

## Performance Measurement in Supply Chain Management

Shannon W. Anderson, PhD

And

Karen L. Sedatole, PhD

Performance measures include financial measures such as cost performance or profitability as well as operational measures, such as quality performance or cycle time. Performance measures are used in several ways within the firm including: as a basis for evaluation and reward of individuals, as a basis for allocation of scarce resources among strategic business units, and as a basis for making decisions that increase future profitability of the firm.

These uses have parallels in strategic supply chain management. So for example, it is common for firms to write contingent supply contracts to attempt to align incentives and to reward or punish certain supplier behaviors or outcomes. Similarly, performance measures may be used to allocate future supply contracts among competing suppliers. Finally, performance measures may be used proactively to identify and act upon opportunities that increase the profitability of both partners, as for example when products are redesigned or processes are streamlined to lower costs or to enhance efficiency of the transaction.

### *Our research objective*

We propose to study performance measurement practices in supply chain networks as a means of describing a relatively new phenomena in management accounting; namely, the accounting for inter-organizational transactions. We will address the following questions in our study:

1. Description of supplier performance measurement systems:
  - a. What are the perceived risks managing supplier relationships? How are those risks identified and quantified?
  - b. What is measured by the buyer? By the supplier?
  - c. How are the metrics defined and measured?
  - d. What is the periodicity of measurement?
  - e. What IT systems are used (e.g., intranet, web, paper reporting) and how are these systems described (e.g., interactive controls, one-way reporting)
  - f. What processes are employed to disseminate performance results
  
2. How are supplier performance measurement systems used:
  - a. Role in supplier selection and award of future contracts
  - b. Role in supporting collaboration on future improvements
  - c. Role in aligning incentives of both parties in the presence of uncertainty and other transactions hazards

Finally, with the adoption by public companies of recent Sarbanes-Oxley legislation, many firms are faced with compliance regulations that extend to significant third party transactions, of which supplier transactions are a critical component (Section 404 of SOX). For those firms that are affected by this legislation, we will examine how this legislation has affected supplier performance measurement practices. We will consider whether the answers to the above

questions differ in the pre versus post SOX period as well as how SOX has changed the climate of strategic supply chain management more generally.

### ***Our funding partners***

We have received funding from the American Institute of Certified Public Accountants (AICPA) to examine the above-described research questions. In this project, we are collaborating with two organizations that are nationally recognized in the areas of supply chain management, Protiviti Inc. ([www.protiviti.com](http://www.protiviti.com)) and APICS ([www.apics.org](http://www.apics.org)). Protiviti is an international consulting firm with special expertise in the areas of enterprise risk management and auditing of internal controls. We will work with their experts in the supply chain management practice in the development and administration of a survey instrument. This survey will be administered to APICS membership and will focus on the research questions outlined above.<sup>1</sup> APICS is a global organization of operations management professionals, with top executive and management members who have direct responsibility for supply chain management, logistics, purchasing/procurement and inventory control. As such, their members provide a natural population of informed managers for studying issues related to supply chain management.

Further, Protiviti and APICS experts will collaborate with us on the interpretation of survey findings and together we will produce at least one white paper for distribution to all survey participants (through the APICS and/or Protiviti web-based knowledge database) and to the AICPA membership (through the AICPA's *Journal of Accountancy* or other outlet as directed). We have agreed to acknowledge AICPA research funding in all publications regardless of distribution outlet.

### ***Motorola: What we would like from you***

We believe that conversing with supply chain professionals is the most effect way to ensure that our survey instrument is comprehensive and relevant to the actual issues and problems that organizations face with respect to performance measurement of individual suppliers, the management of supply chain relationships, and the performance of the overall supply chain. As such, we would like to conduct a series of interviews with individuals in the Motorola organization (identified by Motorola with our guidance) who can speak to the research questions we are examining. We would be interested in talking both to individuals focused on strategic issues associated with the management of supply chain, as well as individuals in procurement, operations, and logistics involved in the day-to-day issues related to supply chain management.

In particular, we will be asking questions such as:

#### **1. When are supplier performance metrics used?**

Surveys indicate that supplier metrics are used by only 50% of firms. As one of our objects is to understand who does and does not use supplier metrics, we would be interested in speaking to individuals who can provide insights into this question. To the extent that supplier metrics are used in some, but not all, supply relationships within the

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<sup>1</sup> We will also likely seek the cooperation of other supply chain associations to provide additional respondents for our survey.

Motorola supply chain, what factors determine these choices (e.g., when there are certain risks, for certain types of supplier relationships, only for key components, etc.).

2. **What types of supplier metrics are used?**

In our survey, we will be providing respondents with a list of supplier metrics. We want to make sure this list is comprehensive so we would like to talk to individuals that can provide insights into the types of supplier metrics Motorola uses.

3. **What types of IT systems are used to support a supplier metric system?**

In our survey, we will be providing respondents with a list of IT systems or system characteristics. We would like to talk to individuals that can provide insights into the types of IT systems Motorola uses to support supplier metric systems. More generally, we would be interested in better understanding the role that IT systems play in supply chain management. For example, do supply chain management practices drive the selection of IT systems, or vice versa? Are there certain components of an IT system that are critical to supply chain management?

4. **Who (what individuals within the firm) uses supplier metrics?**

Are they used by individuals focused on strategic issues associated with the management of supply chain, and/or by individuals in procurement, operations, and logistics involved in the day-to-day issues related to supply chain management.

5. **How are supplier metrics used?**

What types of decisions are supported by supplier metrics (e.g., awarding of contracts, negotiating price, strategic planning as a means of gaining competitive advantage, etc.)?

6. **What are the determinants of supply chain performance?**

Eventually, we hope to provide insight into the performance effects of supplier metric systems (i.e., performance of the supply chain in terms of effectiveness/efficiency/etc. as well as overall firm profitability). Prior research has not examined this question in a very systematic manner. We would be interested in any insights Motorola supply chain professionals have regarding what “works” and what doesn’t? In addition, how does Motorola define “good performance” for individual suppliers and for the supply chain, in general.

***Motorola: How you would benefit***

A recent survey<sup>2</sup> of top managers finds that a majority of companies spend 50 percent or more of earned revenues with suppliers and third party service providers and 47 percent of the survey respondents indicated that their firms had *insufficient* ability to manage and control supplier performance. In addition to the significant spending associated with the supply of direct materials and indirect support services, firms often attribute significant costs to internal procurement and supplier management processes. In some cases, supplier failures generate unintended costs that serve to increase the “cost of ownership” well beyond the purchase price of procured goods and services. With the introduction of Sarbanes-Oxley legislation, many firms face new responsibilities in relation to monitoring the performance and internal controls of key business partners. Together these observations highlight the significant risks to firm profitability that are associated with transactions between involved parties and the significant opportunity that lies in applying management accounting and internal controls to interfirm relations.

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<sup>2</sup> O’Keefe, P. (2006) *Procurement Contract Risk Management*. White paper jointly published by APICS and Protiviti, Inc. available through [www.protiviti.com](http://www.protiviti.com) and [www.apics.org](http://www.apics.org).

In return for participating in this project, Motorola will receive a copy of the white paper prepared for our funding partners (AICPA, APICS and Protiviti). The results of our survey will provide Motorola with important insight into the practices and challenges firms face in using performance measures as an effective supply chain management tool. This, in turn, will lead to a greater understanding regarding whether or not Motorola is: (i) collecting the right supplier performance measures, (ii) disseminating the performance results in a timely manner and to the right individuals, and (iii) effectively using the performance metrics to manage supplier relationships and mitigate your firm's risk exposure.

***Motorola: Confidentiality***

Unless we have express written permission from Motorola, we will not quote any Motorola employee in any publications resulting from this project, nor will we divulge Motorola's name. Further, we would be happy to sign a mutually agreeable confidentiality agreement before our visit.

***Who we are***

The researchers, **Shannon W. Anderson**, Associate Professor of Management at the Jones Graduate School of Management of Rice University, and **Karen L. Sedatole**, Associate Professor of Accounting at the Eli Broad College of Business at Michigan State University, have significant experience conducting high-quality research and publishing in top research outlets. In recent years they have worked extensively, both together and with other research partners, in the area of management accounting and control practices for interfirm transactions. Recent examples of our published work in this area include:

- A empirical survey-based study of the magnitude and probability of risks associated with strategic alliances and the internal control practices employed to mitigate risk;
- an empirical survey-based study of how specific transaction risks affect the terms of alliance contracts as well as the subsequent alliance performance;
- an experimental study of the effect of control systems on trust and cooperation in collaborative settings;
- a comprehensive book chapter on management accounting and control practices in the context of strategic alliances;
- an empirical archival study of how product characteristics and a unique, collaborative management control arrangement between automotive suppliers and a large U.S. auto manufacturer affected the sourcing of parts and the time to develop a new vehicle;
- a theoretical study that examines the use of nonfinancial data on quality performance as a vehicle for communicating and collaborating with suppliers on new product development.

Research business partners for past projects by the researchers include Microsoft, Cargill, Steelcase, GM, Daimler-Chrysler, and Milliken.

*Researcher vitas attached.*