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Redesigning the Commercial Organization of CSX: An Organizational Portfolio Analysis

In 2001, CSX Corporation (CSX) reorganized the structure of its merchandise commercial group from separate groups managing each commodity-based line of business to a more functionally structured organization. The move was intended to provide greater controls and expertise required to compete successfully in a new, post-merger environment. This paper details the former and redesigned organizational structure of CSX's railroad business. It also describes the study and analytic techniques used to support the change. Organizational Portfolio Analysis is used to examine the interconnections among the external markets and the performance fluctuations of each line of business, in order to better comprehend management's challenges, as well as to examine the internal interconnections among the lines of businesses to distinguish between areas of autonomy and synergy.

by **Larry A. Shughart and Lex Donaldson**

INTRODUCTION

In 2001, CSX reorganized its merchandise commercial group to provide a foundation for aggressive revenue growth and increased market share. Over the last 20 years, railroad companies have frequently used changes in organization structure as one of the tools to help them better explore business models and exploit the opportunities presented by deregulation, consolidation, and technology.

The purpose of this paper is to explain CSX's major commercial reorganization restructuring in 2001, and how it was optimized by the use of organizational portfolio analysis (OPA).

ORGANIZATIONAL REDESIGN

The optimal structure for a company's organization depends on the interconnections and interactions among its component parts, i.e., its different business units and their markets. These interconnections have internal and external dimensions. The internal interconnection is the interdependence among the day-to-day activities required to manage

the lines of business or the common responses that may be implemented as a result of changes to external conditions (Thompson, 1967). For example, two business units within a company may be internally interdependent because they share the same inputs or operational equipment. Business units within a company may be externally interdependent because they serve related or complementary markets. Market fluctuations may be synchronized or countercyclical to the performance fluctuation of the company as a whole. These internal and external connections influence a company's organizational design as company leaders seek to structure their businesses in a way that best equips managers to meet the day-to-day challenges that result from the internal and external connections.

Where two business units of a corporation are interdependent, there are likely to be gains in economies of scale by combining them under one organization with shared functions, such as marketing, sales, customer service, etc. (Rumelt, 1974). Where two business units are independent, they will likely gain focus, innovation, speed, and

customer responsiveness by being separated into different divisions (Galbraith, 1973). However, many companies have business units that are at intermediate levels of interdependence, i.e., their businesses are related in that they share either inputs, operational equipment, operational personnel, technology, etc. At this intermediate level of interdependence, the owning company has a choice of whether to adopt a functional or divisional organization structure. Where a company wishes to minimize costs and gain other benefits of strong functional controls, it should adopt the functional structure at the highest levels of the organization, i.e., the whole company (Donaldson, 1985). The company can also design more subtle organizational structures at lower levels in the hierarchy (Corey and Star, 1971). Thus, within a part of the company, a more functional or more divisional design may be used to increase effectiveness and match the level of interdependence and strategic thrust.

OPA is a useful tool for investigating the external interconnections among different business lines of a company (Donaldson, 1999). As supply and demand fluctuates over time in each market, each business line will show fluctuations in performance. Sharply fluctuating performance creates challenges for the business managers striving to deliver consistent and improving results from year to year. Managers will make changes to adapt their business line to a changing environment. The performance fluctuation from one business unit may synchronize with that of the other business unit in a company. The result is fluctuating performance for the company as a whole, which interferes with management's ability to deliver consistent results. Thus, a company's organization can be viewed as being a portfolio of business lines, each with distinct performance fluctuations. OPA examines the degree of performance fluctuation for each business line relative to the company's performance fluctuation. The analysis also quantifies the degree to which a business line performance is synchronized with the company's overall performance and uses that index as an input to the analysis.

OVERVIEW OF ORGANIZATIONAL PORTFOLIO ANALYSIS

In finance, portfolio theory holds that the variance (i.e., fluctuation over time) of the performance of a set of stocks in a portfolio is determined by the variance in the price of each stock and also the covariance between them (Brealey and Myers, 1996). Stocks with larger variances have less dependable returns and thus a higher risk. Conversely, stocks with lower variances have returns that are more dependable and are less risky.

A company's organization can likewise be seen as a portfolio. It contains a number of assets, each with its own returns, risks, and correlations with the other assets, which interact to produce overall return and risk for the company (Amihud and Lev, 1981; Hoskisson, 1987; Miller and Leiblein, 1996). Organizational portfolio theory holds that the fluctuation in the performance of an organization is determined by the fluctuation in the performance of its business lines (e.g., divisions) and the correlations between them (Donaldson, 1999, 2000). The degree of fluctuation in the performance of the entire company may be termed the organizational risk, and the degree of performance fluctuation of a division may be termed the divisional risk (Donaldson, 1999) because these fluctuations indicate the dependability of profit or returns.

Finance assesses risk by using the beta coefficient to measure the degree to which a stock fluctuates in its value over time relative to the fluctuations in the value of the stock market (Brealey and Myers, 1996). Analogously, organizational portfolio theory proposes the concept of a divisional beta coefficient as being the degree of fluctuation in the profitability of a division relative to the fluctuation in profitability of the company over the same period (Donaldson, 1999). Thus, by examining the beta coefficient of each business line, OPA can illuminate the risk profile of each business line.

OPA can also be applied to assess the adaptability of individual business lines. Research has shown that organizations which need to make adaptive changes to fit within

their environmental situation often fail to do so until their performance drops to a low crisis level (Chandler, 1962; Ezzamel and Hilton, 1980; Donaldson, 2001). Thus, OPA posits that a division whose performance does not periodically fluctuate to low levels may remain maladapted and so be suboptimal because crisis does not occur (Donaldson, 1999). In contrast, fluctuating divisional performance facilitates divisional adaptation, leading to long-term growth and success. A similar effect applies for the corporation, in that corporate performance fluctuations drive corporate-level change. Corporate performance fluctuations (i.e., organizational risk) arise from the fluctuations of its divisions (i.e., divisional risk) and their correlations, whereby positively correlating divisional fluctuations reinforce each other and negatively correlating divisional fluctuations counteract each other. Using the beta coefficient measure, OPA can be used to assess a business line's propensity to become suboptimal rather than to adapt. In addition, by revealing the similarity or difference between the performance fluctuations of business lines, the OPA gives information about the degree to which the dynamics of various business lines are similar or different. This comparison of business-line performance adds to the information available from more conventional operations/management-type analyses of common resources, technologies, etc., in assessing whether businesses should be combined or kept separate. Furthermore, by examining the extent to which the performance fluctuation of each business line is synchronized with that of the company as a whole, OPA can shed light on the nature of the challenges posed to management.

As a result, OPA can be used to make recommendations about the organizational structure of a company based on the analysis of its separate business lines. Using the results of OPA, a company may conclude that a business line exhibiting high volatility is relatively adaptive and so should be maintained as a separate unit; business lines that are highly synchronized may benefit from merging and sharing functional resources. Thus, this paper focuses on reporting the

results attained in deploying OPA to a railroad company case and on how the results were used by the company to help guide its reorganization. The information is being shared in the hope that other companies and organizations may use OPA as a tool to help them in their endeavors.

Organizational portfolio theory is one of some complexity (Donaldson, 1999), and a thorough study would involve considering a wider set of variables than those considered in this paper. Similarly, organizational portfolio theory entails many propositions and hypotheses (Donaldson, 1999, 2000). This paper is not a test of the theory; however, it presents the first operational case study and empirical exploration of two of the key concepts of organizational portfolio theory: the business line beta coefficient and the synchronization between the performance fluctuations of the business lines and the company. This paper, therefore, is a necessary step in the evolution of organizational portfolio theory research, focusing on the application of the idea of an organizational portfolio to a specific company case.

ORGANIZATIONAL DESIGN OF THE CSX RAILROAD¹

Applying the concepts of interconnections to railroading reveals interdependent operations. A common set of trains and cars operate on a single set of tracks connecting geographically diverse customers. Railroad operations are run in one integrated organizational structure that is internally specialized by function. However, while the core of operations has this unitary characteristic, the external connections the company faces with its customers and markets are very diverse. Consequently, railroad corporations generally have functionally designed operating departments while the organizations that interface with the customers tend more toward divisions by markets. An examination of "*The Pocket List of Railroad Officials*,"² an industry directory of railroad managers for all North American Railroads, shows the vast majority of operating department leaders have titles such as "VP Locomotives," "VP Engi-

neering,” “VP Terminals,” etc. Conversely, railroad commercial department leaders have titles such as “VP Coal,” “VP Merchandise,” “VP Intermodal,” etc.

However, there are some types of activity that are less connected to the core railroad. These operations can be structured more autonomously, introducing a greater degree of divisionalization. CSX exploited this model in their creation of business units (i.e., divisions) in the early 1990s. Separate business units were charged with managing costs, revenue, and to some extent, the overhead and strategy associated with four major CSX markets: phosphate/fertilizer, intermodal, automobile, and coal. The other CSX markets are characterized as having single-car shipments that move together through the railroad network. These smaller markets are collectively termed merchandise and are essentially the core railroad.

OVERVIEW OF CSX MARKETS

Before applying OPA to the CSX case, it is important to understand the different commodity markets and business lines that make up the CSX portfolio. Variations in performance of each of the businesses may be attributed to changes in the external market, changes in competitors’ strategies, and the responses of the business managers to those challenges. Later in the analysis, we will quantify the divisional beta for each of the CSX business lines, recognizing that the performance results represent a combination of both the exogenous market influences and the internal management responses.

In the following overview of the CSX business lines, we characterize the interdependence of each business line with the core network and note the external market trends.

Fertilizer Business Unit (FBU). Formed in 1992 to serve the phosphate and fertilizer market using dedicated tracks and equipment in Florida’s Bone Valley, the FBU transported phosphate rock from the mines to Tampa’s export docks or to local factories that process the raw material into agricultural fertilizer. The concentration of assets, customers, and

traffic flows in a small area created a unique opportunity within CSX to isolate a piece of the business and promote an entrepreneurial zeal similar to that demonstrated by short line railroads.

Intermodal Business Unit (CSXI). The CSXI business unit managed the transportation of truck trailers and containers on flat cars, a distinct market from the rest of the CSX railroad. CSXI possesses terminal and equipment assets that are solely dedicated to its operations. While it did use the core railroad tracks and locomotives, CSXI had distinct operations and personnel, so that some aspects of the business unit were not highly interdependent with the core. Further, CSXI had distinct customers with special needs. Hence, the interdependence of CSXI with the core railroad was only intermediate. In order to gain benefits, such as responsiveness to customers, it was strategically appropriate to constitute CSXI as a division with its own management and profit center in 1987. CSXI operating functions included terminals, car management, service design, network operations, and customer service. Additionally, CSXI contained its own administrative functions of finance, law, human resources, and planning. Thus, CSXI was able to act with considerable autonomy and was held accountable as a profit center with its own profit and loss statement.

Automotive Business Unit (ABU). The automotive business line includes the transportation of finished autos, trucks, and SUVs, and the transportation of parts and sub-assemblies from the point of manufacture to the final assembly plant. The business unit was much like CSXI in design, in that it had terminal assets and rail cars, but no line-haul routes. ABU organizationally was a division with its own management and income statement. In addition to having its own sales and marketing functions, the ABU included operating functions, such as car management, service design, operations staff, and terminals.

Coal Business Unit. The coal business unit (COBU) was implemented soon after the evident success of the FBU. While it was on a much larger scale than the FBU, the COBU was designed to closely link commercial and

operating functions and decision making around the common goal of maximizing the profit of the coal business. The COBU assets included the routes of the former C&O Railroad (now owned by CSX) as well as tracks, terminals, and piers.

Unlike the FBU where more than 95% of the traffic was in the phosphate and fertilizer market, the COBU had a significant amount of non-coal traffic in its territory. In addition, most of the utility coal and industrial coal destinations were located outside of the COBU territory. The COBU management team was regularly challenged by the need to balance the needs of the non-coal businesses against its mandate to maximize the profit of the coal operations. In addition, the COBU managers had to influence the operations managers on the core network to give good service to the coal trains once the trains left the COBU territory. The COBU was not entirely successful, as might have been predicted from its greater interdependence with the rest of the railroad.

The Merchandise Commodities. There are seven business lines that constitute merchandise:

1. Chemicals line: raw materials and intermediates.
2. Paper and forest line: pulp wood, paper, plywood, paneling, and lumber.
3. Minerals line: stone and aggregate used in construction.
4. Metals line: scrap and intermediate products moving to and from steel mills.
5. Agriculture line: grain, feed ingredients, vegetable oil, corn sweeteners, etc.
6. Food and Consumer line: perishable fruits, vegetables, appliances, and other manufactured goods.
7. Government line: specialized moves of ammunition and explosives, rocket motors, and tanks.

For the most part, merchandise commodities move as carload freight. The rail cars all share common local trains, classification yards, and through trains. However, when volume warrants, or when customers are willing to pay a premium for better service, pieces of the business will move in dedicated unit trains, which nevertheless move on the

unified track system and use common equipment. Thus, railroad operations in the merchandise commodities are highly interdependent with each other and together represent CSX's core operation. Accordingly, the merchandise organization is geared toward providing the least autonomy for each commodity.

Before 1998, the merchandise business lines were managed as a single commercial entity with its own sales and marketing managers. Unlike the other business units, merchandise did not have its own operating function or its own administrative functions. Each commodity group contained a mixture of sales and marketing personnel. Over time, different roles blended to the point where some individuals handled all pricing, marketing, and sales decisions for specific customers and/or specific segments of a market. This structure was oriented toward flexibility in dealing with the sales-marketing idiosyncrasies of each commodity and its market. However, disadvantages included a lack of overhead cost control because of loss of scale economies and a lack of strong functional disciplinary inputs into decision-making, such as future growth strategies and pricing.³

CONRAIL ACQUISITION AND SERVICE GROUPS

With the advent of the Conrail Merger in 1998,⁴ the merchandise business lines, along with the FBU were formed into the Merchandise Service Group, containing the operating functions of customer service, car management, service design, and an operations staff. It also became accountable for profit with its own income statement. This reorganization made merchandise a division equal to intermodal, auto, and coal, with the potential to be more autonomous than it had been. The latter three business units, already rather autonomous, were given even more independent authority and renamed as service groups as well. However, the service group structure did not work as well at CSX as it had at the former Conrail.

The CSX network forms a spider web across the entire eastern United States. This dense and complex network resulted in much more interdependence of operations between the four, rather equal, CSX service groups. Subsequent management challenges that resulted from the internal conflicts between the service groups contributed to deterioration in service and a dramatic increase in railroad congestion.⁵

COMMERCIAL ORGANIZATION STUDY

In July 2001, CSX leaders looked to reorganization as a potential tool to improve the effectiveness of the business line managers: internally, as the business leaders struggled with the reality of the integrated railroad operations; and externally, as they interfaced with markets, customers, and competition. A formal study team was commissioned with the charge of scientifically assessing commercial organization alternatives. CSX executives wanted to better understand commercial employee management strategies, performance measures, and process differences that may contribute to the design of organizations. Furthermore, the leaders stressed that the

analysis should contain both empirical and quantitative assessments to avoid a change-for-change-sake situation.

Detailed organizational benchmarking studies of two other Class I railroads, two major trucking companies, two CSX suppliers, and two CSX customers led the team to conclude that the group of non-rail companies had much more functional organizations than typical in the railroad industry. Table 1 summarizes the differences in structure between the rail and non-rail companies included in the benchmarking study.

For the non-rail companies, each functional group had a singular mission and was staffed by experts in that activity. There was clear delineation between marketing, pricing, sales, and post-sales customer service. This division of duties allowed people to focus on their respective parts of the commercial equation and exploit their talents without having to be distracted by other responsibilities.⁶ With the empirical evidence pointing to the possibility of a more functional organization at CSX, the study team turned to OPA to validate that assertion with a quantitative analysis.

Table 1: Differences in Organizational Structure Found as a Result of Benchmarking

Category	Rail Companies	Non-rail Companies
Pricing Authority	Collaborative, consensus decision	Strong, central authority
Roles & Responsibilities	Sales-marketing-pricing roles are blended	Different functional roles are clearly defined
Field vs. Headquarters	Small field staff	Large field presence
Sales and Marketing Staff	Relatively fewer	Relatively more
Growth Actual & Expected	None – Marginal	8% – 10%

APPLICATION OF ORGANIZATIONAL PORTFOLIO ANALYSIS AT CSX

CSX applied OPA by viewing CSX as a portfolio comprising 15 business lines. The fluctuation of the performance of each business line was compared with that of the whole company to understand the performance dynamics of the portfolio and its parts. The line of business (LOB) beta coefficient captured the degree of fluctuation of the performance of each business line relative to the overall railroad company's performance.

Organizational portfolio theory uses the performance variable crucial to the management of the company; the metric that drives managers' decision making. Typically, if this performance variable drops below the satisfactory, i.e., acceptable level, management perceives a problem and takes action (Simon, 1976). In many companies, the key performance variable is profit. At CSX, operating profit of the different business lines is measured by contribution. Contribution is total revenue less long-term variable costs (i.e., costs directly attributable to a business line). CSX internal costing systems include directly associated costs to each specific move: fuel, switching, and car rents. Economic costs, such as equipment wear and tear, track degradation, and train crews are also deducted. Some indirect costs are included in the contribution calculation as factors that are derived from allocating the total cost of those support functions to the various moves. Examples of allocated costs include customer service, technology, and accounting. In total, 70% of the total CSX cost structure is deemed variable and attached to the specific revenue moves. Previous internal CSX analysis concluded that total CSX contribution had a correlation coefficient of 0.93 with net operating income over a 10-year period.

Contribution is a major factor affecting decision making by CSX management; Contribution is measured for each year, and therefore, despite the existence of seasonal or quarterly fluctuations and changes in annual performance, annual contribution was the appropriate focus for the CSX OPA.

Contribution statistics are well understood by all CSX constituents, accepted as a credible measure of performance, and consistently calculated over time. They are not affected by special charges, the status of the ratio of debt to equity, or other external impacts to the corporate income statement.

We measured the LOB beta coefficient for each CSX business line by comparing fluctuations in that line's contribution over 1997 to 2001 relative to fluctuations in total company contribution over the same five-year period. We first regressed the contribution of a business line against the total contribution of the company to find the slope coefficient. This coefficient gives the sensitivity of changes over time in business-line contribution relative to changes in company contribution. Because total company contribution is much greater than the contribution of any single business line, these variables have different scales. Therefore, if only the slope coefficient was used as the LOB beta coefficient, the measure would be a small decimal figure lacking intuitive meaning. For example, the agriculture business line contribution represents around 5% of the company contribution resulting in agriculture having a small decimal slope coefficient. To correct for the scale difference, the five years of data (for each business line contribution and company contribution) were re-expressed as variations about their respective means. This could have been done by dividing each annual observation by the mean for that variable and then entering it into the regression. However, a mathematically equivalent procedure is to take the slope coefficient of businesses line contribution on company contribution from the regression, and then multiply it by the ratio of the means of company contribution and business line contribution. The latter procedure has the benefit of rendering the LOB beta coefficient as a number that ranges around one. If, over the five years, the degree of fluctuation of a business line's contribution (relative to its mean) was the same magnitude as the degree of fluctuation of company contribution (relative to its mean), then the LOB beta coefficient would have the value of 1.0 as,

for example, is the case for agriculture business line.

Moreover, because business lines differ in the magnitudes of their contributions, their slope coefficients would not be readily comparable with each other, which would vitiate a major objective of the analysis. For example, the slope coefficient of chemicals is 0.170, which is three times greater than the slope coefficient of agriculture (0.059). However, this difference is due to the greater magnitude of chemicals' contribution, which is about three times that of agriculture. In finance, risk is variation about the mean (Brealey and Myers, 1996), which controls for differences in magnitude (i.e., scale). Similarly, we are seeking to measure volatility around the mean, rather than the raw magnitude of changes. When chemicals' contribution is re-expressed relative to its mean, the variation in its annual contributions is 21%, which is similar to that of agriculture, 23%. Hence, removing scale differences, chemicals is about the same volatility as agriculture. When the slope coefficient is corrected for scale differences, the LOB beta coefficient for chemicals is 1.0. This shows that chemicals has the same sensitivity relative to fluctuations in company contribution as has agriculture, which also has a LOB beta coefficient of 1.0. Thus, by standardizing for scale differences, the beta coefficients of the lines of business become comparable.

Since the coefficient is a measure of relative fluctuation, it is consequently a measure of relative risk. Since it is similar to a ratio, with the fluctuations for the business unit in the numerator and the company as a whole in the denominator, an LOB beta coefficient of 1.0 indicates that the business market has the same level of risk as the company.

An LOB beta coefficient of more than 1.0 indicates that the business line's contribution fluctuates more than that of the company as a whole. This implies that the business line is more likely to adapt to market conditions (since fluctuating performance promotes adaptation) but that it is riskier than

the company as a whole. Also if the synchronization index, as defined below, is non-trivially positive, then the line is likely to be missing opportunities to reduce costs through synergies with other divisions. A tradeoff may have to be made between maintaining adaptability by remaining as a separate unit and taking advantage of economies of scale by combining with another business line.

An LOB beta coefficient of less than 1.0 indicates that the business line is less risky than the company, so that the business line is decreasing the overall risk of the company. However, because of its limited fluctuations in performance, as noted above, it is more likely to remain maladapted to external market conditions.

The synchronization index (SI) captures the degree to which a business line's contribution fluctuates in synchronization with, and therefore reinforces, the contribution fluctuations of the whole company.⁷ To compare the fluctuations in the contributions of a business line, the contribution for each year is divided by the mean over the five-year period for that business line and expressed as a percentage, e.g., the mean level is 100%. The SI is the degree of positive correlation between the business line's and company's contributions. A negative SI signifies that the business line's contribution is countercyclical to that of the company.

For calculating the LOB beta coefficient, at least several years of data are required to capture fluctuations over time in business line contribution and company contribution. However, it would be inappropriate to use too long a time period because the beta coefficient would no longer hold since the sensitivity of the fluctuations in business line contribution to fluctuations of company contribution may have shifted. For this analysis, we were restricted to using at most five years of data. Each year, CSX restates contribution figures for the previous five years using the current year's cost basis in order to have a database of comparable statistics to support a variety of trend analyses.

Table 2: Results of Organizational Portfolio Analysis

Business Units and Lines	LOB Beta Coefficient	Synchronization Index
Merchandise		
Metals	0.4	+0.82
Minerals	0.4	+0.60
Paper	0.5	+0.77
Phosphate	0.2	-0.44
Agriculture	1.0	+0.95
Chemicals	1.0	+0.96
Food & Consumer	2.1	+0.95
Government	2.5	+0.95
Intermodal		
Premium	5.5	+0.98
International	3.3	+0.95
Domestic	2.5	+0.65
Automobile		
	2.6	+0.97
Coal		
Export	1.9	-0.89
Industrial	0.1	-0.25
Utility	0.8	+0.75

CSX OPA CASE STUDY RESULTS

Table 2 reports the results of the organizational portfolio analysis, listing each of the 15 business lines’ LOB beta coefficient and synchronization index. Within merchandise, the metals and minerals business lines both have low LOB beta coefficients of 0.4; paper has a coefficient of 0.5. The contributions of these three commodities only fluctuate about half as much as the company overall.

Similarly, the phosphates and fertilizers (PF) business line has a very low LOB beta coefficient, 0.2. Thus, four of the eight merchandise service group commodities have low contribution volatility. The fluctuation in contribution over the five-year period from 1997 to 2001 is shown for metals, as compared with the whole company, in Figure 1. It can be seen that metal’s contribution is more stable than that of the company.

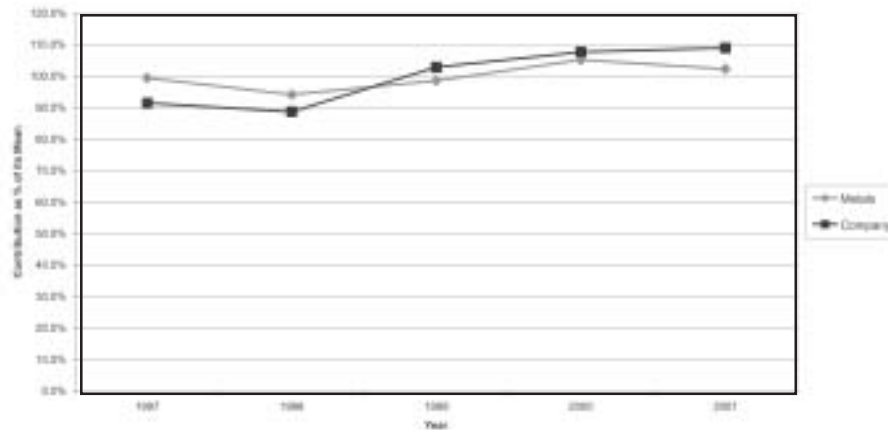
Agriculture and chemicals both have LOB beta coefficients of 1.0 and so their contributions fluctuate to the same degree as the company overall.

Only two merchandise lines of business have LOB beta coefficients of more than 1.0: food and consumer has a coefficient of 2.1 and government 2.5, indicating that their annual contribution fluctuates over twice as much as the company overall.

As a group, the merchandise lines of business would be classified by organizational portfolio theory as “stability leading to lack of adaptation” (Donaldson, 1999); meaning that, due to the relatively stable contribution levels, corporate-level management will tend to overlook problems in these business lines and neglect to induce changes that lead to adaptation.

This view is reinforced by the fact that the fluctuations in the performances of the merchandise lines of business are synchronized with the performance of the company

Figure 1: Performance Fluctuations of Metals versus Company



as a whole. With the exception of the phosphate/fertilizer business line, the merchandise lines all have substantial positive synchronization indices, ranging from +0.60 (minerals) to +0.96 (chemicals). Therefore, when any one business line has low performance, the company as a whole would also, so that unsatisfactory company performance would spur corporate leaders to prompt remedial action in the business lines.

The merchandise business lines are all positively inter-correlated (mean of +0.72 with the exception of the phosphate/fertilizer market). Therefore, almost all the commodities (seven out of eight) would have low-performing years if the company were in a low-performing year. As a result, the leader of the merchandise group would have to deal with seven ill-performing business lines simultaneously. Given the bounded rationality of managers (Simon, 1976), i.e., limitations of time, energy and knowledge, the merchandise leader would be unable to intervene productively in all these commodities. Therefore, the low and synchronized volatility of the business lines rendered them prone to maladaptation, as was evidenced by the problems with suboptimal marketing, pricing, and market innovation revealed by the qualitative analyses.

As a result of the study team's findings (low volatility and high synchronization), CSX decided to reorganize the merchandise lines around a more functional organization. Instead of each manager dealing with a single commodity but expecting to be an expert in all facets of the commercial relationship, each manager would now deal with a diverse array of commodities by specializing on one aspect of the business, i.e. marketing, sales, pricing, customer service, etc. It was hoped that each manager would become more productive and effective as they specialized by work activity. It was expected that the merchandise business lines would be less prone to maladaptation as they were supported by stronger functional capabilities.

As explained in more detail below, analysis of the intermodal and automotive business lines revealed high volatility and

positive synchronization across the two divisions. This indicated that CSX would benefit by combining them into one unit organized in a more functional structure.

The coal division, however, was found to have an intermediate level of volatility and varying synchronization across its three business lines, indicating that it already exhibited the appropriate level of autonomy and that it would be most beneficial to maintain its organizational structure.

CSX REDESIGN AND IMPLEMENTATION

Overall, CSX retained the divisional aspects of its structure, in that the intermodal, coal, and merchandise business lines remained in existence. The automotive business lines were grouped with the intermodal business lines because of their high synchronization. Merchandise was reorganized from being internally specialized by commodities to being organized by functions in order to make it less prone to maladaptation. On Oct. 24, 2001, CSX announced a new organization structure for its merchandise group. The new structure aligned employees around their functional duties rather than their market specialties. Recall that the old organization held leaders responsible for all aspects of a commodity group: sales, marketing, pricing, planning, forecasting, etc. The new organization had seven vice presidents each assigned to a separate function: core sales, field sales, system marketing, emerging markets, pricing and yield management, market performance, and process transformation. Operational, service design, equipment, and overhead activity were turned back over to the central operating functions.

The OPA showed CSX executives that aligning talent by function rather than by commodity would give customers the benefit of an account team made up of experts at their respective responsibilities rather than multi-tasking individuals. The realignment of the sales support functions was designed to release the sales force to spend more time addressing customer needs and designing

cost-effective transportation solutions.⁸ As demonstrated in the benchmarking study, the sales team was divided between a centrally located group focused on managing the largest accounts, while the field sales team was responsible for small, medium, and new accounts. Sales people at CSX became focused solely on selling value; selling rail logistics solutions; managing a major customer set; and identifying, cold-calling, and converting new non-rail customers.

The process transformation function was designated as the commercial representative and clearing house for all of the activity associated with cross-departmental strategy and improvement teams that distract resources and focus away from the day-to-day duties of sales and marketing. Designating one group to lead all of these efforts also ensured consistency, continuity, and proper trade-offs among all of the competing technologies and constituencies. The process transformation group was also charged with the training and development of the commercial staff as they entered new roles and employed new processes.

Pricing responsibility was given to a separate group responsible for maximizing yield and contribution. This group was to manage strategy development and execution for price in close coordination with sales and marketing. The pricing team was given clear expectations by senior management, including implementing strategies to maximize price, persuading the organization to take risk, simplifying current price models, engaging interline partners, and developing yield strategies to maximize revenue.

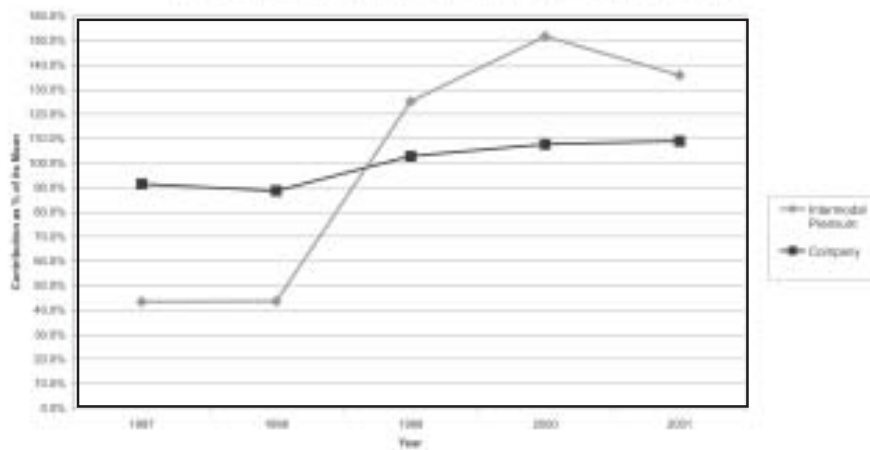
The system marketing group needed to develop fundamental skills and processes that appeared to have been lost or downplayed during successive strategy and organizational changes. Many of the textbook activities of a marketing function were no longer being executed well in the divisional structure. CSX leaders saw a need to improve marketing ability to identify and prioritize growth opportunities, develop strategies and markets, identify and communicate value drivers, and advertise and promote markets.

The market performance team manages the post-sales customer experience. The organization included customer service and the interface to field operations. The goal was to develop a “zero-defect mindset” in operations to support growth. This group was to closely interact with service design and car management, both of which were repositioned in the organization to report to the operating department.

CSX cordoned off several specific lines of business due to their future growth potential. The resulting emerging markets included large farm machinery, government, municipal waste, auto shred (the nonmetallic refuse resulting from recycling old automobiles), and the rock runners (short haul unit trains of aggregates previously handled in the minerals group). Cultivating business relationships with these customers involves commercial, environmental, industry, municipal, and regulatory expertise not usually encountered in traditional rail transportation. To be successful, the emerging markets unit was designed to be entrepreneurial and high-growth oriented, with a goal to significantly increase market share.

The OPA found that, in contrast to the merchandise business lines, intermodal contribution was highly volatile, as indicated by the high LOB beta coefficients of its three business lines all being much greater than 1.0: 2.5 (domestic), 3.3 (international) and 5.5 (premium). Figure 2 shows the fluctuations of contribution of the intermodal premium business line compared with the whole company. It can be seen that intermodal premium’s contribution is much more volatile than that of the company. Moreover, the performances of the three intermodal business lines are highly correlated with each other (mean inter-correlation of +0.83), so that they reinforce each other. Therefore, CSX’s performance fluctuates much more than that of the company as a whole. Furthermore, the performances of the intermodal business lines are strongly synchronized with that of the overall company, as found by their synchronization indices of +0.65, +0.95 and +0.98, respectively. Therefore, the annual fluctuation

Figure 2: Performance Fluctuations of Intermodal Premium versus Company



tuations in CSXI's contribution are tending to amplify those of the company and increase its overall risk. The great fluctuations (as indicated by the high LOB beta coefficients), synchronized with those in company performance (as indicated by the high SI's), encouraged company leaders to leave CSXI as a separate business unit so the CSXI managers could take adaptive action to attune CSXI to its markets. However, this autonomy comes at the expense of cost-reducing synergies within the core operations.

In the OPA terms, the automotive business line is like the intermodal lines, in that its contribution fluctuates greatly, with a LOB beta coefficient of 2.6. Moreover, the contribution of the automotive business line correlates considerably with the three intermodal business lines (+0.50, +0.89 and +0.93, respectively). Thus, the automotive line's contribution fluctuates in harmony with that of the intermodal lines. Therefore, we would expect a combined automotive and intermodal division to experience large fluctuations in contribution. The combined division would be adaptive and benefit from sharing functional resources. The nature and timing of the performance management challenges will be similar across the business lines, which will assist divisional management in identifying trends and finding commonalities in solutions. Because there are only four business lines involved (one automotive plus three inter-

modal), the manager in charge of the division will face less of a bounded rationality problem than the manager in charge of the merchandise group, with its larger number of business lines. It is hoped that the risk to the company will be reduced as the managers match production synergies across the two business lines to changes in market demand.

The automotive business line also shared many operational commonalities with intermodal that could lead to synergies: both had dedicated, high-speed trains, the same equipment supplier (TTX), trucking operations, a few big customers, and dedicated and specialized terminals. Therefore, the study team recommended that automobile and intermodal should be combined into the same division. In order to extract the synergies, the automotive and intermodal business lines not only had to report to the same VP, but also had to integrate their activities at all levels of the hierarchy.

The study team concluded that performance issues within the coal lines were not related to the organizational structure. While there was some evidence that the organization of the industrial coal business line might benefit from being more functional (LOB beta coefficient of 0.1 indicating low volatility), and that the export coal line could be more adaptive if operated as a separate unit (LOB beta coefficient of 1.9), the utility coal line (the largest and fastest-growing of the three

coal lines) had a LOB beta coefficient of 0.8 which, being close to 1.0, indicated that there already existed an appropriate degree of autonomy in the structure of the organization. Overall, the coal business line and the company exhibited comparable contribution volatility and only mildly negative synchronization (an average of -0.13 across the three coal lines) with the company as a whole, indicating that it did not have a significant effect in either direction on the company's overall adaptability. Consequently, the study team did not recommend changes to the coal unit's organization, but did point out to the CSX leadership that the coal business managers in the export and utility lines should take advantage of their autonomy and adapt more quickly and effectively to their challenges while looking for missed opportunities to build on synergies with the industrial coal line.⁹

CONCLUSIONS

Based on the qualitative and quantitative findings of the study team, CSX adjusted its commercial organization to better fit its internal and external interconnections resulting from its changed environment. The structure shifted toward functions in order to deal with enhanced competition and new opportunities. The OPA aided CSX in its quest to balance each division's autonomy and ability to adapt with its opportunity to reduce costs. The OPA analysis gave insight into the underlying causes of lack of adaptation by the merchandise business. Further, OPA illuminated the opportunity for cost synergies between the intermodal and automotive business lines while maintaining hyper-vigilance regarding the environment in these volatile markets. The analysis highlighted real differences between the various coal business

lines, contributing to the CSX leaders' decision to delay organizational changes in the coal business while other performance issues were being studied.

It is difficult to assess the beneficial result of this reorganization. Since the commercial reorganization discussed in this paper occurred, CSX's financial performance has lagged other railroad companies. CSX has changed its top levels of leadership, including the dismissal of the head of the merchandise group who was responsible for visioning and implementing this study. CSX is in the midst of a broader corporate reorganization aimed at reducing the number of management layers and abolishing more than 800 positions. Some of the complementary recommendations of the study team were never implemented, including the hiring of functional experts from outside the company and aggressively training existing commercial managers to better equip them for their new roles.

The automotive and intermodal business lines remain in one organization and continue to be integrated and combined. The purely functional organization of merchandise has started to evolve back into a more divisional structure.

However, this case study does prove that organizational assessment need not be a purely qualitative exercise. Analytical techniques can be used to provide objective assessments of the effectiveness of different organizational structures and suggest alternatives that may better suit the internal production function and external market conditions of a company. While OPA may not be a singular solution that a company should rely on in determining the need for reorganization, at CSX, OPA validated qualitative findings and reassured executive leaders that a change was warranted.

Endnotes

1. This paper focuses solely on the commercial organization of the CSX railroad business and not on the larger business activities of CSX Corporation. Since 1980, CSX, more than any other railroad company, has used organization structure as a tool to experiment with different approaches to running a railroad business in a deregulated environment.
2. Published quarterly by Commonwealth Business Media, Inc., East Windsor, NJ
3. Prior to deregulation in 1980, railroad commercial functions were largely transaction-focused. There were few departments or people with “marketing” in their title, job description, or duties. The customers interfaced with local freight agents who managed car orders, switching instructions, way billing, and freight billing. Sales forces were aligned geographically, with the salesperson’s primary responsibility to maintain or increase a customer’s traffic by establishing close working relationships and by helping the customer resolve any service problems. There was a headquarters pricing function that administered tariffs and represented the companies in rate bureaus.
4. CSX purchased 42% of Conrail, another Class I railroad located in the northeastern United States, increasing the size of CSX by about one third.
5. Other merger-related challenges included computer systems integration, operations integration, and vigorous commercial competition from the Norfolk Southern Railroad.
6. One company made it a point to discuss how sales people hired from other industries quickly came up the learning curve and outperformed their best, internally developed sales people who had spent an entire career at the company in a variety of different departments. Professional salesmen outperformed the people commonly regarded as industry experts.
7. The conclusions being drawn from an OPA must be qualified by saying that they hold given that other relevant factors remain constant. *Ceteris paribus*.
8. Generally, a business downturn translates into more opportunities for railroads to capitalize on their low rates as compared with trucks. Customers are willing to sacrifice minimization of their long-term economic total logistics costs for reduced short-term cash expenditures associated with inexpensive transportation. The improved service and lower cost (compared with trucks) created a fertile sales environment.
9. One suggested alternative, short of an organizational restructuring of the coal market, encouraged building a stronger relationship between industrial coal business managers and the merchandise business managers.

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