Harvard Business School

N2-725-366
REV: JUNE 18, 2025

RAMON CASADESUS-MASANELL

Preparing for Growth in the Fiber Optics Industry

In January 2015, five recently graduated MBAs began their careers at a prestigious consulting firm as associates, tasked with their initial assignment for Alcatel, a leading producer of fiber optics cable. Alcatel was evaluating options to expand its production capabilities within the North American market. The company faced a decision among three potential options: maintaining current capacity, investing in a modest-sized manufacturing facility capable of producing 4.5 million fiber-kilometers annually, or opting for a larger facility with a capacity of 9.5 million fiber-kilometers per year. The consulting team's primary objective was to develop a recommendation for Alcatel, advising whether to build a new plant and, if so, which capacity option to pursue.

Simultaneously, another top-tier consulting firm welcomed its own group of five fresh MBA associate recruits, assigning them to a project for Corning, a competitor in the fiber optics industry. Like Alcatel, Corning was also exploring a similar expansion in North America and considering the same investment options: no expansion, the construction of a small-scale production site, or the establishment of a large-scale manufacturing facility. The consultants at this firm were charged with the task of providing Corning with a detailed analysis and strategic recommendation. They needed to present industry insights, strategic alternatives, an initial evaluation of these alternatives, and recommended actions to guide Corning in its decision-making process.

Industry Background

The fiber optic cable industry was a relatively concentrated market, with a few significant companies and a large number of minor players. All of the significant companies were “integrated producers” that produced the optical fiber used in cable manufacturing. The minor players tended to be “independent producers” that purchased the optical fiber to make fiber optic cable. Most of the optical fiber available for purchase on the open market was produced by integrated producers that manufactured more fiber than they could use in their cabling operations.

One of the key differences between the integrated producers and the independent producers was that the cabling portion of the operations of integrated producers was fully linked to the fiber-producing operations. Consequently, the cabling equipment used by integrated producers could not feasibly be re-deployed to manufacture any other type of cable. By contrast, the cabling equipment used by independent cablers was flexible and could be re-deployed to manufacture other types of cable relatively easily and inexpensively.

Professor Ramon Casadesus-Masanell prepared this case with the assistance of RC Strategy Faculty. This case is not based on a single individual or company but is a composite based on the author’s general knowledge and experience. Funding for the development of this case was provided by Harvard Business School. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

Key Industry Players

There were five major integrated producers operating in the North American market:

- Alcatel was the largest producer of fiber optic cable in Europe and a significant producer in North America. It operated plants in France, Germany, and the US. Alcatel was currently considering expansion plans.
- Corning was the largest producer of fiber optic cable in North America. It operated plants in the United States, Germany, and the United Kingdom. Corning was also currently considering expansion plans.
- Lucent was a producer of fiber optic cable in North America. It was currently facing a number of financial challenges and did not have any expansion plans for the foreseeable future.
- Pirelli was a producer of fiber optic cable in Europe and North America. It had no plans for expansion in North America.
- Samsung LG was a producer of fiber optic cable in South Korea and North America. Most of its energies had been focused on serving the Asia-Pacific market, and it had no expansion plans in North America.

There were additional integrated producers operating in different parts of the world, particularly in the Asia-Pacific region. Nearly all of their output was destined for their home markets and they did not export to North America.

Market Segments

Industry demand was divided into four main segments:

1. Long-haul communications. Fueled by the influx of new long-distance communication companies and the expansion and conversion of incumbents' long-distance networks to include fiber optic cable, this market segment accounted for over half of demand.
2. Feeder/local telecommunications. Substantial investments in upgrading existing feeder/local telecommunications networks, combined with substantial new entry into these markets, had caused this segment to grow to roughly 25% of total demand for fiber optic cable.
3. Cable television. The expansion of cable television networks had spurred demand, accounting for roughly 15% of the market.
4. Monitoring applications. Applications such as sensors, medical devices, and utility monitoring equipment rounded out the remaining 10% of the market.

Demand Characteristics

Industry demand had been growing rapidly in recent years, and most analysts expected demand in North America to increase significantly in the coming years. Several characteristics of demand for fiber optic cable were noteworthy.

First, demand for fiber optic cable was determined by the level of demand for services that required the cable, such as broadband applications. There was practically no differentiation in the fiber optic cable between industry producers. Overall demand for fiber optic cable was highly price inelastic. This

inelasticity resulted from the lack of close substitute products. Additionally, the cost of fiber optic cable constituted a relatively small portion of the total expenses involved in developing and expanding digital communications networks. Since fiber optic cable was a commodity, producers sold at the prevailing market price on a per fiber-kilometer basis.

Second, purchasers of fiber optic cable were sophisticated buyers who understood the costs faced by different producers reasonably well. Fiber optic cable buyers commanded greater bargaining power relative to producers and were effective in negotiating away excess returns that producers attempted to extract. This sophistication stemmed from their deep knowledge of the industry, including production costs, market dynamics, and technological nuances, which enabled them to make well-informed purchase decisions. Transparency of costs further empowered these buyers, allowing them to accurately assess fair price and diminishing the ability of producers to charge an excessively high price. Additionally, the competitive market, with multiple producers vying for their business, provided buyers with the leverage to demand favorable terms and prices, as producers could not afford to lose out to competitors. Moreover, buyers often made bulk purchases, which increased their negotiation power, as large orders were highly valuable to producers, who were therefore inclined to reduce prices to secure these contracts.

Third, the main determinants of future demand growth for fiber optic cable hinged on resolving key regulatory issues in the telecommunications industry and the pace of development and deployment of broadband applications. Due to uncertainty surrounding these issues, there was a wide range of predictions available for demand in this industry.

Geographic Markets

There were three major geographic markets: North America, Europe, and Asia-Pacific. The three markets were separated by moderately high shipping costs that limited the competitiveness of imports.

The North American market was by far the largest market and was the focus of current strategic decision-making due to the recent resolution of a number of critical regulatory issues. It was clear that demand for fiber optic cable was likely to increase in the coming years; companies were faced with the question of whether to expand capacity in anticipation of this increase in demand.

The European and Asia-Pacific markets were also likely to expand in the future. However, a number of key regulatory decisions had yet to be made in those markets that would influence the ultimate structure of the telecommunications industry and, therefore, the demand for fiber optic cable. No significant capacity expansions would likely be considered in these markets until the regulatory issues were resolved. It was expected that most of these issues would be resolved in the next year or two – so, the decisions currently under consideration in the North American market would be revisited in other parts of the world in the relatively near future.

Current Decision and Project Approach

The most pressing issue facing Alcatel and Corning was how to respond to the expected increase in demand in the North American market. The question facing both management teams—which needed to be answered in the next two months—was whether to build additional capacity in North America. If either company decided to proceed, the new plant could be fully operational by the end of 2015.

Three options were being considered:

1. Do not add any additional capacity
2. Build a small plant with a capacity of 4.5 million fiber-kilometers per year
3. Build a larger plant with a capacity of 9.5 million fiber-kilometers per year

Given the relatively concentrated market structure, it was clear that the evaluation of these options would need to consider the likely actions of other players in the market.

The Consulting Firm's Objectives

The primary objective for both consulting firms' studies was to evaluate the specific options currently under consideration and develop recommendations for the option(s) that their clients should pursue. The evaluation would include an assessment of the decisions that key competitors were likely to make.

In addition, the consulting firms would endeavor to expand the range of options available by identifying and evaluating other strategic opportunities to improve the overall performance of the company.

A key secondary objective was to build the capabilities within both organizations to better address similar strategic challenges going forward.

Proposed Approach

In order to work as efficiently and quickly as possible, as well as to facilitate the transfer of skills and approaches to both companies, the consulting firms proposed similar approaches, whereby a core team consisting of consultants and company representatives would be established. This would allow the teams to access the significant amounts of data and other information that had already been compiled, as well as research and analytical capabilities. Both consulting firms had the opportunity to involve various technical and industry experts (e.g., game theory and telecommunications experts) as necessary to address specific issues within the engagement.

The teams' work would proceed in two phases. Phase 1, planned for two weeks, would address specific issues associated with the three options and would provide preliminary recommendations regarding the option(s) that should be pursued. These findings and recommendations would be presented by both consulting firms by the end of January 2015.

Phase 2 of the project planned to build upon the work in Phase 1 by developing specific action plans to implement the option(s) that were selected in Phase 1 and by identifying/evaluating additional strategic opportunities that were available to both companies.

Phase 1 The specific outcomes of Phase 1 were to include the following:

- A "baseline" analysis of the North American fiber optic industry market for 2016 that reflected conditions in the industry assuming no significant capacity expansions in the coming year
- An options assessment that reflected the likely impact of the different options on company performance—including an assessment of the likely options that key competitors would pursue

- Preliminary recommendations concerning the option(s) that the company should pursue. Next steps would be identified and agreed upon during the workshop to guide Phase 2 of the project

Phase 2 The specific activities and analyses undertaken in Phase 2 would be determined at the end of Phase 1. It was expected that they would include an assessment of options other than or in addition to capacity expansions to improve company performance. Phase 2 was also expected to include the development of an action plan and a communications plan.

Production Costs

The consulting firms had met with their clients' engineering teams to learn more about production costs for fiber optic cable within the industry as a whole as well as to gain more information about the costs associated with the new plants under consideration.

Market analysts, who possessed a detailed understanding of the cost structures of competitors in the market, participated in these meetings. Additionally, team members from the companies' marketing departments had extensive contacts with independent cablers (who frequently purchased cable on the open market) and were thus able to provide detailed cost estimates of those producers. (See **Exhibit 1** for a table of relevant costs).

Key Cost Elements

The most important cost element in the production of fiber optic cable was optical fiber, which accounted for well over half of the total cost of production. On this element, integrated producers (who produced the fiber they needed) had a significant cost advantage over the independent cablers (who often purchased fiber from integrated producers).

The second most important cost element was energy, which accounted for about 20% of total cost. Hourly and salaried labor made up approximately 15% of total cost. Depreciation, research and development (R&D), and sales, general and administrative (SG&A) costs comprised the other remaining cost elements.

Cost Projections: Alcatel vs. Corning in 2016

Corning's plant was more efficient than Alcatel's due to a significant modernization two years earlier. Alcatel's plant had not been substantially modified in the last three years. This difference largely explained the delta in depreciation expenses between Corning and Alcatel.

With regard to R&D expenses, both Corning and Alcatel maintained substantial corporate research and development facilities devoted to advancing fiber optic technology and developing new applications for optical fiber. Expenses for these facilities were allocated across all business units in each corporation. No new R&D expenses were expected to be incurred if additional capacity was built using current technology.

Cost Projections for Other Producers in 2016

The teams were unable to obtain detailed information concerning the costs of the three other integrated producers operating in North America – Lucent, Pirelli, and Samsung LG. However, the consensus of experts was that the costs of these producers were roughly 33% higher than Corning's costs, with the exception of depreciation and R&D expenses.

The cabling portion of the operations of integrated fiber and cable producers were fully linked to the fiber-producing portions of the operations. Accordingly, the cabling equipment used by integrated producers could not feasibly be re-deployed to manufacture any other type of cable.

With regard to depreciation, the facilities operated by Lucent and Pirelli were built at roughly the same time as Alcatel's, so the depreciation expenses of these companies were projected to be similar to Alcatel's.

In turn, Samsung LG had upgraded its facility at roughly the same time as Corning, so its depreciation expenses were roughly in line with Corning's. With regard to R&D expenses, Samsung LG and Lucent's expenses were believed to be about half of what Corning spent, whereas Pirelli's expenses were likely to be about half of Alcatel's.

Costs of Independent Cablers

The independent producers' fiber cost reflected price paid for optical fiber purchased from integrated fiber optic cable producers. In addition, the capital costs reported for independent cablers represented the imputed cost of renting the independent cablers' equipment and production facilities.

The cabling equipment used by independent cablers was more flexible and could be re-deployed to manufacture other types of cable relatively easily and inexpensively. Despite this flexibility, no new independent cabling capacity was expected to be added in the United States in the foreseeable future; any new independent cabling capacity built in the coming years was expected to be built in Asia-Pacific.

Costs of Imports

The general guideline in the industry was that production costs for imported cable were essentially identical to the costs of independent producers in North America (i.e., any advantages in labor costs were offset by higher costs for cable and other costs). Thus, as a practical matter, the only relevant difference between cable produced in North America and cable produced elsewhere was the cost of shipping the product internationally, which added about 10% to the cost incurred by importers of fiber optic cable.

Costs Associated with New Facilities

The engineers and cost accountants on both companies' teams had developed detailed estimates of the costs associated with each of the facilities. The teams expected the basic costs of these facilities to be identical regardless of whether they were built by Alcatel or Corning. No new R&D expenses would be required for either Alcatel or Corning, as current R&D costs were being allocated across the existing facilities.

Refer to **Exhibit 1** for a complete summary of all industry cost projections for 2016. **Exhibit 2** summarizes production capacity available to serve the North American market. **Exhibit 3** provides information on projected demand for fiber optic cable in North America.

Conclusion

The new recruits needed to work swiftly to develop a recommendation of the best course of action for their respective clients. Would it be best to build a plant? If so, what size? How could the consultants guide their clients in thinking about competitive actions?

As part of the work, the new recruits at both consulting firms would need to develop an industry cost curve. To construct the cost curve and obtain a price forecast, they would need to discern which costs each producer needed to cover to serve the market and which producer would be the marginal supplier in the market. They had been given a slide showing an example of industry cost curves (see **Appendix A**) pertaining to the scenario in which Corning or Alcatel build small or large plants.

The consultants had to address the following questions:

- Assuming the consensus demand projection was 45 million fiber-kilometers with no new capacity, what would be the market price for fiber optic cable in 2016?
- What would be the profit for Alcatel and Corning under this scenario?
- Additionally, if both firms built large plants, what would be the market price for fiber optic cable in 2016?
- What would be the profit for both companies under the second scenario?

The new recruits were eager to make a strong impression with their project leaders and knew they would need to work quickly and intelligently to drive towards the best solution for their clients.

Exhibit 1 Summary of Projected Costs 2016

Units: US Dollar ($) per Fiber-kilometer (km)

	Fiber cost	Hourly labor	Salaried labor	Energy	Depre-ciation	R&D expense	SGA	Other	Int'l freight
Corning	27.0	4.5	2.3	9.0	2.5	3.0	1.8	0.5	0.0
Alcatel	30.0	5.0	2.5	10.0	1.3	2.0	2.0	0.5	0.0
Lucent	36.0	6.0	3.0	12.0	1.3	1.5	2.4	0.6	0.0
Samsung LG	38.0	6.0	3.0	12.0	2.5	1.5	2.4	0.6	0.0
Pirelli	39.0	6.0	3.0	12.0	1.3	1.0	2.4	0.6	0.0
U.S. indeps.	41.0	7.0	3.5	14.0	1.0	0.0	2.8	0.7	0.0
Imports	41.0	7.0	3.5	14.0	1.0	0.0	2.8	0.7	7.0

Source: Casewriters.

Exhibit 2 Available Production Capacity to Serve North American Market: 2016

Units: Thousands of Fiber-kilometers (km)

Company	Projected 2016 Capacity
Corning	9,000
Alcatel	8,000
Lucent	4,000
Samsung LG	3,500
Pirelli	3,000
US Independent Producers	7,000
Imports	25,000

Source: Casewriters.

Exhibit 3 Projected Demand for Fiber Optic Cable in North America: 2016

Units: Thousands of Fiber-kilometers (km)

Sources examined	Estimates
University of Michigan	31,500
US Department of Commerce	39,000
KMI Corp. Reports	45,000
JP Morgan Analyst Reports	45,000
North American Fiber Optic Cable Association	47,500
Morgan Stanley	53,000

"Consensus Estimate" = 45,000, as reported by KMI Corp. It is the median estimate provided by the other sources.

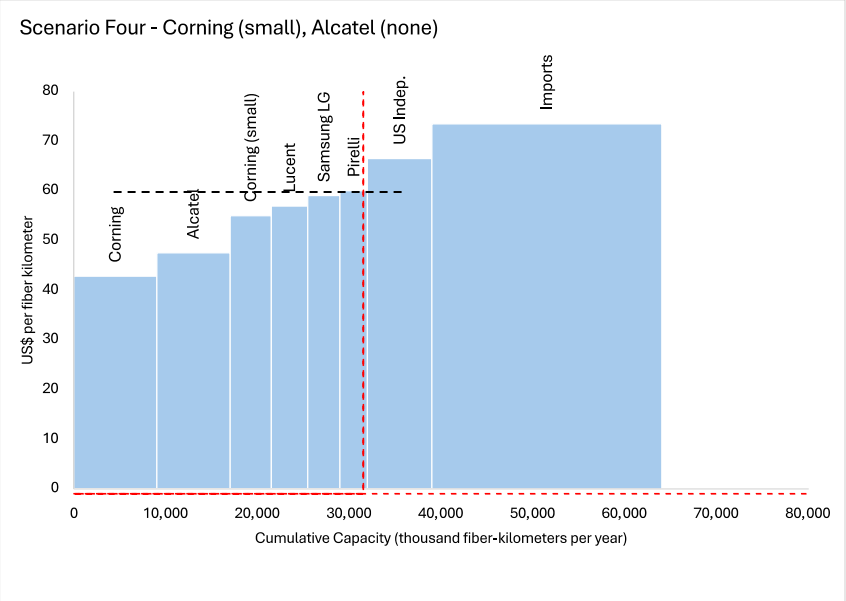
"Low Estimate" = 31,500, as reported by the University of Michigan

Compiled by the consultancy

Source: Casewriters.

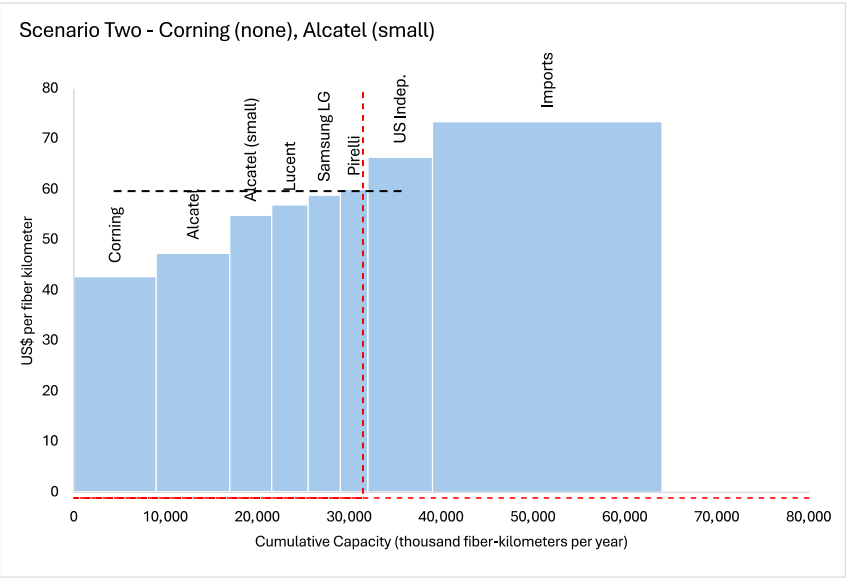
Appendix A: Sample Scenarios

Only Corning builds a small plant and low demand prevails (market price = $60 per fiber km)



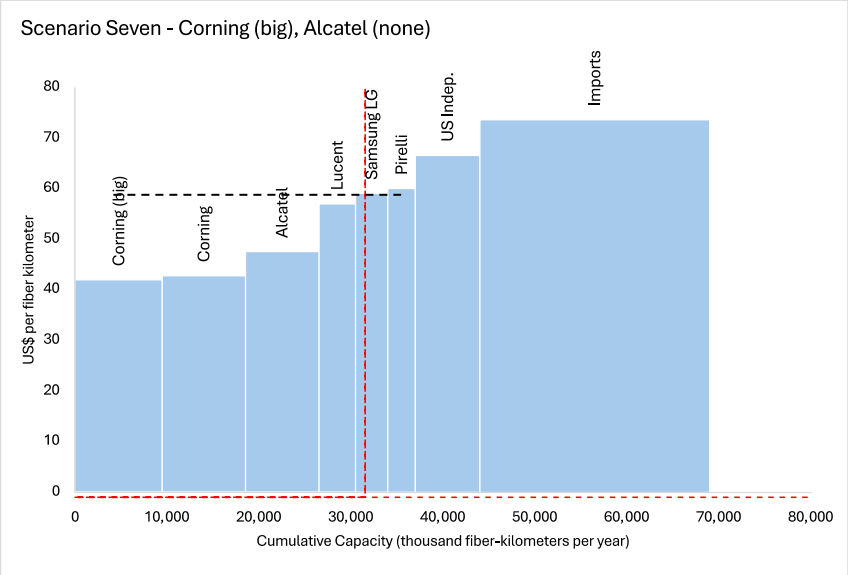
Source: Casewriters.

Only Alcatel builds a small plant and low demand prevails (market price = $60 per fiber km)



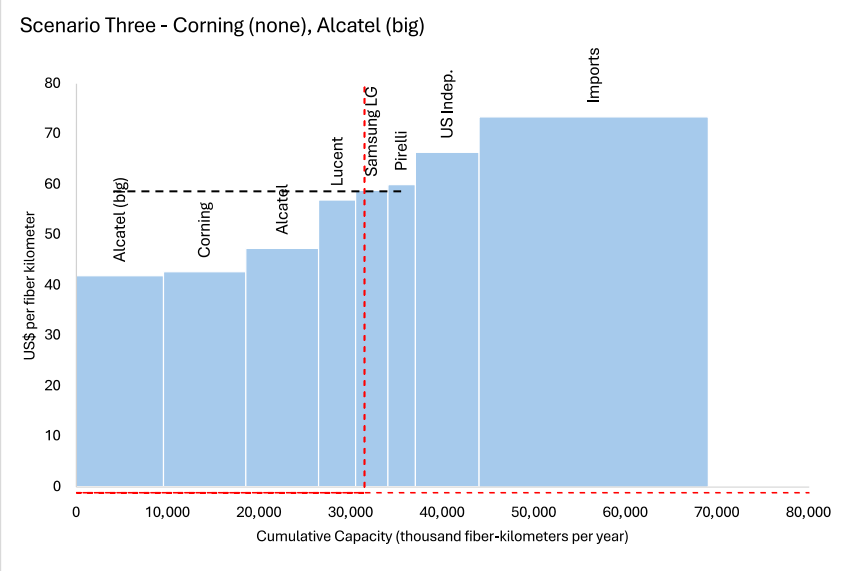
Source: Casewriters.

Only Corning builds a large plant and low demand prevails (market price = $59 per fiber km)



Source: Casewriters.

Only Alcatel builds a large plant and low demand prevails (market price = $59 per fiber km)



Source: Casewriters.

Key assumptions for constructing industry cost curves

1. R&D is an allocation of corporate level research and development to this business unit. These expenses are excluded because these costs will be incurred regardless of whether one of the integrated producers shuts down a plant in North America. Thus, they are sunk costs.

2. SG&A (sales, general and administrative) costs are attached to individual plants, and can be saved if the plants shut down.

3. Salaried workers have job security in the short term, as their contracts cannot be easily breached, nor can they be quickly reassigned to other productive roles.

4. Think of depreciation as a "capital charge"—the cash flow necessary (on a per fiber-km basis) so that the initial investment in the plant earns a return that covers its cost of capital. The first five producers cannot easily redeploy their existing plants, so these costs are sunk for these producers.

5. Depreciation costs are included for independent producers and imports because their equipment is easily re-deployable and, therefore, recoverable if the company were to stop producing.

6. If the vertical demand curve intersects the industry cost curve directly between two suppliers, assume the market price is set at the intersection of the demand curve with the lower cost supplier.

Source: Casewriters.