Y.TIMES, February 28, 1991 at D1.

24. An early example of this union is Digital Equipment Corporation's COMMUNITY MULTIMEDIA NETWORKING product. Leasing unused capacity on coaxial cable systems, DEC then packs four Ethernet circuits onto two video channels. *See* Patrick Flanagan (1993), *Digital enters CATV with Ethernet offerings*, TELECOMMUNICATIONS (Amer. ed.) July at 10. Hardware-software systems include Intel's *CablePort*, Digital Equipment Corporation's *ChannelWorks*, and Hewlett-Packard's *Broadband Interactive Data Solution*.

25. Continental Cable teamed up with Performance Systems International to extend Internet access to cable customers in Boston and elsewhere. In a more ambitious effort, Intel and General Instrument have announced plans to offer high-speed data links to residential cable customers to support a wide array of data and video services; Comcast and Viacom are the cable partners in the technical trials. NEW YORK TIMES, December 1, 1993. In a highly visible case, Time Warner Cable is offering an experimental, residential on-line service in Elmira, NY called "Southern Tier Online Community." *Time Warner Will Test Local On-line*, MULTICHANNEL NEWS, 2:29, Jul. 17, 1995.

26. For various economic motivations for diversification see Katz and Hermalin (1993).

27. None of these factors—technical change, regulatory policy and competition—is exogenous; each depends to some extent on the others. However, we will treat the dynamics in each case as if they were unrelated to changes in other factors. One could also give strategic reasons for the entire industry's decision to diversify into telephony, not just individual operators' mode choice. The industry might use entry into telephone markets as a "bargaining chip" in their negotiations with LECs seeking entry into video markets. It is unlikely that, given its atomistic nature, the cable industry could erect such a monolithic front, however. Alternatively, cable operators might attempt to foreclose competition in video markets by bundling in phone service as part of into its service package. They may also seek to escape the constraints of cost-based regulation by shifting costs from phone services to video services.

28. *See* Foster (1994).

29. *See* Omoigui, et. al. (1995).

30. *See* Kellogg, et.al. (1995).

31. The key provisions, introduced as part of a 1970 Order, are contained in sections 63.54 and 63.58 of the FCC rules. For a detailed discussion of the FCC's cross ownership restrictions see Kellogg, Thorne and Huber (1995),

Chapter 7.

32. See FCC Docket 87-266, *Telephone Company-cable Television Cross-ownership Rules*, October 24, 1991. The First Report & Order of this docket interprets Section 613 of the 1984 Cable Act to say that IXCs are not local telephone companies for purposes of the cross ownership ban.

33. FCC Docket 91-141, *Expanded Interconnection with Local Telephone Company Facilities*, September 17, 1992. In September 1993, the provisions were applied with little alteration to switched access. The fate of requirement of physical collocation (as opposed to virtual collocation) is uncertain after the courts determined it violated rights of LECs. An important open question is whether cable companies will be forced to open up their networks to interconnectors if and when they provide ubiquitous phone service.

34. As recently as August 1993, Mercury Communications charged access fees that amounted to as much as 70% of the telephone revenue collected by cable telephony operators. At that time, reciprocal interconnection arrangements were agreed upon among 60 cable companies and BT and Mercury; these agreements reduced interconnection charges to roughly 50% of telephone revenues but extended the agreements for up to 5 years. *Bonanza for Exchange Makers as U.K. Cable Companies Start Installing Own Switches*, COMPUTERGRAM INTERNATIONAL, Aug. 27, 1993; *Cable Operators in U.k. Sign Agreement with Mercury, BT*, GLOBAL TELECOM REPORT, Sept. 6, 1993.

35. U.K. Office of Telecommunications, *Pricing of Telecommunications for 1997, A Consultative Document on BT Price Controls and Interconnection Charging*, December 1995.

36. Federal Communications Commission, *Transport Rate Structure and Pricing*, CC Docket 91-213.

37. Typical rates are about 10-15% below LEC tariffs. See CONNECTICUT RESEARCH REPORTS (1994).

38. Even under the FCC price cap scheme for LECs, downward pricing flexibility is limited: for the high-capacity special access, the services that compete directly with CAPs' offerings, annual movements in rates cannot exceed five percent. Connecticut Research (1994).

39. Section 301 of the Act eliminates rate regulation immediately for small cable systems and systems subject to effective competition. All other systems are rate deregulated on March 31, 1999.

40. If the alternative to diversifying into telecommunications for a cable operator is competition, and not a video monopoly, then its incremental profit from entering is greater when video markets are opened up. If entry costs facing video competitors are lowered, it is unclear whether they will have a greater incentive to enter, and hence, spur cable operators to preempt the competition. In any event cable entry into telecommunications is clearly not a "defensive" response to the attack on its core business; video services continue to have great potential for cable networks.

41. As of June 1995, ten states had required dialing parity for local telephone service. *States at Risk on Dialing Parity*, MULTICHANNEL NEWS, 2:25, June 16, 1995.

42. As of mid-1995, six states were experimenting with various implementations of number portability. *FCC Wants Faster Cable Entry into Telephone Business*, MULTICHANNEL NEWS, 2:29, July 17, 1995.

43. A typical figure for the cost per household of upgrading to cable telephony, assuming a 100% take rate among cable customers, is \$400 excluding customer interface equipment. See Omoigui, et. al. (1995). Another study sets the figure at about \$900 per household including premise equipment. The combined revenue for local service

and network access is about \$90 billion per year. Spread over approximately 100 million households, that comes to \$900 per household per year. At \$90 per household per year, a 60% cable penetration rate would pay back the cost of a nationwide upgrage in about 6 years. Of course, a telephony upgrage can be undertaken in selective markets.

44. Sprint's cable joint venture, Sprint Telecom Venture, plans to bundle long distance with fixed and wireless local service as well as with cable service. Time Warner already provides cellular phone service in Rochester, NY, which it intends to bundle with its cable phone service. *See* Time Warner, Inc. 1995 Annual Report.

45. In May 1993, MCI announced its "Custom Access" marketing arrangement that offers business customers alternative access and transport in 30 cities and 1,200 buildings through affiliation with local providers which included several large cable companies. Bob Wallace, *MCI Pitches Single-source Plan*, NETWORK WORLD, May 31, 1993 at 1; Charles Mason, *MCI to Integrate Custom Access Services from LECs and CAPs*, TELEPHONY, May 31, 1993 at 6. This program has since evolved into the long distance company's "MCI Metro" division which included \$2 billion program to construct networks in all the largest U. S. cities. *See* Patrick Flanagan, *MCI to Wage \$20 Billion 'War' Against the RBOCs*, TELECOMMUNICATIONS (Amer. ed.), March 1994 at 13.

46. *See* footnote 10 *supra*.

47. Another neglected aspect is the timing of the diversification decision. Riordan (1992) models the strategic timing game between a single cable firm and a single telephone company deciding when to deploy a new technology that provides both advanced video services and switched telephony.

48. Other cable resources shared between video and telephony include customer lists, brand name, billing and marketing overhead, and other administrative activities.

49. These strategy options need not be mutually exclusive: large MSOs have pursued several different strategies in different markets. The best example of broad diversification is TCI.

50. *See* Owen (1982), p. 137.

51. Section 652 of the new Telecommunications Act limits cable companies and local exchange carriers to a 10% stake in one another. It also prohibits joint ventures between cable and phone companies in the same service territory.

52. Rasmussen (1988) examines strategic equilibrium when entrants have the option of selling out to incumbents after entry.

53. *See* Gilbert and Newbery (1992) for a model with a sequence of entrants.

54. This section draws on strategic analysis of the relative merits of acquisition vs. direct entry by Gilbert and Newbery (1992) and McCardle and Viswanathan (1994).

55. US West's and SBC Communications activities are described in footnote 10 *supra*. In 1994 Bell Atlantic attempted to merge with cable giant TCI and BellSouth initiated a \$4.8 billion venture with Cox Cable. Both deals have since been scuttled.

56. *See* Kogut (1988) for reasoning along these lines.

57. A 1972 FCC Order required that all future cable systems be designed to be two-way capable by setting aside a 25 MHz band for “return traffic.” Cable Television Report and Order, 36 FCC 2nd 143 (1972).