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A Call for Changes in Research Practice:

A Note on the Adequacy of Single Respondents and the Identification of Key Respondents in Empirical Supply Chain Research

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1. Introduction

The purpose of this essay is to address two related methodological questions: when is a single respondent design appropriate in supply chain research?, and, how do we identify "key" respondents in single and multiple-respondent designs? We believe these questions should be revisited because the fields of operations management and supply chain management have progressed dramatically along two fronts (Malhotra and Grover, 1998). First, the body of research in these fields is increasingly empirical, both testing and confirming theory (Boyer and Verma, 2000; Speier and Swink, 1995). Second, the field of inquiry increasingly spans functional and organizational boundaries. While we applaud this progress, we are concerned that there are continued weaknesses in the empirical literature, especially survey-based research – and that these problems stem significantly from lack of attention to our two methodological questions.

Recently we examined forty eight articles published in *Production and Operations Management* and *Journal of Operations Management* between 2003 and 2006 that used empirical methods and dealt with supply chain issues. Of these, ten used case studies as the primary data collection instrument. All of the case study designs used multiple respondents. The remaining thirty eight studies gathered data primarily from surveys. Of these, only seven studies used multiple respondents; the remainder used a single "key informant." Therefore, the vast majority of cross-functional survey research being published today in leading journals still relies on a single respondent. If such designs are weak because of validity concerns then much of the survey research that has been published in our top journals is suspect. While some authors have previously expressed concerns about the continued dependence on a single "key" respondent, (e.g, Boyer and Verma, 2000), we believe that the field as a whole has yet to take this concern seriously.

In this essay we address these concerns by providing guidelines for researchers who are designing new survey based supply chain management research projects – with an aim of providing fodder for further discussion.

2. When is a single respondent design appropriate in supply chain research?

Some researchers have argued there is no single, reliable source of information within an organization (Seidler, 1974; Phillips, 1981); therefore the desirability of multiple respondents has been frequently articulated (e.g. Phillips, 1981; Kumar, Stern and Anderson, 1993; Boyer and Verhma, 2000). Explicit in the definition of a supply chain is the inclusion of multiple processes managed by managers working in multiple organizations (e.g., Handfield and Nichols, 1999). This definition suggests that the predominant single-respondent design used to capture data that crosses departmental, functional or organizational boundaries within a supply chain is of questionable validity. While we believe that single-respondent designs should generally be discouraged, we also believe that they can be justified in certain situations.

Clearly the research question should drive the research design decision. If the research focus is decision-making across *internal* supply chain (intra-company) functions, such as purchasing, operations and logistics, capturing the perspectives of each of these functions may be necessary. In our own research, we have found that representatives of these various functions often know little about the practices and decision-making within other functions. Thus, a single-respondent design cannot adequately address questions about the practices of multiple functions within the firm. Similarly, a single respondent is unlikely to be able to accurately address questions related to practices at other organizations in the chain.

In contrast, we have found that representatives across functions typically provide similar, valid responses to high-level, non-function-specific questions such as company performance. Single respondent designs may then be appropriate for these types of constructs, both within the organization and across the chain.

For constructs where managers across the supply chain generally do not have consensus the use of a single key respondent cannot yield valid results, or at minimum, cannot provide a holistic picture. However, we argue that there are company or chain level constructs where a single respondent would be acceptable, i.e., where most individuals within the chain could be a key informant. Our contention is that much of the extant SCM research, including our own, has not always accurately differentiated between these situations.

3. How do we identify "key" respondents in single and multiple-respondent designs?

The assumption often used to justify a particular set of "key respondents" is that upper-level managers have knowledge of activities across the organization and the supply chain. However, this assumption has not withstood scrutiny. Kumar et al. (1993) note that even “knowledgeable” informants may disagree on the measures of some constructs. Further, Lincoln and Zeitz (1980) and Phillips (1981) provide evidence that people at different organizational levels have different perceptions of the same phenomena, suggesting that a single top manager may not provide the same responses as their functional managers. For example, Kathuria, Porth and Joshi (2001) found that general managers and manufacturing managers in the same plant did not agree on manufacturing priorities for that plant. If the top managers in the plant cannot reliably identify the priorities their reporting managers are following, they cannot be relied on to provide valid responses regarding what occurs within the departments they do not manage on a daily basis (Kathuria et al., 2001).

Key informants are identified as such because they are knowledgeable about the constructs of interest, that is, because they are engaged with managing the phenomena being studied (Kumar et al., 1993). The identification process may be enhanced through case studies and/or pretests of surveys that delve into the titles and roles of prospective respondents and their areas of responsibility. Further, following examples such as Cusumano and Takeishi (1991), survey questions can ask respondents how knowledgeable they are about the constructs of interest.

Finally, surveys are often filled out by somebody other than the person who was targeted. Therefore more effort should be made after the data has been collected to investigate the roles and titles of the various respondents to ensure that they can provide valid perceptions regarding the constructs of interest. Surveys that are filled out by people whose titles and roles are significantly different from the target sample, or who may have short tenure with a company should be examined closely to see if they fit the description of key informant. Those respondent surveys that do not match key informant characteristics should be evaluated further and discarded if they do not meet pre-defined key informant criteria.

4. Research involving single respondents in supply chain and cross-functional research

While we generally recommend against a single respondent for most supply chain research, a single respondent study that is contained *within an organization* (multiple supply chain process in the same organizations) may be conducted successfully using single respondents, if the following conditions are met:

1. *Consistent respondents for all organizations*. Most studies target a specific respondent, but end up with a collection of respondents with varying titles and ranks. Based on the literature, this mixing of managers from different levels and functions of the organizational is of concern, and may affect the validity of the results.

2. *The respondent is the person directly responsible for the phenomena under study. Alternatively, the information requested is available and accessible to managers across*

the entire organization. Purchasing managers addressing purchasing decisions is justified. Purchasing managers addressing decision making in manufacturing is not.

3. *A sample size that is large enough to deal with random error*. If we assume that the perceptual differences between managers in an organization are randomly distributed, a large sample will mitigate some informant bias concerns.

It is therefore possible to do a very limited range of research within a single organization's internal chain with one respondent, as long as the sample is large and there are appropriate controls for who responds and an effort to discard survey responses that may be invalid.

Crossing organization boundaries using a single respondent design requires additional assumptions:

1. *The data requested is objective and not subjective / perceptual*. There is no evidence that managers can accurately assess the perceptions of others, especially those who work in other organizations.

2. *The same information on the phenomena of interest is freely available to all managers in the supply chain*. Even truly objective items can have multiple "right" answers. For instance a supplier shows a delivery as on time based on when they shipped, but a buyer's information system shows the same delivery as late based on when it reached their receiving dock.

With the exception of a very limited range of constructs such as the content of a contract there is seemingly little that could be validly addressed crossing organizational boundaries with a single respondent. At best a single respondent design that crosses organizational boundaries could only provide information on one respondent's perceptions, which are likely to be different from the perceptions of other members of the chain.

5. Suggestions for multiple respondent designs in supply chain and cross-functional research

We believe that the calls for multiple respondents should be more carefully delineated because there seems to be an implicit assumption that "multiple respondents" means multiple respondents addressing the same survey questions. Moreover, there is evidence that when using multiple respondents who have knowledge of the phenomena of interest, the respondents may not agree (Kumar, Stern and Anderson, 1993, provide a complete discussion). Thus, while methods exist to create composite scores for multiple respondents, composites yield results that, while different from the results of using single respondents, may be no more valid (Kumar et al., 1993). In supply chain management this lack of agreement has serious implications for multiple respondent research designs.

We provide the following guidelines for designing multiple-respondent supply chain research based on the assumption that multiple-respondent research designs generally will not use a single survey instrument. Different respondents will address different items, although there may be items that are common across all surveys.

Note these recommendations apply equally for crossing functional and or organizational boundaries.

1. *Objective items.* When there is a "correct" answer, our goal as researchers should be to create a research design that captures this valid response with as few respondents per supply chain as possible. In such settings a single respondent who is close to the phenomenon is the best respondent. However, this does not mean using one respondent for the entire survey effort. Rather we propose that the person closest to each decision should be the respondent who addresses those constructs. A study that has purchasing, manufacturing, and marketing constructs would require at least three respondents, each of whom would address different elements of the supply chain. If these elements are addressed across a dyad, six respondents would be needed.

2. *Subjective items which are operationalized for various roles within the supply chain.* When theory predicts that managers will perceive the same phenomena differently <u>and</u> that there is a chain wide level of the construct, multiple respondents should address the construct. For instance the level of trust in a relationship is perceptual and should be addressed by respondents from all parties. Models could then include the individual perceptions of trust as well as an aggregate measure for the chain.

3. *Subjective items for which there is no chain wide equivalent.* The suggestions here are the same as for objective items. For instance, if the research question is focused on supplier development, the buying firm providing the development and the supplier receiving it could have very different perceptions of why the activity was engaged in and the efficacy of the activities.

4. *More effort should be made to investigate the efficacy of secondary responses that represent a subset of the respondents.* For example, if 200 responses are received from new product development engineers, what methodological and analytical contributions

can be gained from gathering data from a subset of, say, 50 suppliers who were involved in a subset of these efforts?

6. Conclusion

Prescriptions to aid managerial decision-making that are derived from faulty research designs are unacceptable. Our proposals call for multiple-respondents in most studies, but also for researchers to think about when single respondent studies may be sufficient and justified. While we acknowledge that some of our suggestions will increase the cost of doing research, we believe that doing valid research should be our paramount concern. We believe paying attention to these issues is crucial to advancement of supply chain research and welcome input from fellow researchers.

References

Boyer, K. K., Verma, R., 2000. Multiple raters in survey-based operations management research: A review and tutorial. Production and Operations Management 9, 128-140.

Cusumano, M.A., Takeishi, A. 19991. Supplier relations and management: A survey of Japanese, Japanese-transplant, and U.S. auto plants. *Strategic Management Journal,* 12(8), 563- 588.

Handfield, R. B., Nichols, E. L., 1999. Introduction to supply chain management. Upper Saddle River, NJ: Prentice Hall.

Kathuria, R., Porth, S. J., Joshi, M. P., 1999. Manufacturing priorities: Do general managers and manufacturing managers agree? International Journal of Production Research 37, 2077-2092.

Kumar, N., L. Stern, W., Anderson, J. W., 1993. Conducting inter-organizational research using key informants. Academy of Management Journal 36 (6), 1633.

Lincoln, J. R., Zeitz, G., 1980. Organizational properties from aggregate data: Separating individual and structural effects. American Sociological Review 45 (3), 391-408.

Malhotra, M., Grover, K. V., 1998. An assessment of survey research in POM: from constructs to theory. Journal of Operations Management 16 (4), 407-416.

Phillips, L.W., 1981. Assessing measurement error in key informant reports: A methodological note on organizational analysis in marketing, Journal of Marketing Research 18, 395-415.

Seidler, John., 1974. On using informants: A technique for collecting quantitative data and controlling measurement error in organization analysis. American Sociological Review 39, 816-831.

Speier, C., Swink, M., 1995. Manufacturing strategy research: a reexamination of research methods and analytical techniques, Boston MA: Conference Proceedings, Decision Science Institute.