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Carrier scorecarding: purposes, processes, and benefits

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ABSTRACT

Carrier scorecarding programs (CSP's) provide a formal, quantitative mechanism for use in assessing carrier performance. Such programs provide valuable input for carrier rationalization and contract development initiatives and can also serve as a key component of a Six Sigma program.

In this study, the overall goal was to address three research questions. First, why are organizations adopting CSP's? Second, how are organizations using carrier scorecarding to select and manage carriers? Finally, how does carrier scorecarding impact organizational performance? These questions were used to develop the set of research propositions that formed the basis for the investigation. In-depth case studies of six organizations were conducted to generate the evidence necessary to support or refute the research propositions.

Carrier scorecarding was found to be an objective, process-oriented approach that improves the ability of the transportation buyer to realize significant improvements in customer service while strengthening internal cost control. In the current industry environment of intense competition, narrow margins, pressure for shorter cycle times and improved supply chain efficiency, carrier scorecarding is rapidly gaining recognition as a valuable tool for use in carrier selection, evaluation and retention.

INTRODUCTION

In this era of supply chain management, companies often lose sight of the critical role that transportation plays in the organization. By providing the physical connections in the supply chain, transportation impacts inventory availability, manufacturing performance, sales, and customer satisfaction (Giblin, 2001). Combine these supply chain considerations with

the amount of money spent on freight transportation in the United States ($605 billion in 2002), and it becomes clear that transportation cannot be ignored (Cooke, 2002). Transportation managers must satisfy a wide variety of stakeholders who demand exceptional supply chain support and value in the form of high quality, flexible transportation service at a reasonable cost.

To address this value challenge, transportation managers are employing a wide variety of strategies for the purchase and evaluation of transportation services. Their key initiatives include: stringent carrier selection processes, measurement of key performance indicators (KPI's), and adoption of Six Sigma programs. The popularity and success of these strategies have been widely discussed in the logistics and transportation literature (e.g., Carman, 2000; Richardson, 2001, Premeaux, 2002; Dasgupta, 2003).

Transportation scorecarding is another valuable tool for promoting transportation success (Bowman, 1997). Scorecarding programs provide a formal, quantitative mechanism for assessing the ability of carriers to fulfill a wide array of requirements (Gibson & Mundy, 1998). These programs can highlight the "winners" and "losers" in the transportation "game" much like scoreboards and box scores do in baseball or basketball. The scorecarding process also supplies valuable input for carrier rationalization and contract development initiatives, serves as a key component of a Six Sigma program, and can help transportation managers make more effective use of KPI's (Hannon, 2003; Vitasek & Geary, 2003).

The purpose of this study is to investigate the application of performance scorecarding to the purchase of transportation services. An exploratory study was undertaken to provide insight into the purpose, process, and value of carrier scorecarding. The ultimate objective of the research was to establish a normative model that describes a step-by-step process for building

a carrier scorecarding program (CSP) that can be used to identify and reward premier carriers.

RESEARCH QUESTIONS AND PROPOSITIONS

Given the current strategic focus on transportation purchasing, the overall goal of the research was to address three key questions:

1. Why are organizations adopting CSP's?

2. How are organizations using carrier scorecarding to select and manage carriers?

3. How does carrier scorecarding impact organizational performance?

Since the focus of this research was the investigation of unique processes, and cost-benefit issues, insight was gained by asking open-ended "how" and "why" questions. These questions could not be planned as easily as quantitative "how much" or "how many" questions. Thus, precisely defined hypotheses were not developed. Instead, working propositions were developed to direct attention to the key goals of the study (Yin, 1994). These propositions are outlined in Table 1.

These propositions and related questions allowed a penetrating analysis of carrier scorecarding by studying the development plans, implementation processes, and outcomes experienced by organizations that use this strategic purchasing tool.

METHODOLOGY

Successful investigation of the research propositions required the collection of comprehensive, accurate information from various sources in multiple organizations. Field research, in the form of case studies and document analysis, was the logical methodology. It allowed direct observation of a phenomenon in its natural setting, thus promoting profound, realistic understanding (Babbie, 2003). While other methods may have compiled broad conceptual overviews

TABLE 1
RESEARCH PROPOSITIONS

	Proposition	Implication	Related Research Questions
P_1	A standard set of issues drives the development of CSP's.	This proposition suggests that organizations that have adopted CSP's do so for universal reasons. These reasons could be functionally focused or a common reaction to changing supply chain requirements.	The research questions will help explain why organizations undertake this time and resource intense strategy and what value they expect to receive from it. • Why did you adopt a CSP? • Did a specific trigger event drive your CSP? • What are the goals of your CSP?
P_2	A general framework exists for the development of CSP's.	This proposition suggests that organizations that have adopted CSP's faced common design and implementation issues. These issues include the step-by-step method used, the individuals involved in the process, and the resources required to successfully initiate the CSP.	The research questions related to this proposition focus on how the process is organized and how other organizations should proceed in developing a CSP. • Who developed your CSP? • What was the CSP development and implementation process? • What costs were involved?
P_3	The rewards of CSP's outweigh the risks involved.	This proposition implies that organizations that have adopted CSP's experience significant improvements in carrier performance (e.g., improved on-time performance, reduced claims, lower costs, etc.) while encountering limited problems.	The research questions focus on identifying the value of score-carding and will foster accurate cost-benefit analyses of the scorecarding programs. • What have you gained by initiating a CSP? • Have the results of your CSP met your expectations? • What problems were faced in the implementation of your CSP?

and isolated quantitative facts, case studies combined with document analysis produced rich explanations and illustrative examples that generated great detail of both the process and its implementation in multiple settings (Sommer and Sommer, 1998).

The case study candidates were identified through a purposive sampling effort (Ellram, 1996). An extensive literature review, discussions with transportation professionals, and a relevant database analysis generated a list of 175 potential participants. From this list, case study candidates were identified using the following criteria:

- A well-documented, structured CSP;

- Two to five years of program activity and performance history;

- High annual sales (indicator of substantial transportation spending);

- Industry diversity.

Six organizations participated in the research—enough to generate compelling evidence to support or refute the research propositions (Yin, Bingham & Heald, 1976). The participating organizations had annual sales ranging from $1.4 billion to $24 billion. They represented a variety of manufacturing industries—apparel, building products, chemical, consumer durables, and forest/paper products. The operational profile of the participants was evenly split between corporate and divisional transportation departments.

A research plan and interview guide was developed using CSP documents, information from the literature review, and the research propositions. Half-day site visits were conducted with each organization and interviews were conducted with key personnel. These in-depth interviews involved asking open-ended questions from the interview guide, recording the answers, and posing additional relevant questions to probe in greater depth as necessary. Although straightforward, this process produced a detailed blueprint of each CSP and generated a holistic understanding of the interviewee's views (Patton, 1987).

The semi-structured nature of the interviews allowed participants to initiate their own observations, rather than act strictly as passive respondents. This additional informant role encouraged participants to provide spontaneous insights and increased access to corroborating evidence (Yin, 1994). The dual respondent/informant role can increase interview clarity and improve the probability of developing accurate, reliable models and theories (Eisenhardt, 1989).

Case study data analysis consisted of examining, categorizing, tabulating, and recombining the evidence to address the research propositions. Each case study was examined independently and a written case study narrative was developed and given to the participants for review, revision, and confirmation. These reports organized key information via matrices (check-lists, event listings, and summary tables) and networks (event flow charts and activity records) (Miles & Huberman, 1994).

After the individual case reports were completed and verified, cross-case analyses were conducted. Various meta-matrices (master charts assembling descriptive data from all case studies in a standard format) and graphical displays (scatterplots over time and composite sequence analysis) were developed to promote effective and unbiased comparisons of the case studies. Multiple analytical techniques (pattern-matching, data partitioning and clustering, counting, and building a logical chain of evidence) were used to evaluate the research propositions (Miles & Huberman, 1994).

RESEARCH FINDINGS

The goal of the case studies was to develop insight into CSP adoption goals, implementation processes, and performance results of six large manufacturers. These insights were critical to the development of a normative CSP model. They also hold pragmatic implications for organizations considering CSP's (e.g., the research provides insight into the value of CSP's and suitable processes.).

These goals were addressed through the investigation of three research propositions. The

cross-case analysis of each research proposition is presented below.

P₁ - CSP Purposes

Proposition 1: A standard set of issues drives the development of CSP's. This suggests that organizations adopt CSP's for a universal set of reasons. The key issue is whether these reasons are consistent across organizations or unique to individual organizations. Consistent responses would imply that scorecarding is appropriate for a common, but limited range of applications. On the other hand, diverse responses would indicate that scorecarding is applicable to a wide variety of circumstances. Three research questions were used to analyze P_1.

The initial question, "why did you adopt a CSP?" elicited multiple responses during each case study. Many responses revolved around common organizational, departmental, or external issues. An often cited organizational issue was the need to participate in organizational quality initiatives. A common departmental reason for developing a program was the need to initiate or continue carrier base reductions. The improvement of customer service and satisfaction was a universal external concern. Finding reliable, fast carriers to address transit time pressures and lower customer inventory levels were common reasons for CSP adoption.

The participants also identified unique reasons for adopting CSP's. These reasons are outlined in Table 2.

The second question, "did any specific trigger event drive the development of your CSP?" produced two types of responses. The most commonly cited trigger event was an internal reorganization of the transportation function. Centralization of the transportation function preceded two CSP's, while departmental decentralization triggered two others. Quality agendas spurred the other two CSP's. One was created in response to a company-wide drive while the

other CSP was triggered by an industry association effort to improve safety. Table 2 highlights these trigger events.

The third question—"what are the goals of your CSP?"—generated external and internal goals. The external, carrier-oriented goals were consistent, revolving around the issues of performance improvement, supplier reduction, and relationship enhancement (i.e., strategic alliances, volume growth, and exclusive territories). Cost reduction was another goal, although carrier rate reduction was not. The participants indicated that CSP-related reductions in carrier performance variation, improved operational efficiency, and streamlined administrative activities would lead to lower costs. The internal, departmental goals were unique to each organization. They are identified in Table 2.

Enhanced customer satisfaction is the ultimate goal of a CSP, according to the participants. However, they indicated that external and internal goals must be accomplished before customer value and strategic competitive advantage can be achieved.

Given the case study results, it is clear that CSP's have been considered and adopted for much more than a "standard set of concerns". The participants identified a wide variety of reasons for developing a scorecarding program, cited a number of different trigger events, and specified a variety of goals. Thus, P_1 is not supported by the data collected in the current study.

The diversity of responses indicates that carrier scorecarding is not perceived as a narrow transportation management strategy that applies to a limited number of situations. CSP's serve as effective response to departmental needs, organizational initiatives, and external pressures.

The extensive list of program goals also indicates that the potential value of a CSP is not limited to the transportation department. CSP's also

TABLE 2
META-ANALYSIS OF PROPOSITION 1

Organization	Primary Reason for Adoption	Primary Trigger Event	Key CSP Goals
Apparel Manufacturer	Departmental—desire to harmonize service requirements and carrier management procedures.	Reorganization—transition to a regional distribution strategy.	More objectivity in carrier selection and evaluation.
			Leverage purchasing power.
Building Products Manufacturer	Departmental—desire to be more objective in future carrier reduction initiatives.	Reorganization—shift to division-based logistics departments.	Tailor service priorities to division's customers.
			Create uniform practices and transparency between divisional facilities.
Chemicals Manufacturer— plastic packaging	Organizational—needed to keep pace with explosive sales growth and customer demands for smaller, more frequent deliveries.	Quality Issue—Company requires development of quality program.	Manage increased volume with current staff.
			Maintain quality of service while controlling costs.
Chemicals Manufacturer— specialty products	Organizational—needed to reduce company's liability exposure to transportation related chemical incidents.	Quality Issue—participation in Chemical Manufacturers Association Responsible Care initiative.	Eliminate unsafe carriers.
			Create uniform practices and transparency between divisional facilities.
Consumer Durable Goods Manufacturer	External—address pressures for faster delivery times from retail customer base.	Reorganization—transportation operation absorbed into centralized logistics function.	Establish a more reliable carrier base.
			Better visibility of carrier activities and performance.
Forest/Paper Products Manufacturer	Departmental—desire to combat the excessive cost of administering 1,100 carriers.	Reorganization—creation of national load control center (that could not handle the volume of carriers used by the company).	Reduce cost of administering carrier base.
			Manage increased volume with less staff.

provide value to the organization and the customer. These broader benefits prompted the participants to initiate CSP's.

Based upon these findings, the first proposition should be recast to reflect the flexibility and wide applicability of carrier scorecarding. A more appropriate statement of this proposition would be:

P_{1r} A wide-ranging set of departmental, organizational, and external concerns drives the development and implementation of CSP's.

P_2 - Program Processes

Proposition 2: A general framework exists for the development of CSP's. This proposition suggests that organizations have followed a common pattern in designing a scorecarding program. Key issues of investigation included the existence of comparable program development processes and the existence of similar program phases. Three research questions provided insight into the participants and resources involved in CSP implementation. Most importantly, the questions helped explain how the programs work.

The initial question "who developed your program?" produced similar responses from the participants. In all cases, the person with primary responsibility for building the basic structure of the scorecarding program and overseeing the development process was a transportation manager. This person personally chose a team to develop and manage the CSP.

In four cases, individuals outside the transportation department provided CSP development assistance. Purchasing managers, managers from external organizations, and external consultants were involved in most of the development initiatives. Only two organizations developed a program from the ground up without external assistance.

The second question, "what was the CSP development and implementation process?" produced a cohesive set of responses. Although each program employed a varying number of steps, they shared a common platform of four key stages: preliminary preparations, qualification and selection, initiation of operations, and performance analysis.

The first stage involved the task of preparing program guidelines and procedures. Initially, the implementation teams developed a general definition of the program's intentions to ensure that CSP goals were well established, synchronized with the broader organizational mission,

and clearly identified for carriers. Later, attention turned to determining CSP criteria and methods for selecting, evaluating, and categorizing carriers.

In the second stage, candidate carriers were identified and screened according to basic operating capabilities. The remaining carriers were invited to participate in the CSP qualification process. During this process, the candidates' capabilities were thoroughly evaluated. Finally, candidates were evaluated on their ability to provide mutually beneficial long-term relationships. A manageable number of carriers were then chosen to move freight and participate in the CSP.

Attention turned to the development of formal operating agreements in the third stage. Key service criteria were negotiated and the responsibilities of each party were established. When all issues were settled, the carrier was assigned specific lanes and operations commenced.

After a brief break-in period for carrier familiarization and service stabilization, the carriers moved into the final stage of performance analysis. Each program had an established process for collecting performance metrics on a monthly basis for every shipment handled by a particular carrier. Performance reports were distributed to the carriers on a monthly basis. Three organizations used EDI transactions to monitor performance, while the others used paper documents.

After a substantial amount of data was collected on a carrier (usually covering a year), the programs moved into the rating phase. Most programs used a 100-point scale to rate each carrier. This scale consists of both objective performance measurements (e.g., on-time percentages, billing accuracy, etc.) and subjective performance ratings (e.g., customer service response, competitive pricing, etc.). In most programs, the objective component dominated the scale.

Carrier site visits were used in five CSP's for subjective performance evaluation purposes. Facility audits, process reviews, equipment inspections, and personnel interviews were frequent activities in these site visits. The visits also provided an opportunity for the organizations to discuss potential process modifications and develop continuous improvement plans.

These ratings were used to classify the carrier into one of three categories (e.g., Preferred, Approved, Back-up). The top category indicates that the carrier is an outstanding service provider. This level of performance normally results in the assignment of additional lanes to the carrier. The other levels provide less security and can result in a loss of volume if the carrier does not make significant performance improvements by the next rating period.

Of course, the six programs have unique features. The primary difference was found in the weighting factors of individual performance criteria. Each organization stressed one or two issues tied to their initial reason for adopting a CSP. Other unique features dealt with the duration of a program cycle, frequency of reviews, and the potential carrier awards/rewards. Still, these features did not have a material impact on the overall structure of the programs.

The third question, "what costs were involved?" revealed that the unique program features did not significantly influence resource requirements. The respondents concurred that the primary resources required are management time and a travel budget to visit carrier facilities. Other costs included computer resources and programming expenses, clerical resources to measure performance and develop reports, and management resources to oversee the program. Publication and communication expenses were also identified as minor costs by two organizations.

Analysis of the six organizations' responses to these three questions indicates that P_2 is a reasonable and accurate statement. A great deal of consistency existed between the organizations' programs even though they were developed under a wide range of goals. That is, the means to the end were consistent. The programs essentially involved the same group of people, development and implementation stages, and resources.

The acceptance of P_2 is valuable from the standpoint of an organization that wishes to develop a program in the future. The information gathered during the case studies provides insight into the time, effort, and steps they will face. The availability of this type of information can certainly lead to a reduction in CSP implementation time.

The acceptance of P_2 also provides the opportunity to develop a normative model of the carrier scorecarding development and implementation process. Figure 1 provides a flow chart of this process.

P_3 Program Benefits

Proposition 3: The rewards of CSP's outweigh the risks involved. This proposition suggests that organizations gain significant improvements in carrier performance as an outcome of the scorecarding process. Of particular interest was the participants' overall assessment of CSP results. Three questions were used to analyze this proposition.

The initial question, "what have you gained by initiating a CSP?" produced a set of responses that emphasized strong shipper-carrier relationships. All six participants stressed that they had strengthened their relationships with carriers as a result of their scorecarding programs. Improved communications, a mutual understanding of each other's operations, and increased visibility with carriers were widely noted benefits.

Three organizations developed partnerships or strategic alliances with carriers based on their performance in the scorecarding process. Their CSP's facilitated the identification of appropriate partnership/strategic alliance candidates. That

FIGURE 1
SCORECARDING PROCESS FLOW CHART
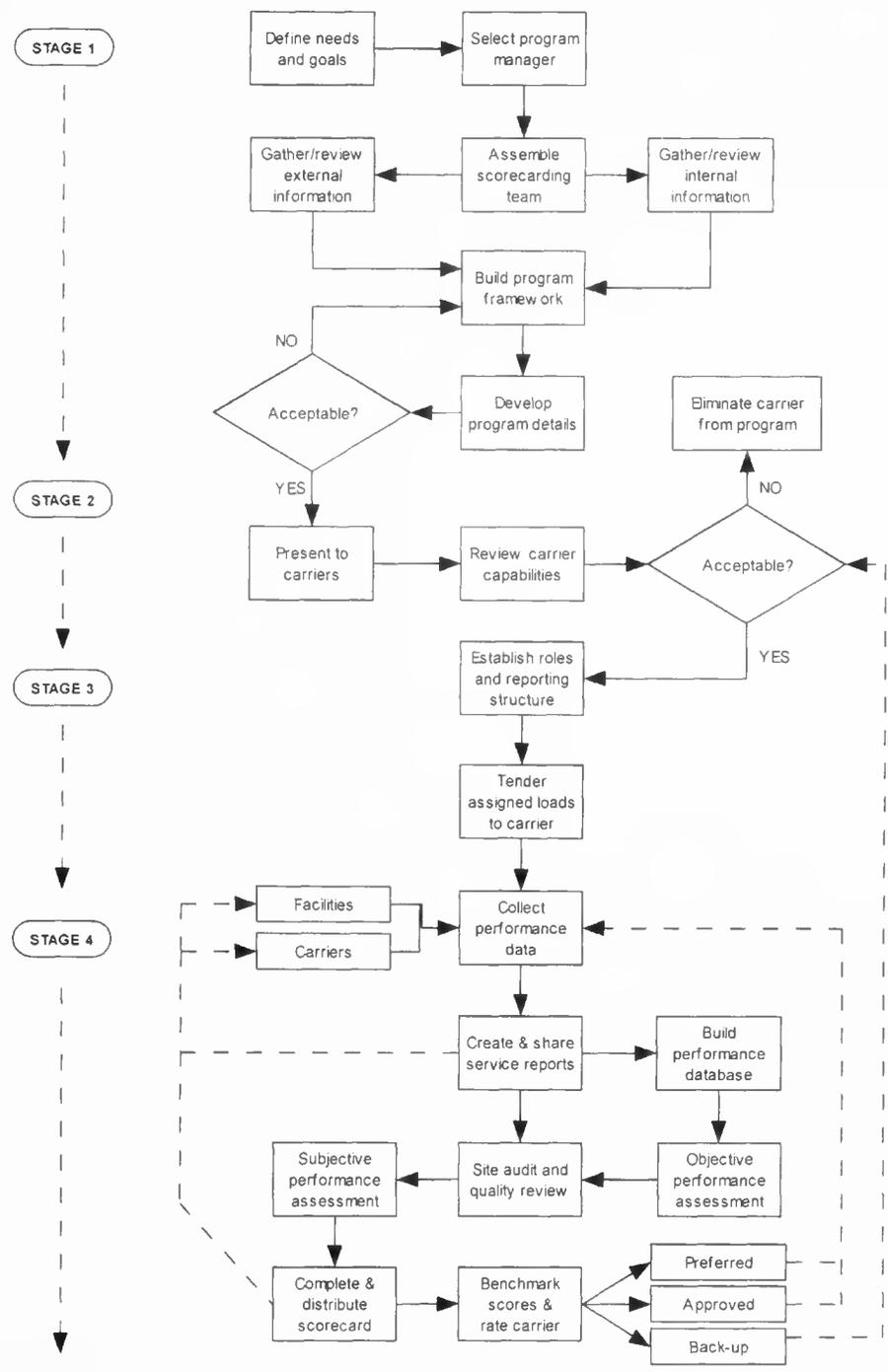
is, frequent interaction, site visits, and performance evaluations provided an accurate picture of a carrier's capabilities so that effective decisions could be made.

The participants indicated that scorecarding produced a variety of other benefits. Performance gains included a reduction in the number of accidents, a significant increase in customer satisfaction, and notable improvements in on-time deliveries. Departmental gains included greater uniformity between facilities, enhanced buying leverage with carriers, and reduced operating costs.

Overall, these types of benefits helped the organizations develop competitive advantages in their respective industries. The participants also indicated that the benefits are not one sided. Carriers also gained a great deal from the scorecarding process as well. Scorecards clearly lay out what is expected of carriers—the key performance indicators, scoring methods, and service levels are established prior to service provision. Scorecards also provide carriers with benchmarking data that can help determine where to target improvement initiatives. Finally, scorecarding facilitates frequent, structured communication between the carrier and their customers.

Responses to the second question, "Have the results of your CSP met your expectations?" were also positive. All participants stated that their programs performed as anticipated. Three organizations even suggested that their programs exceeded expectations.

The third question, "what problems were faced in the implementation of your CSP?" did not reveal severe complications. Participants indicated that their primary problems revolved around time pressures, capacity pressures, and handling the volume of information generated by the carrier evaluation process. However, none of these seriously impacted the value or performance of the scorecarding programs.

Most of the participants indicated that they were not able to keep their initial project schedules. A few program managers found that the travel requirements and meeting times were more demanding than they expected. These problems tended to delay the first round of performance evaluations and ratings.

Some participants indicated that changing business conditions slowed their progress. Mainly, they found that the programs could not be fully implemented because their best carriers were at full capacity. While the programs intended to replace marginal carriers with preferred carriers, the latter were unable to expand capacity quickly. Thus, these programs were unable to achieve their original carrier reduction goals as rapidly as desired.

The participants indicated that these issues were inconveniences, rather than CSP inhibitors. The participants identified four strategies for avoiding problems:

1. Set realistic dates and targets for implementation,

2. Visit shippers and carriers already involved in CSP's,

3. Use information technology to streamline data collection and performance reporting, and

4. Use common sense when developing and administering a CSP.

The responses to these three questions indicate that P_3 is an acceptable proposition. Overall, the participants widely stated that the benefits of developing a program significantly exceed the risks of doing so, and that the biggest potential risk of all may be choosing not to develop a scorecarding program. They feel that CSP's will become more widely used because they have proven to be successful and easy to implement (with help from existing programs).

Collectively, these cross-case analyses indicated that carrier scorecarding is a practical, value-adding transportation purchasing strategy that can be used by a wide variety of organizations. Scorecarding programs enhance opportunities to improve performance, fortify shipper-carrier relationships and create customer satisfaction, with minimal downside risk.

MANAGERIAL IMPLICATIONS OF THE RESEARCH

Given the applied nature of the research and focus on the current practices of transportation buyers, the primary contributions from the study are managerial in nature.

The basic challenge facing transportation buyers today is the simultaneous achievement of exceptional customer service, equitable carrier compensation, and internal cost control. Many strategies are touted as having the capability to accomplish all three goals. However, most have fallen far short of such "win-win-win" results. This research details a transportation management tool with an established track record of creating customer value, strengthening shipper-carrier relationships, and reducing transportation expenses. That tool is carrier scorecarding.

This research addressed a variety of practical issues that potential CSP users must consider. These pertinent topics focused on program development issues, resources and effort required, and the potential payoff (benefits realized versus risks assumed). Such information can help a transportation buyer answer the question, "would a CSP benefit my organization?"

Finally, this research analyzed the scorecarding program development and implementation process in detail. Using actual scorecarding program information from innovative transportation purchasers, a descriptive step-by-step development and implementation model was established. This knowledge greatly increases the likelihood of establishing a successful program. Thus, the research can help the transportation buyer

confront the ultimate question, "how should my organization proceed in developing a CSP?" with confidence and intelligence.

This research also fills a void in the logistics literature regarding carrier scorecarding. Existing articles provide some anecdotal evidence regarding the purpose and value of CSP's, but little else. This study advances the knowledge base with a normative model of the CSP development and implementation process as well as discussion of its value. Such information can be used as a benchmark for future research initiatives into related topics.

LIMITATIONS OF THE RESEARCH

The primary limitation of the research is that the results may not be representative of all organizations (e.g., smaller companies and industries other than those studied), although steps were taken to promote transferability. At minimum, the results can be viewed as a comparative analysis of the practices among participating firms (Bowersox, et al., 1989). This is not to say that the theories and model produced by the research have no value in other situations. The results provide a great deal of insight into the research questions, produce valuable direction for additional research, and provide a set of general guidelines that other organizations can use. Ultimately, however, future studies must subject the research results to the process of refutation and falsification to prove generalizability (Lynch, 1982).

CONCLUSION

This research was conducted to provide insight into an emerging transportation purchasing tool that has previously received limited exposure in the literature. Through the case study research methodology, three key goals were effectively analyzed. Carrier scorecarding was found be an objective, process-oriented approach that helps the transportation buyer simultaneously achieve exceptional customer service and internal cost control. In the current environment of Six Sigma,

lean operations, compressed cycle times, and supply chain efficiency, carrier scorecarding is an appealing tool that merits additional academic and industry attention.

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