



MICHAEL TUSHMAN
MICHAEL J. ROBERTS

Compagnie Lyonnaise de Transport (A)

It was April 2015, and as Jacques Tremblay drove back to his office at Compagnie Lyonnaise de Transport (CLT), he found himself replaying the conversation he had had with his boss, Compagnie Lyonnaise de Transport's CEO, Michel La Croix. CLT was a €3.3 billion manufacturer of industrial machinery, including a large business that focused on the transport sector—trains and controls for both passenger and freight rail systems. The company's historical roots were in the manufacture of railway cars for the French railway system. CLT was headquartered in Lyon, France where it had been founded in the 1890s.

Tremblay was the head of the company's Communication & Controls (C&C) Division, headquartered 200 miles north in Strasbourg, France. The C&C Division provided advanced electronic devices used to communicate information between modern train-sets (locomotives and the rail cars they were pulling) and central dispatch facilities, which coordinated the movement of trains on increasingly congested tracks. Several other CLT divisions served this same core transport market, including the Railway Car & Equipment Division.

La Croix had requested that Tremblay meet him near the headquarters facility on the far side of Lyon for lunch, and Tremblay had enjoyed a fine meal with his colleague. They had been friends for over 20 years, since Tremblay joined CLT after university. As La Croix finished his crème brûlée, he folded his napkin and came to what Tremblay suspected was the point of their outing.

It concerned the company's centralized Transit Research Center (TRC). The TRC was located in a facility near the company's headquarters building in Lyon. The TRC provided market research and competitive intelligence on passenger transit markets and competitors around the globe. The center also conducted technology-oriented research, coordinated marketing and engineering efforts across divisions, and served as a central point of contact for planners and governmental authorities who were CLT's prospective customers. The conversation with La Croix still rung in Tremblay's ears:

La Croix: Jacques, I've got a bit of a problem with the TRC and with Gerard Tuille [general manager of the Railway Car & Equipment Division]. You know what a great proponent of entrepreneurship and independence Gerard is. You also know that with our tight earnings picture and the downturn in his sales pipeline we're really cutting his capital spending. In fact, when I go up to Paris next week I expect to cut about €12

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million out of his budget for next year. Tuille is being difficult. He's refusing to pay his share of the overhead allocation for the TRC. He claims that it produces insufficient revenues for him, that he could get most of this business on his own, and that TRC people have caused his field sales and engineering people nothing but headaches anyway. He's going to be tough to deal with on this issue, and I'd like your advice.

Tremblay: Would you like me to wear my divisional or my corporate hat?

La Croix: Nice try, Jacques, but you're up to your neck in this either way. Your division is the biggest user of TRC, and your people seem to be the only ones in this company who take an "objective" view of Alex Roux [the TRC's director]. Before I go to Paris next week, I'd like your thoughts on how we should deal with this issue.

Background

Headquartered in Lyon, France, Compagnie Lyonnaise de Transport was a diversified manufacturer of automotive parts; railway and transit equipment; and components sold in industrial, defense, and other governmental markets. With 2014 sales of approximately €3.3 billion, the company consisted of nine product divisions – all based in France but with significant international sales – and several majority-owned foreign subsidiaries. In total, CLT operated 30 manufacturing facilities. (See **Exhibit 1** for recent operating data and **Exhibit 2** for an organization chart.)

Sales to the freight rail and passenger transit markets accounted for 30% of CLT's total 2014 revenues and a somewhat higher percentage of its operating income. Of the approximately €1 billion of sales in these markets, the Railway Car & Equipment Division accounted for nearly €550 million, and the C&C Division slightly more than €410 million. The remainder was distributed among the Aerospace Systems, High Performance Metals, and Automotive Seating divisions. (See **Exhibit 3** for the product lines of the three divisions which dealt most closely with the transit market.)

Historically, the bulk of the firm's sales had been in France, but since the late 1990s, the company had successfully broadened its geographic base. In particular, CLT had enjoyed success in the U.S. market, where it had made major sales to Amtrak and San Francisco's BART systems.

Organization and Control at CLT

CLT's top management viewed the product divisions as the basic operating units, and each was held responsible for meeting budgeted yearly profit goals. Careful attention was paid to insuring that responsibility for the design and sale of any particular product line was assigned to a single division. By and large the market segments served by CLT's divisions were sufficiently distinct that this policy had raised few problems, and total interdivisional transfers of product had never exceeded 10% of CLT's cost of goods sold. There were, however, some instances in which new customer requirements or new technological developments had brought certain divisions into direct competition with one another. For instance, in the early years of the new century the Railway Car & Equipment and the C&C divisions had developed serious jurisdictional disputes regarding several types of control devices. This conflict was ultimately resolved by a signed "province agreement" in which Railway Car & Equipment took full or prime contractor responsibility (in dealing with the customer) for devices which operated mainly *within* the cars themselves, while C&C was responsible for all other devices (e.g., those in central control offices and along right-of-ways). The two divisions also had divided responsibility for field management of contracts on a geographic basis.

Senior management also espoused an organizational concept of “divisional autonomy with active central control and coordination.” La Croix outlined this approach as follows:

Our core competence includes three important corporate resources that we are committed to utilizing in the most effective way possible. First, we have a larger pool of funds, which allows individual divisions to take higher risks than they could if they were separate companies. Second, our range of operations provides an opportunity for division managers to avoid re-inventing the wheel; the divisions can learn from one another’s successes and mistakes. Finally, we encompass a wide enough area of opportunities to attract and hold highly competent people at the top levels of division management. We at the corporate level are committed to active leadership in employing these resources rather than simply following a holding company philosophy.

Several aspects of the CLT organization attested to its commitment to active headquarters involvement including: the institution of formal planning and market research roles at both headquarters and divisional levels; rigorous headquarters review of all divisional plans, budgets, and operating results; regular interdivisional and headquarters-divisional transfer of managers; and a small but active corporate staff (105 professionals) which provided a number of central services (e.g., legal, human resources), and organized cross-functional committees among divisions (e.g., purchasing and R&D), which conducted operations audits of problematic functional areas within the divisions (usually at La Croix’s request).

Each year the divisional management teams gave full-day, formal presentations of both their five-year plans and annual budgets to key members of the headquarters staff. Detailed, written versions of these plans and budgets containing financial figures plus a wide range of supporting data were then transmitted to the corporate office for further scrutiny by the staff, the president, and the chairman. Once approved, these budgets – along with a “Budget Objectives Letter” – became a fixed commitment from the division to corporate. All significant deviations from this budget required written explanations. Divisional results were reviewed monthly, and a revised quarterly forecast was prepared four times each year. Bonus payments for division general managers and their key subordinates were based on their ability to meet the goals laid down in their “Budget Objectives Letter.” The single most important criterion was profit relative to the budget. Other criteria included market share, rate of new product development, cost reduction, and employee and community relations – all relative to agreed-upon objectives.

The Transit Market

While transit authorities had purchased cars, systems, and components from CLT for many years, city traffic congestion, terrorism, high energy costs, and the adequacy of public transportation had become a growing concern in countries around the world, particularly in the U.S., where CLT had 28% of its C&C and Railway Car & Equipment sales. In 2015, for instance, the United States Federal Transit authority was expecting to receive nearly €65 billion over six years to improve its transit systems. CLT believed that large market opportunities were also developing in the transit markets of Europe and Asia.

In 2014, CLT top management established the TRC, both to bring its total capabilities to bear on the fast growing global transit market and to avoid duplication of effort among divisions that served the transit market.

CLT decided to focus on the North American market, where open competition was encouraged and increasing congestion had created a public appetite for more passenger transit. In 2014, Amtrak's ridership increased 4.3% over 2013. Across the country, cities and counties were proposing 27 new commuter transit systems, in such growth markets as Minneapolis and Austin-San Antonio. In San Francisco alone, the Bay area's BART system was investing €3.5 billion over five years into new routes and system-wide upgrades to withstand seismic tremors. After a long period of relatively minimal investment, the political climate for investment in public transit seemed to be improving.

By 2013 it had become quite clear to CLT management that this newly emerging passenger transit market was quite different and a good deal more uncertain than most of the markets the company had traditionally served. For one thing, it was extremely difficult to forecast the size and timing of funds that would be available for investment in transit projects. The number of people and organizations influencing the final characteristics of new or extended transit systems was distressingly large—ranging from Congress, the U.S. Department of Transportation, and state and city governments, to transit authorities, consulting engineers, and local citizen groups. Battles raged among these groups on numerous issues such as more funds for highways vs. more transit, buses vs. rapid rail system, new hardware vs. existing systems, and local power vs. U.S. Congress. This was a very different marketing environment from that which CLT faced in selling to railroads or in selling discrete transit components. Competition was also intense, with such firms as General Electric, Siemens, and Bombardier all moving aggressively toward various segments of the market.

Another factor that had proven challenging to CLT was the fact that sales in the passenger transit market were increasingly at the “systems” level. Tremblay explained:

In the old days, we sold relatively standardized components—freight cars, rail cars, communication systems—and the customer put them together. The freight railway business is still that way, but not passenger rail. As these elements have become increasingly electronic, computer-controlled and integrated, you have to be willing to sell and deliver a system. It is just too complicated for the customer to take this on themselves.

Despite these problems and uncertainties, CLT still considered the transit market as an attractive source of future revenue. In 2014, the TRC estimated the market potential for 2015-2019 at nearly €11 billion for this market alone, excluding expenditures for studies. It was estimated that approximately half of that figure would go for hardware and the other half for construction. CLT planned to compete for about 15% of these expenditures or €1.6 billion.

CLT Interest and Capabilities

CLT management had been concerned for some time with its heavy dependence on moderately growing, cyclical areas such as the railroad and automotive parts markets. By 2014 it appeared that the rest of CLT's business was facing the downward side of another cycle, and management looked to the transit market as a means of both profit maintenance and potential growth. If CLT were able to capture even half of the transit business it planned to compete for, this would represent an important influx of revenues over current levels. See **Table A** for an overview of current revenues each CLT division earned in the passenger transit and freight railway segments.

Management was keenly aware that achieving and then maintaining a significant role in the passenger transit market would depend on its ability to secure prime contractor or major subcontractor positions in a reasonable proportion of the extensions and new systems which were

currently under planning. Such positions not only provided significantly higher margins but they also offered the possibility of follow-on business and helped develop a solid product-market base for weathering the competitive shakeout which would eventually occur. (See **Exhibit 4** for an example of TRC's work relating to the U.S. transit market and CLT's capabilities for serving it.)

Table A Significance of Passenger Transit and Freight Railway (year 2014, € million)

Division	Passenger Transit	Freight Railway	Total Division
Railway Car & Equipment	108	433	541
Communication & Controls	133	298	431
Aerospace	13	0	378
Others	<u>14</u>	<u>0</u>	NA
Total	268	731	

Source: Company documents.

The Transit Research Center

Alex F. Roux had been director of the TRC since its formation in 2014. Prior to that, he had spent two years as a member of CLT's Corporate Marketing and Planning group. His pre-CLT experience consisted of long-range planning and market research positions in two other large industrial corporations. Roux's office was decorated with drawings and scale models of a number of futuristic transit systems, and on one wall was an aerial photograph of Los Angeles, which very graphically showed the high proportion of land space given to freeways and automobile parking. Unlike many of his colleagues in senior management, Roux was extremely informal, often teased for his colorful variety of polo shirts and absence of socks in warmer weather.

The TRC was located near CLT's headquarters in Lyon. In addition to Roux, it employed three market researchers, a competitive analyst, a promotion and communications specialist, a transit system planning consultant, a librarian, and a secretary. Roux described the work of the center in terms of four objectives, two internal and two external:

First, we have established and continue to update a base of market and competitive research on the transit market. Our transit library here in Lyon represents one of the most extensive data banks in the world. We develop answers to such fundamental questions as: What is the market? Who are the key purchasers? What are their needs? How can we best approach them? What is the competition doing? We gather these data and provide them to the key decision points in the CLT organization. In addition to written research reports and a monthly newsletter, we set up field visits from time to time. For instance, we actually took the general managers to San Francisco and proved to them that there was an advanced technological opportunity out there. We have also spent a lot of time getting the division marketing and engineering people aware of developments in the field, familiar with new market sources, and sensitive to the new kinds of people (e.g., consulting and environmental engineers) who are increasingly influencing the final form of projects.

We are also responsible for implementing a unified engineering and market program that maximizes the potential revenues and margin for the company as a whole. In some instances we've had serious problems both with duplication of efforts and outright

competition among divisions on contracts. We try to get in and help put the issues into focus. Once you get the division people around a table, the animosity usually disappears. But you have to talk it all out from both the customer's and the company's perspectives.

Externally we promote CLT's overall transit hardware and software capabilities and provide assistance – within practical limits – to planners, politicians, and others who are trying to stimulate public awareness of the need for improved transit facilities. We want to project the image of CLT as a skilled and forward-thinking participant in this market; that it's not just another "stone-age" railway equipment maker. We don't have the money for heavy market development advertising, and so we've relied on personal presentations to key people and organizations and on an extensive direct mail campaign.

Turning to the issue of TRC's results, Roux said:

Of course, gauging the results of an effort like this is difficult. La Croix has become increasingly concerned that we haven't picked up a prime contractor position for a major new project. For example, we got one major potential buyer to accept many of our concepts in the specs they were developing for a new system expansion and then a competitor grabbed the job on price. So, La Croix asks, "Are you guys selling transit concepts or CLT hardware?"

Being in at the beginning of a contract is crucial. It gives you an early understanding of the problem and puts you in a key position to influence the specs. Even if you don't come out as the prime contractor, it can put you in an excellent subcontractor position. We have gotten a number of these. With this idea in mind I got us into the study business last year, and we've currently got four of these going, staffed mainly by the Aerospace Systems Division. We've really been able to put CLT on the map in this market. We're well respected by the Department of Transportation and by most consulting firms. Top management likes the publicity, but now they're looking for the big hardware sales.

Roux discussed the organizational aspects of TRC's position as follows:

La Croix keeps saying that we're a line operation with P&L responsibility, but that's really hard to nail down. We start things going but it's the divisions that make the final specs and sell the products. I can only recommend and reason with divisional people, I can't make the final decisions.

The funding arrangements for this group don't help matters. Our budget this year is approximately €5 million and we hope to get about the same amount next year. (See **Exhibit 5** for TRC's 2014 budget.) This sum is allocated to the divisions based roughly on their annual sales to the transit market (approximate 2013 allocations were C&C – 50%; RC&E – 40%; Aerospace Systems – 5%; other divisions – 5%). This is seldom a welcome charge. The division's marketing function has to pick it up in its budget, and this really kills cooperation. I have recommended that the corporation fund us, but La Croix simply won't accept this.

The divisions see us mainly as a promotional function. They don't put much stock in our work with the national governments despite its potential long-term impact on the

direction of transit concepts. We've tried to stimulate the Railway Car & Equipment people to look at new product areas but they are totally oriented to their existing and profit-making items. Jacques Tremblay and the C&C people are a lot more responsive to us, but they too can get hard-nosed and short-term-oriented. Of course, we're all human and immediate divisional problems will always take precedence. They want to turn a profit and have their own divisions look good.

La Croix is our sole source of support at headquarters. Although he has his own viewpoint on what we should be doing, he has beaten the divisions back time after time. This year's profit squeeze really has them yelling. La Croix can't see why his managers don't see us from the same point of view as he does.

Other Views of the TRC

In early 2015, La Croix described his concerns regarding interdivisional cooperation in general and the TRC's charter in particular:

I'm concerned because we have not developed any significant market programs that don't follow our existing organizational structure, and I wonder why. The advance of technology tends to bring about an increased need to integrate many of the C&C and Railway Car & Equipment divisions' products. We are also interested in translating our aerospace technology into some of our industrial markets. We've got to find an answer to this. Perhaps we should consider recombining these operating units in a different way.

In transit, we can't simply think in terms of coordinating activities; the customer won't sit still for this. I see no payoff for establishing an integrating or coordinating unit in this business. We must design our efforts around the customer and their particular requirements. There's a big distinction between coordination, or cooperation, and having responsibility for customer needs. Alex Roux is supposed to have line authority on any contracts he gets. He may have to come up here to clear up any personnel matters that arise, but we can't leave this thing in its current floating state.

Tremblay looked at the issues from a different perspective:

Going after a new transit system or a major extension is a very complex task which can stretch over a number of years, and it always involves intense competition. During the early stages, we're trying to influence the engineering firm hired by the transit authority. This can be five to 10 years ahead of time. Three years out things get very specific. By the time you start to dig, you've nailed down exactly what the system will be.

Our original concept back in 2014 was that the TRC should assume responsibility for all direct sales efforts in the transit market. It was to have its own sales force, and it would farm out contracts to the various divisions. The idea was to tie responsibility for transit activities to one person. This never came about because the divisions didn't trust the TRC—either in its ability to do a proper selling job or to act in a way that would serve their [the divisions'] individual interests. So our second approach was to restrict the Center to direct selling for new properties. This appears to have been too vague a role, so now we've got to rethink the whole thing.

Alex Roux is something of a paradox— that’s part of our problem. He’s outstanding on the promotional aspects of the job—e.g., press conferences, governmental contacts, getting study contracts, wooing politicians and consulting engineers. Hell, he knocked off both Battelle and Carnegie on one of his R&D contracts. But Louise Decelle, my marketing vice president, finds it hard to pin things down with him businesswise. He’s volatile, doesn’t like to get into the nuts and bolts. He’s great for the one-shot sale but we can’t give him overall line selling responsibility. For some of these contracts you have to work for months and years, and he simply loses interest if it’s not glamorous.

About a year ago I sat down and told him my feelings on this. I said, “Alex, you’ve got to decide whether you want to be manager or a promoter.” There’s nothing wrong with that. He has single-handedly created an image for CLT in several markets around the world, but I feel he has made the relationship problems among us, Railway Car & Equipment, and Aerospace Systems worse. These problems center around nuts n’ bolts issues and the details around field projects. The issues are a matter of poor attention to detail and conflict that simply goes unresolved. What else is there to being a manager? Alex would go into a district and not even let our district sales people know. Louise Decelle would be steaming because a lot of these contracts are politically charged. Olivier Lordes, vice president of marketing at the Railway Car & Equipment Division is extremely sour on the TRC, and he and Gerard Tuille now see a chance to use the overhead allocation as a bargaining point with headquarters. This could wipe out the whole TRC. Alex has handled the relationships with the French Transport Ministry as well as the various U.S. government agencies admirably, but his standing in the company is not good. Some of this is certainly built into the job. Maybe it should be solely a staff function.

Decelle made the following observations:

Interfacing between divisions is something relatively new in this company. Five years ago the Railway Car & Equipment Division’s businesses and customers were separate. Beginning with new transit projects and automatic car classification systems, things started getting more complicated. Olivier Lordes and I have been working very hard on this. We worked out a “province agreement.” For major contracts where this agreement doesn’t provide clear guidelines we negotiate who will be responsible for handling the hardware and who is responsible for presenting a face to the customer. Then, we usually set up a three-day out-of-shop meeting with our 20 key field people. On the first day we meet separately as divisions, on the second we have a joint meeting, and on the third he and I conduct individual sessions with each field person. I feel cooperation is improving greatly from both sides, but we’re still working from a meager base of tradition. More than once Alex Roux has undone half of our work by inadvertently stirring things up in the field. We just don’t need that.

Tuille was variously described by his peers and superiors as “extremely individualistic,” “headstrong and stubborn,” and “The Baron.” The comment referred to the large, sprawling facilities of the Railway Car & Equipment Division, presided over by an imposing eighteenth-century building (complete with wine cellar and executive offices decorated with paneling and furniture from a fifteenth-century chateau), which did little to dispel this image. Tuille was a tall man with a rugged face, thick white hair, and a white mustache. He frequently wore a black wool beret and cravate (scarf). He also had quite pointed views about corporate and divisional relationships. He had noted:

The capital allocation procedures here are not satisfactory. You submit a project and they cut it or whatever they feel like. The corporate people really take a rather short-

term view of things. There are no longer-term commitments of capital so that we know what we can do. This year the fund ceiling is much too low. The whole thing is based on the wrong measurements. It ends up being based on what money is lying around in the corporate till rather than what the business could productively invest or simply what's required to keep your head above water.

I think our division is the best cash generator in this company, and we've probably done the best job of managing working capital. And yet we have to fight like hell for funds. Don't get me wrong, we've ultimately gotten approval on almost everything we've needed. But it simply takes too long; they want to go over every nit-picking detail with us. Well, we figure out a way to live with it. Right now, for instance, I'm carrying out plant improvements that haven't been approved yet. Michel La Croix knows this; all he has to do is make peace with the board. I've got a pretty clear idea of what this business requires, and I do what's needed and we worry about the details later.

You know, the corporate people attempt to control things through their review and approval procedures. That is particularly true in the manufacturing area. It all adds up to too much interference, very little competent help, and a lack of understanding of our operations on their part. Until recently though, things haven't been all that bad. The corporation does manage by exception, and a lot of the corporate staff leaves us alone because they don't feel too comfortable up here. Even so, we still have trouble with people coming up here trying to tell us what to do. I guess you'd say we're a typical old, successful division that is trying to keep from being taken over by the corporate staff. We're introducing the management innovations that we know are needed, and we'd like to run the business with a minimum of interference.

The overhead allocations for the TRC are a case in point. For the €2.2 million we had to pay last year, we received a few conceptual pieces, a monthly newsletter, and the honor of having Alex Roux running around out in the field getting into our engineers' hair. This year Michel La Croix is squeezing the hell out of us. Fortunately, I've got one idea that will add about €2.1 million to our bottom line with virtually no effort.

Lordes elaborated on these comments as follows:

We sold about €110 million in the transit area last year. We got that business through our own capabilities and with the help of the C&C Division. That TRC expense produces virtually nothing for us, and with all the other capital projects that we're trying to fund in a lean year we'd like to get that charge off our back.

Alex Roux likes to wax philosophically about the future of the transit market and the need for quantum leaps in technological capability, but we've got our hands full modernizing and extending our existing facilities and product lines. When things start getting tight you have to decide where to place your bets, and quite frankly we're less than excited about wholesale investments in areas like the transit market with continual political in-fighting and recurring inability to fund large hardware orders.

Tremblay's Deliberations

Tremblay was well aware of the range of opinions concerning the TRC. Despite the Center's problems, he was convinced that the transit market would be an increasingly important source of revenues for CLT and that the company would continue to need some means of identifying opportunities and focusing its various capabilities in that area. He also knew that he had exactly three days in which to apprise La Croix of his position regarding the Center.

Exhibit 1 Selected Operating Data^a

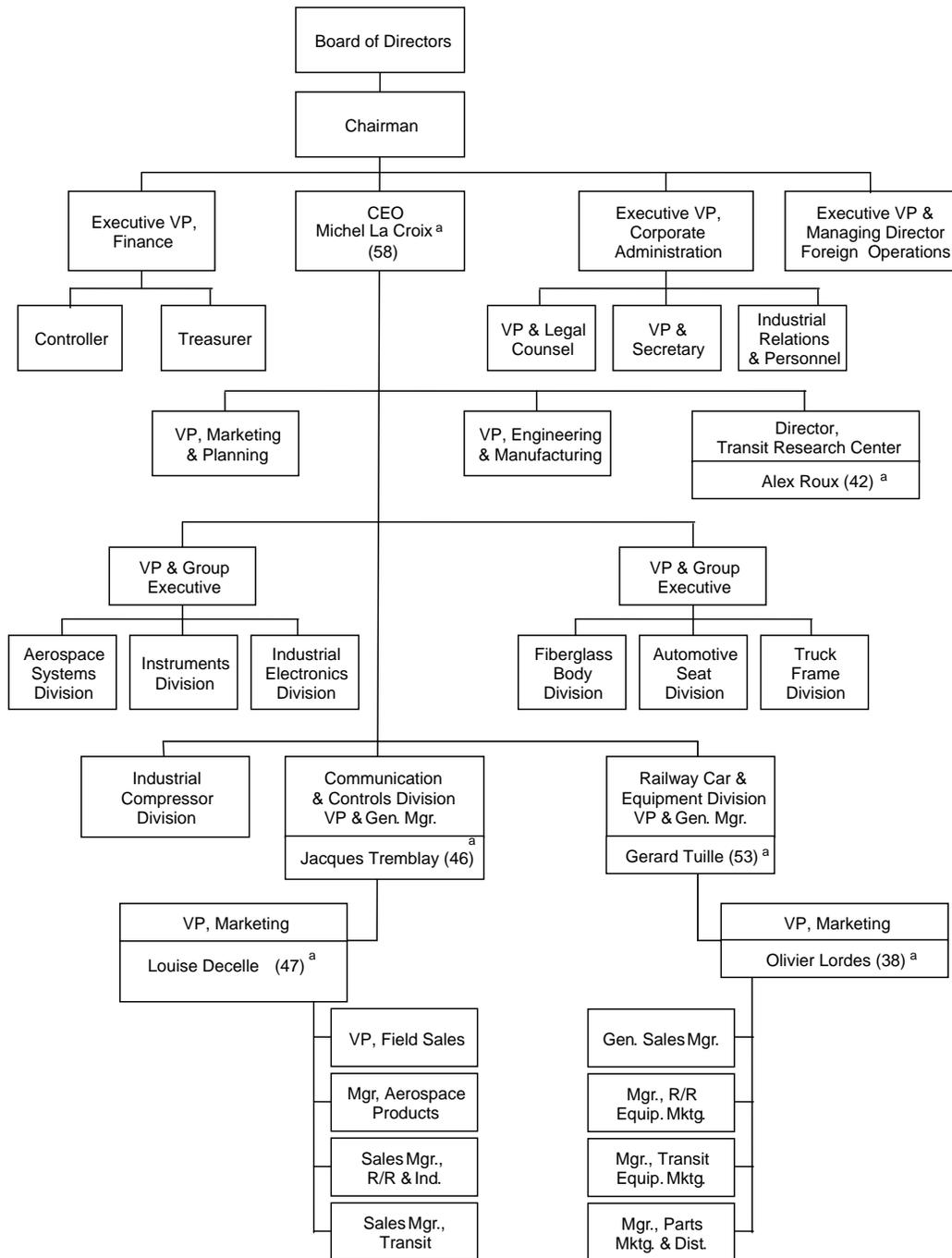
	2015 (est.)	2014	2013	2012	2011	2010	2009	2008	2007	2006
Sales (€ million)	3,252.8	3,304.2	2,927.4	2,707.5	2,574.1	2,109.9	1,817.5	1,989.4	2,235.9	2,201.7
Railway and transit (%)	27	30	29	29	25	27	30	31	NA	NA
Automotive (%)	29	29	29	27	24	26	26	26	NA	NA
Defense and aerospace (%)	24	18	19	22	33	26	24	32	NA	NA
General industry and other (%)	20	23	23	22	18	21	20	11	NA	NA
Net income (€ million)	128.0	179.3	138.7	129.1	100.4	88.6	88.6	81.2	121.7	93.9
Earnings per share (€)	23.5	39.9	31.0	30.3	23.5	21.0	21.0	19.4	28.9	22.4
Return on capital ^b (%)	38.0	59.0	47.3	54.3	44.2	40.4	41.9	38.8	59.0	45.8
Property and plant additions (€ million)	162.3	139.8	115.3	143.0	76.9	17.2	35.2	82.3	37.4	36.3

Source: Company documents.

^aFigures do not include a number of majority-owned foreign subsidiaries. Sales and net income of these operations for 2010 were €731 million and €33 million, respectively.

^bNet income + (Total assets - Current liabilities).

Exhibit 2 General Management Organization and Partial Division Organizations



Source: Company documents.

^aNames are included only for persons mentioned in the case. Numbers in parentheses indicate age of each executive.

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Exhibit 3 Product Lines of Three Divisions Most Closely Related to Rapid Transit Customers**Communication & Controls Division**

Primarily engaged in the design and manufacture of traffic control, signaling and communications equipment for railroads and transit systems. Also produces systems and components for aerospace, aviation and industrial markets—e.g., integrated circuit modules for aerospace applications, computer controlled flight simulations for jet aircraft, air traffic control systems, and control equipment for industrial plants. Division headquarters and main plant in La Mans. Two smaller manufacturing facilities in Lille and Grenoble.

Railway Car & Equipment Division

Design and manufacture of passenger rail cars for mainline, commuter, and transit service; automatic couplers and a wide variety of systems for control of braking and acceleration of railroad locomotives, freight, passenger, and rapid transit cars. Brake products range from simple components to a highly complex and completely automated freight train control system. Division headquarters and main plant in Lyon. A second plant is located in Paris.

Aerospace Systems Division

Engaged primarily in research, development, and production projects as prime and subcontractor for government agencies. Initially nearly all of this division's work was for military and space programs. More recently it has undertaken nonmilitary work including laboratory studies of solar energy conversion, health programs, and environmental testing. Also, currently engaged in study contracts involving the testing, instrumentation, and evolution of rapid transit equipment. Division also makes several products for commercial applications, including tuning forks and frequency standards, marking inks, flame photometric detectors, and a proprietary heat storage shipping container. Principal facilities located in Bordeaux.

Source: Company documents.

Exhibit 4 Excerpts from Promotional Piece Prepared by TRC for U.S. Marketing Efforts**THE BASIC PROBLEM****The Coming Verdict: Life or Death for the Cities**

Between 2014 and 2025, it is estimated that there will be an additional 50 million commuters thronging into American cities with populations over 100,000 and a similar set of figures prevails in Europe. This is causing a critical urban transportation crisis, and it's going to get worse.

Rapid transit enthusiasts suggest that the additional 100 million commuters could be carried in only 1,500 rapid transit trains, whereas it would require 10,000 buses or 40 million automobiles. They conclude that rapid transit systems are the only efficient way to carry commuters, because you have to “dismantle” the city to accommodate the required increase in automobiles.

At the opposite extreme is the idea that automobiles *alone* can transport the commuter increase. Some highly respected transportation planners feel that the central city concept is obsolete. They believe that the central city is *dying*, and that therefore there is no need for rapid transit systems.

Both views are misleading. The 50 million commuters do not settle in fixed “straight line” locations as in the past. They are so widely scattered that 1,500 rapid transit trains could not possibly serve them all, therefore millions will remain totally dependent on automobiles. On the other hand, there is mounting evidence that automobiles alone cannot do the job, especially in very large cities. For one thing, we're running out of places to put the cars.

A typical 700-car parking garage can cost €10 million excluding land, and serve 1,100 commuters—about half the number that can be carried in a single rapid transit train. Yet even worse than the high cost per vehicle space (€14,300) is the fact that the land is closed to commerce and removed from the tax rolls when publicly owned. Non-commuters visit cities because commercial establishments are plentiful, varied, and close together: but these conditions cannot exist if we devote too much land to the automobile.

The U.S. spends €100 billion per year on highway infrastructure. Since 1995, highway delays across the largest 68 metropolitan regions have nearly tripled. Airline flight delays have grown by more than 33%.

The cost of highway infrastructure has continued to grow as well. The cost of a recently completed freeway in LA was €155 million per mile. In contrast, a mile of high-speed rail track is estimated to cost only €10 million per track mile.

The downtown areas of some cities are already in danger of becoming an urban sprawl of streets, parking lots, and garages—in fact some cities now devote more than 50% of the downtown area to these purposes.

A mile of multi-lane expressway can consume 40 to 50 acres of taxable, revenue-producing real estate that could support stores, restaurants, and places of entertainment. Yet you can carry an equivalent number of commuters on a surface rapid transit system that occupies only 1/20 the real estate.

The need for large city rapid transit has been well documented. The purpose of this booklet is to discuss some of the practical realities of how to do it. Imaginative thinkers have come up with many provocative solutions, and we are all intrigued by the prospect of air-cushioned hovercraft, suspended monorail systems, gyrostabilized monorail units, magnetic guidance for rubber-tired vehicles, and totally automatic central computer control.

All these things are possible, and they're possible now. We know because CLT is deeply involved in advanced transportation concepts, as well as the microprocessor and optical communication. We have a sound knowledge of the present state of the art: no American missile has ever been fired that did not use CLT control components either in the air or the ground support system; and we are by far the leading supplier of transportation control equipment—not only in rapid transit and train control, but in such things as the complex remote and unattended pipeline control systems that use state of the art microprocessor-based controls.

It is one thing to have a component failure result in the launch-pad explosion of a €50 million missile, or require the manual override of a 3,000-mile pipeline. It's quite another thing to strand 10,000 commuters for a couple of hours, or run the risk of annihilating some of them.

To solve the rapid transit problem, brilliant concepts are essential. But in the end, it's the hardware that counts: the actual physical equipment that must withstand heat, cold, water, snow, vibration, abuse, negligence, or pure stupidity. As the world's largest manufacturer of rapid transit control systems, and with over 100 years of hard-earned experience, CLT is in a unique position to counsel planners who are grappling with the rapid transit problem. The CLT TRC has been established for this very purpose, and transit planners are invited to call upon the Center at any time for information and advice.

It is essential to retain a competent transportation consulting firm to plan and coordinate the engineering, financial, and economic phases of a modern rapid transit system. However, in the areas of train protection, control, braking systems, and propulsion power control, the CLT TRC can furnish valuable information and advice.

The CLT TRC, located in Lyon, pools the knowledge of the CLT team who have both state of the art transit systems knowledge and a solid background of practical experience.

CLT has never constructed rights-of-way nor furnished propulsion power and distribution systems. It does design and build cars. More importantly, we are concerned with the *control* of these things, and are prepared to design to any degree of sophistication for any type of vehicle that operates over an exclusive right-of-way. Our specific areas of interest are:

1. Automatic propulsion and braking control systems.
2. Integrated collision prevention systems.
3. Remote and automatic traffic control.
4. Remote control of vehicles.
5. Crewless vehicle operating systems.
6. Magnetic levitation systems.
7. Automatic routing systems.
8. Centralized computer traffic control.

9. Automatic vehicle storage and retrieval systems.
10. Wireless voice and data communications.
11. Automatic fare collection systems.
12. Passenger-control loading systems.
13. Automatic car coupling systems.
14. Remote monitoring and display systems.
15. High speed, automatic vehicle identification systems.

These are simply the major areas of interest for CLT. However, we willingly undertake concept studies on *any* phase of rapid transit control.

Some Accomplishments in the CLT World of Transit

1. First automatic fail-safe brake system.
2. First transformer produced in the United States.
3. First practical semi-conductor – the copper oxide rectifier.
4. Vacuum tubes for train control – first use outside the radio field.
5. Introduced 100-mph car identification system.
6. Introduced first hand-size special-purpose digital computer readout indicator.
7. More miles of pipeline control systems than any other manufacturer.
8. Pioneered microwave multiplex traffic control systems.
9. Introduced first composition brake shoes for smoother, safer stopping.
10. Produced first completely automatic car classification yard with closed-loop radar-sensing computer-determined output and remote servo-operated speed control and switching.
11. Designed microcomputer relays in every French missile launch.
12. Co-engineered first crewless rapid transit train in revenue service.
13. World's largest manufacturer of rapid transit control systems.
14. World's largest manufacturer of centralized traffic control systems for railroad.
15. Supplier for by far the majority of control equipment for Paris, London, New York, Chicago, Boston, Lyon, and Stockholm rapid transit lines.
16. More than 100 years' experience in transportation braking.
17. More than 100 years' experience in train protection, signaling, and control.

Source: Company documents.

Exhibit 5 2014 Budget for TRC

	2014
Salaries and fringes ^a	€2,140,000
Advertising and promotion	1,244,000
Capital Equipment (Demo Center)	590,000
Travel	481,000
Other expenses ^b	<u>646,000</u>
Total	5,101,000
Less: Reimbursed expenses and operating profit on study contracts	<u>481,000</u>
Amount allocated to divisions	€4,620,000

Source: Company documents.

^aIncludes Roux, 3 market researchers, 1 competitive analyst, 1 promo/communications specialist, 1 system planning consultant, 1 librarian and 1 secretary.

^bIncludes supplies, library, corporate, and interdivisional charges, external consultants and research.