A proposed set of criteria for supply chain strategy evaluation

Roberto Perez-Franco

Center for Transportation and Logistics, Massachusetts Institute of Technology

Centre for Supply Chain and Logistics, Deakin University

ABSTRACT

This note explores the applicability of *evaluation criteria* to the problem of evaluating the supply chain strategy of an organization. A discussion of supply chain strategy evaluation is relevant today, as the validity of the dominant approach – proposed two decades ago and based on matching types – has come into question. While evaluation criteria have a long history in other disciplines, they are new to supply chain strategy evaluation. To help supply chain scholars assess the applicability of evaluation criteria to supply chain strategy, this note proposes a tentative set of criteria and provides insights derived from the authors' recent experience. We propose that the use of criteria for the evaluation of supply chain strategy may be a useful alternative, or at least a complement, to the dominant approach. These proposed criteria are currently being validated in a project with a company in Uruguay; we invite further empirical validation by third parties.

Keywords: *supply chain strategy; strategy evaluation; evaluation criteria*

INTRODUCTION

There seems to be a consensus among academics that a good supply chain strategy (SCS) is important for an organization. Before supply chain management (SCM) had a name as a discipline, strategy was already recognized as an important facet of what was then called *business logistics* (Shapiro & Heskett, 1985). Supply chain strategy, it has been said, is necessary for a supply chain (SC) to realize its potential and provide the business a competitive advantage (Stevens, 1989). In the new century, supply chain strategy has become "an increasingly

important topic" (Morash, 2001, p. 50). It has been argued that "top performers have a clear supply chain strategy aligned with overall business objectives and customer requirements" (Varma, Wadhwa, & Deshmukh, 2006, p. 226), that a "successful supply chain strategy is critical to a firm's long-term competitive success" (Narasimhan, Kim, & Tan, 2008, p. 5234), and that "supply chain practices solidly built upon a supply chain strategy can enhance the firm's and its supply chain partners' business performance and thus their competitiveness" (Roh, Hong, & Min, 2014).

But what makes for a *good* supply chain strategy? Or – if the term 'good' is deemed too simple – what makes a given supply chain strategy *"ideal"* (Fisher, 1997, p. 109), *"right"* (Lee, 2002, p. 106), *"optimal"* (Kotzab, Skjoldager, & Vinum, 2003, p. 347), *"appropriate"* (Varma et al., 2006, p. 226) or *"suitable"* (Brun & Castelli, 2008, p. 169) for a given organization and setting? To fully understand this question, consider the following "idealized problem," posed decades ago by Rumelt (1979) and rewritten here in terms of supply chain strategy:

> *Suppose one is given a reasonably comprehensive description of an organization, its overall strategy and its supply chain, as well as its context and environment. Suppose one is also given a supply chain strategy for consideration. What are the legitimate grounds for evaluating this supply chain strategy, and to what theories, knowledge or models can one turn for help in making such an evaluation?*

The Dominant Approach

The dominant approach to determine whether a supply chain strategy is *right* for an organization comes from Fisher (1997), the most widely cited article discussing supply chain strategy. Fisher presents a framework – a typology of supply chain strategies – that has become the cornerstone of the received view on what makes for a good supply chain strategy. The framework classifies products, based on their demand patterns, into two categories: primarily functional or primarily innovative. Likewise, it classifies supply chains, based on their priorities, as either physically efficient or responsive to the market. These two dichotomous variables are used to produce a typology with four possible combinations of product type and supply chain type, arranged in a 2-by-2 matrix where each cell represents a supply chain strategy. Fisher claims that two of these combinations – or supply chain strategies – represent advantageous

"matches", while the other two are "mismatches" that should be avoided.

"Typologies," says Hambrick (1984, p. 28), "ring true, often sounding very plausible. However, since they are largely the product of rather personal insight, they may not accurately reflect reality." Fisher's typology of supply chain strategy, based on his experience, is extremely easy to grasp and intuitively very appealing, and has been "widely accepted by researchers" (Qi, Boyer, & Zhao, 2009). However, multiple efforts to empirically validate it have produced mixed, inconclusive or even negative results (Li & O'Brien, 2001; Lo & Power, 2010; Qi et al., 2009; Selldin & Olhager, 2007), which suggest Fisher's classification of products and supply chains into dichotomous *types*, combined with his reduction of the problem of supply chain strategy evaluation to a *matching* of these types, may have left out decisive factors.

The impact of Fisher's approach cannot be overstated: it remains, *by far*, the most influential idea to date regarding the evaluation of supply chain strategy. Several other typologies of supply chain strategy that have been proposed can be traced back to Fisher's original typology. They revise it and expand it by introducing new types of products and supply chains (e.g. Cigolini, Cozzi, & Perona, 2004; Narasimhan et al., 2008) or new dichotomous variables (e.g. Lee, 2002, which adds *supply* types). It is possible that one of these expanded typologies may overcome the validity challenges facing Fisher (1997), but they have yet to be empirically tested and validated.

A Different Approach

This note discusses our experience with a different approach to the problem of evaluating the supply chain strategy of an organization, one that relies not on *matching types*, but on the use of *evaluation criteria*. In contrast with the dominant approach, this approach focuses not only on matching supply and demand, both of which are *external* factors, but also on *internal* factors, such as bridging the gap between the overall strategy of the organization and its supply chain execution, and on sorting out the organization's competing goals across different areas of interest to the supply chain of the organization.

As part of an initiative in supply chain strategy, we conducted a series of five exploratory interviews with supply chain managers from diverse industries and levels to understand their view of the role of supply chain strategy. Key insights from these interviews were that practitioners expect the supply chain strategy of an organization to provide *support* to the overall strategy of this organization, and display *consistency* both internally and with the strategies of

related functions. Subsequently, insights from an in-depth *collaborative management research* project suggested that *support* and *consistency* were useful as criteria to evaluate the supply chain strategy of an organization. Feedback from these projects also suggested additional criteria: that the supply chain strategy should be comprehensive in its *coverage* of all areas that are relevant to the supply chain, and that its support for the supply chain objectives of the organization should be *sufficient*, that they be fully satisfied. A second in-depth project served to validate these four criteria. Both projects and their findings are described in detail in Perez-Franco (2010, pp. 89-95).

Following the advice of Eisenhardt (1989) and Ellram (1996), we went back to the existing literature to explore whether similar criteria had been used to evaluate supply chain strategy before. Although not much was found in the supply chain strategy literature, we found that use of criteria in the evaluation of business strategy goes back at least half a century (Andrews, 1991; Moroney, 2000; Porter, 1996; Rumelt, 1979; Tilles, 1963). Evaluation criteria from several of these authors served to validate and – more importantly – to refine and enrich our understanding of the subject. With the insights from these authors, we revisited the data from our projects, and produced a revised list of evaluation criteria. Details can be found in Perez-Franco (2016, pp. 63-69) and Perez-Franco, Phadnis, Caplice, and Sheffi (2016, pp. 390-391).

So, what makes for a *good* supply chain strategy? We propose that a supply chain strategy should serve at least three general *purposes*: (i) translate the overall strategy of an organization into supply chain objectives, policies, choices and – ultimately – actions; (ii) focus the effort that the organization puts into supply chain activities towards the fulfillment of its supply chain objectives and – ultimately – its overall strategy, and (iii) harmonize and prioritize the competing efforts that take place in different areas of interest across the supply chain. We propose that – in order to fulfill these purposes – a supply chain strategy should possess certain *properties*. We argue that these properties, in turn, can serve as criteria to evaluate the merits and shortcomings of the supply chain strategy of an organization. For the purposes of this paper, the supply chain strategy of an organization is defined as the collection of objectives, policies and choices relevant to its supply chain, spanning across multiple areas of interest and several levels of abstraction.

PROPOSED CRITERIA

We propose the following set of tentative criteria for the evaluation of a supply chain strategy.

Coverage

The supply chain strategy of an organization must be comprehensive, in that it must address –or *cover* – each and every area of decision that matter for the supply chain. Since coverage is about avoiding blind spots in the supply chain strategy, its evaluation relies on expert knowledge of what areas matter to the supply chain of a given organization. Called "the frame test" by Rumelt (1979, p. 199), coverage is about knowing that "the critical issues" for a strategy have been identified and "are being worked on" (Rumelt, 1979, p. 200). For example, in our second project, several of their supply chain experts – after examining a thorough summary of their current supply chain strategy – realized that this strategy had nothing to say about collaborating with customers, an area that they considered increasingly important for their supply chain (Perez-Franco, 2010, p. 189).

Clarity

The supply chain strategy of an organization must be clear. For this, the strategy must not only be "made explicit" (Tilles, 1963, p. 114) but it should also be "made clear" (Andrews, 1991, p. 118). In a "clear supply chain strategy" (Varma et al., 2006, p. 226), each of the objectives, policies and choices that compose it must be clearly understood by those making decisions based on them. For example, in our first project, one of the general objectives of the supply chain strategy was to "Grow spread". Although unintelligible to others, the meaning of this objective was clear to the supply chain experts of that organization: increase the difference between the cost of producing a good and the price it commands from the customer.

Internal Consistency

The supply chain strategy of an organization must be consistent with itself. This property of a strategy – called "internal consistency" by Tilles (1963, p. 115) and by Andrews (1991, p. 119), "goal consistency" by Rumelt (1979, p. 199), and both "consistency" and "strategic fit" by Porter (1996, p. 70) – is one of the most fundamental of all strategy evaluation criteria. It refers to "fit, unity, coherence, compatibility and synergy" (Andrews, 1991, p. 119) among different

objectives, policies and choices in a strategy. In our experience, it is useful to think of internal consistency in a supply chain strategy in terms of three levels: compatibility, coherence and synergy.

Compatibility**,** the most basic level of internal consistency, is about avoiding what Rumelt (1979, p. 199) calls "gross inconsistencies" within a strategy: the different objectives, policies or choices in the supply chain strategy are expected to be compatible – i.e. able to co-exist – with each other. For example, a compatibility evaluation in our second project revealed that their objective of serving customer segments differently according to their needs was incompatible with their policy of using the same logistics configuration in their supply chain to serve all segments. "To me, it was like a light bulb went off…," said their Senior VP of SC, describing his reaction to the findings of our evaluation: "We are trying to do everything!" (Perez-Franco, 2010, p. 227).

Coherence refers to reduced antagonism among the different objectives, policies or choices in the supply chain strategy, whereby they "cumulate or do not erode" (Porter, 1996, p. 71) – or at least erode as little as possible – each other's positive "cumulative impact" (Tilles, 1963, p. 114) on the overall goals. Porter (1996, p. 71) calls this "simple consistency" and "first-order strategic fit". "A key function of strategy is to provide coherence to organizational action", says Rumelt (1993, p. 2), and warns that "problems of strategic inconsistency" may result in "conflict" and "bickering" across functions. Our experience shows that this is true also in supply chain strategy: a coherence evaluation in our first project allowed us to identify a three-way coherence conflict at the core of their current supply chain strategy, involving their objectives for manufacturing, inventory levels and customer service. The VP of SC in this organization confirmed that this "3-way conflict is a very, very important item right now", one of "the fundamental issues we're struggling with" (Perez-Franco, 2010, pp. 226-227).

Synergy refers to reinforcing relationships – preferably, but not necessarily, mutual – between objectives, policies or choices in the supply chain strategy, whereby one of them augments the positive impact that another has on the overall goals. Porter (1996, p. 71) calls this "second-order strategic fit". In our projects, we found several examples of synergy: for instance, in the first project, their policy of manufacturing exclusively in high volume plants had – according to their SC experts – synergy with their objective of minimizing the cost of procuring

raw materials (Perez-Franco, 2010, p. 83).

External Consistency

The supply chain strategy of an organization must be consistent with "the chosen context" (Rumelt, 1979, p. 197). This expectation that a strategy should "both match and be adapted to its environment" is called "consonance" by Rumelt (1993, p. 3). This environment includes the rest of the organization, the market and industry or – if not competitive – the specific setting of the organization, and the world at large. "Consistency with the environment" – described by Tilles (1963, p. 115) as an "important test of strategy" – is about whether its components "really make sense with respect to what is going on outside", both "now" and "in the future". In our first project, for example, we found an external inconsistency between the firm's intention of retaining their market share in premium products mostly through high product quality (e.g. without heavy investment in product innovation), and the fact that the new premium products in their industry were all the result of innovation.

Support

The supply chain strategy of an organization must support the overall strategy. More than simply being consistent with the overall strategy (Porter, 1996, p. 71), each component of the supply chain strategy – each objective, policy and choice – *must support* (i.e. must enable, advance or help realize) some element of the overall strategy. A component that provides no support –directly or indirectly – to the overall strategy, or whose net support is negative, should be modified or eliminated from the supply chain strategy. An example of a supportive component is found in our first project, where the policy of "working as an integrated organization" was deemed by the team of experts as very supportive of most objectives in the overall strategy of the organization.

Sufficiency

Each one of the objectives that have been set for the supply chain of an organization should be realized by the combined support it receives from the policies and choices in the supply chain strategy. This was called the "workability test" by Rumelt (1979, p. 201): whether "the proposed policies and actions work together to produce the results sought". An example of a sufficiency shortcoming comes from our second project: one of the high-level objectives set for their supply

chain, namely to “make our customer's business less complex and more cost effective,” was found by a team of experts as not being fully satisfied by the policies and actions of the supply chain (Perez-Franco, 2010, p. 186).

Feasibility

The supply chain strategy of an organization must be feasible. Each one of its objectives, policies and choices must be realizable in practice given the competencies and resources (physical, human, financial, technological, etc.) available to the organization, and the constraints of its setting. Called “competence test” by Rumelt (1979, p. 200) and “feasibility” by Rumelt (1993, p. 7), this criterion was described as “appropriateness in the light of available resources” by Tilles (1963, p. 115) and as consistency with “competence and resources” by Andrews (1991, p. 119). Exploring the feasibility is especially important in the case of a new component for the supply chain strategy. In our second project, the organization decided to “move away from price, and into value and solutions”. Before committing to this change in their supply chain strategy, they determined it was feasible by means available to them (Perez-Franco, 2010, p. 220).

For all the criteria described above, we have enough supporting evidence from our projects to consider they warrant further examination and validation from third parties. Other criteria that seem promising, but for which we do not have empirical evidence yet, include the following:

- ***Actionability***, the notion that the supply chain strategy should be specified in enough detail to be a good guide for taking actions,
- ***Parsimony***, the notion that the supply chain strategy should only use the resources that are necessary to provide the desired level of support to the overall strategy,
- ***Riskiness***, proposed by Tilles (1963, p. 118) as “acceptable degree of risk” and echoed by Andrews (1991, p. 119) as “feasible” “level of risk”, a notion concerning whether the supply chain strategy represents more risk than the organization or supply chain are willing to face.
- ***Advantageousness*****,** a criterion that applies to supply chains in competitive settings, regarding whether the supply chain strategy provides the organization a unique differentiating competitive advantage (Andrews, 1991; Porter, 1996; Rumelt, 1979, 1993).

The proposed criteria for the evaluation of a supply chain strategy is summarized in Table 1.

Table 1. Summary of the proposed evaluation criteria.

Criteria	Description
Coverage	A good supply chain strategy must be comprehensive, addressing every relevant area of decision, and avoiding blind spots.
Clarity	A good supply chain strategy is clearly understood by decision makers.
Internal Consistency	A good supply chain strategy must be consistent with itself, on three levels: compatibility, coherence and synergy, discussed below.
- Compatibility	A good supply chain strategy should not contain gross inconsistencies.
- Coherence	A good supply chain strategy has parts whose positive effects cumulate, and do not erode each other.
- Synergy	It is desirable for the different parts of a supply chain strategy to reinforce each other positively.
External Consistency	A good supply chain strategy should be consistent with its context, and well matched and adapted to its environment.
Support	A good supply chain strategy must support the overall strategy of its organization. Each element in it should provide support to some goal.
Sufficiency	Objectives set for the supply chain should be satisfied by the cumulative support received from the supply chain strategy as a whole.
Feasibility	A good supply chain strategy must be realizable given the resources and competencies of the organization, and the constraints of its setting.
Actionability	A good supply chain strategy should be specified in enough detail to serve as a good guide for decision makers to take actions based on it.
Parsimony	A good supply chain strategy should only use the resources that are necessary to provide the desired level of support to the overall strategy.
Riskiness	A good supply chain strategy should not represent more risk than the organization or supply chain are willing to face, given their objectives.
Advantageousness	In competitive settings, a good supply chain strategy should provide the organization a unique differentiating competitive advantage.

DISCUSSION

Each criterion we have proposed above has either enough supporting empirical evidence from our projects over the last decade, or enough rooting in the literature about business strategy evaluation to warrant further examination. Among the criteria that have been validated in practice through application in projects are *coverage*, *internal consistency* (in all its varieties: *compatibility*, *coherence* and *synergy*), *support* and *sufficiency*. Through testing in multiple supply chain strategy projects, we have collected empirical evidence to support the merit of these criteria, at least at a basic level. At the time of writing, a validation project is being conducted in Uruguay; we invite further validation, especially by third parties.

The evidence is promising enough to suggest that – if there is a single takeaway from the present note – it should be the following: the overall soundness of a supply chain strategy can be evaluated by exploring:

- its *coverage*, namely evaluating whether the supply chain strategy is comprehensive enough, or if – on the other hand – it has any significant *'blind spot'*,
- its *internal consistency*, namely whether the elements that compose the supply chain strategy are at conflict with each other, or – on the other hand – do not interfere with each other and even work harmoniously together, in the best case, and
- its *support* and *sufficiency*, namely whether the means that compose the supply chain strategy are supportive of its goals, and furthermore, that this support is sufficient to realize these goals fully.

Other criteria not yet tested in projects, such as *clarity*, *feasibility* and *parsimony* are very intuitive. Claiming that a supply chain strategy should be clear, feasible and not wasteful is not – we hope – a very controversial claim. The remaining criteria (*external consistency*, *advantageousness*, *riskiness* and *actionability*), equally plausible, are also strongly rooted in the literature. Since these criteria formalized *after* our projects were completed, we cannot claim that they have been validated in practice. We are currently applying these criteria in a new project, which will be published as a case study once completed.

In future work, it will be necessary to formalize, test and validate these criteria, both individually and as a set. It is our hope that the present note will start a discussion about the

important subject of supply chain strategy evaluation, about the role of criteria in the evaluation process, and about whether these criteria – or any others – are valid and useful to practitioners and academics undertaking it.

REFERENCES

Andrews, K. R. (1991). The concept of corporate strategy. In C. A. B. Joseph L. Bower, C. Roland Christensen, Andrall E. Pearson, Kenneth R. Andrews (Ed.), *Business Policy: Text and Cases* (7 ed.). Boston, MA: Irwin.

Brun, A., & Castelli, C. (2008). Supply chain strategy in the fashion industry: Developing a portfolio model depending on product, retail channel and brand. *International Journal of Production Economics, 116*(2), 169-181.

Cigolini, R., Cozzi, M., & Perona, M. (2004). A new framework for supply chain management - Conceptual model and empirical test. *International Journal of Operations & Production Management, 24*(1-2), 7-41.

Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *Academy of Management Review, 14*(4), 532-550.

Ellram, L. M. (1996). The use of the case study method in logistics research. *Journal of Business Logistics, 17*(2), 93.

Fisher, M. L. (1997). What is the right supply chain for your product? *Harvard Business Review, 75,* 105-117.

Hambrick, D. C. (1984). Taxonomic approaches to studying strategy: Some conceptual and methodological issues. *Journal of Management, 10*(1), 27-41.

Kotzab, H., Skjoldager, N., & Vinum, T. (2003). The development and empirical validation of an e-based supply chain strategy optimization model. *Industrial Management & Data Systems, 103*(5-6), 347-360.

Lee, H. L. (2002). Aligning supply chain strategies with product uncertainties. *California Management Review, 44*(3), 105-119.

Li, D., & O'Brien, C. (2001). A quantitative analysis of relationships between product types and supply chain strategies. *International Journal of Production Economics, 73*(1), 29-39.

Lo, S. M., & Power, D. (2010). An empirical investigation of the relationship between product nature and supply chain strategy. *Supply Chain Management-an International Journal, 15*(2), 139-153.

Morash, E. A. (2001). Supply chain strategies, capabilities, and performance. *Transportation Journal, 41*(1), 37-54.

Moroney, M. (2000). Strategy evaluation: Towards an updated paradigm. *Irish Journal of Management, 21*(1), 103.

Narasimhan, R., Kim, S. W., & Tan, K. C. (2008). An empirical investigation of supply chain strategy typologies and relationships to performance. *International Journal of Production*

Research, 46(18), 5231-5259.

Perez-Franco, R. (2010). *A methodology to capture, evaluate and reformulate a firm's supply chain strategy as a conceptual system.* (PhD in Engineering Systems), Massachusetts Institute of Technology, Boston.

Perez-Franco, R. (2016). *Rethinking your supply chain strategy*. Boston: MIT Supply Chain Strategy Lab.

Perez-Franco, R., Phadnis, S., Caplice, C., & Sheffi, Y. (2016). Rethinking supply chain strategy as a conceptual system. *International Journal of Production Economics, 182*(Supplement C), 384-396. doi:https://doi.org/10.1016/j.ijpe.2016.09.012

Porter, M. E. (1996). What is strategy? *Harvard Business Review, 74*(6), 61-78.

Qi, Y. N., Boyer, K. K., & Zhao, X. D. (2009). Supply Chain Strategy, Product Characteristics, and Performance Impact: Evidence from Chinese Manufacturers. *Decision Sciences, 40*(4), 667-695.

Roh, J., Hong, P., & Min, H. (2014). Implementation of a responsive supply chain strategy in global complexity: The case of manufacturing firms. *International Journal of Production Economics, 147*(Part B), 198-210.

Rumelt, R. P. (1979). Evaluation of strategy: Theory and models. In D. E. a. H. Schendel, Charles W (Ed.), *Strategic management: A new view of business policy and planning* (pp. 196-212). Boston: Little, Brown.

Rumelt, R. P. (1993). Evaluating Business Strategy. Retrieved from http://www.anderson.ucla.edu/faculty/dick.rumelt/Docs/Papers/EVAL2.pdf

Selldin, E., & Olhager, J. (2007). Linking products with supply chains: testing Fisher's model. *Supply Chain Management-an International Journal, 12*(1), 42-51.

Shapiro, R. D., & Heskett, J. L. (1985). *Logistics Strategy: cases and concepts*: West Publishing Company St. Paul, Minnesota.

Stevens, G. C. (1989). Integrating the supply chain. *International Journal of Physical Distribution & Materials Management, 19*(8), 3-8.

Tilles, S. (1963). How to Evaluate Corporate Strategy. *Harvard Business Review, 41*(4), 111-121.

Varma, S., Wadhwa, S., & Deshmukh, S. G. (2006). Implementing supply chain management in a firm: issues and remedies. *Asia Pacific Journal of Marketing and Logistics, 18*(3), 223-243.