

Measuring performance of agri-food supply chains

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Introduction

During the last years, there has been increasing attention placed on indicators of supply chain performance. A large number of various performance indicators have been used to characterize supply chains, ranging from highly qualitative indicators like customer satisfaction to quantitative indicators like return on investments. This large number of different performance indicators makes performance measure selection quite difficult. Furthermore, combining these indicators into one measurement system proves to be difficult. Efforts as well as progresses have been made in this area but supply chain performance measurement received little or no attention in the field of food and agribusiness. Being able to measure performance, will help decision-makers along the supply chain to make better informed decisions on their behavior and its impact on the chain (Gunasekaran et al., 2004). The objective of this paper is therefore to develop a performance measurement framework for the food and agribusiness. This framework needs to be inclusive, universal, measurable, and consistent with the goals of the agri-food chain (Beamon, 1999). Inclusiveness implies the measurement of all pertinent aspects of the chain, universality allows for comparison under various operating conditions, measurability means that data required are measurable and consistency suggests that indicators are consistent with organizational goals. To meet these criteria a literature review on existing and suggested performance indicators and models is made. Combining these indicators with the characteristics of the agri-food chain, e.g. perishability, food safety, seasonality, results in a preliminary performance measurement system for agri-food chains.

A conceptual framework on performance measurement system have been developed. The framework consists of four main categories of performance indicators, which are efficiency, flexibility, responsiveness and quality and is based on literature research. Each of these categories consists of group of more detailed indicators. This framework is tested by means of interviewing experts and stakeholders along the tomato chain. Together with other questions, experts were also asked to choose between these two frameworks the one that most convenient for practical use in tomato supply chain. An opportunity has been given to the experts to suggest new or other performance indicator and/or to reject proposed once, by giving sufficient reasoning. Based on these interviews a final performance measurement framework is developed that meets the criteria of inclusiveness, universality, measurability and consistency.

Materials and Methods

To achieve the objectives of this study, firstly, a literature review is executed to make an inventory of existing measures, their contents, and their construction. The literature study aims to make clear what supply chain performance entails. In this clarification the need for financial as well as non-financial (technical, logistic, environmental, social) performance indicators are discussed. Beside a general overview of financial and non-financial measures it is important to note that the subject of the study is an agri-food supply chain which means that, especially in the case of non-financial measures specific product and production characteristics might be of importance (freshness, food safety, healthiness, etc). The literature review resulted on developing of the performance measurement framework for agri-food supply chains.

In the framework performance indicators are grouped in four major categories: efficiency, flexibility, responsiveness and quality. Each of these categories contains detailed performance indicators that better describe the performance of the agri-food supply chain. For more details see diagram 1. The possibilities of quantifying each of these indicators are discussed.

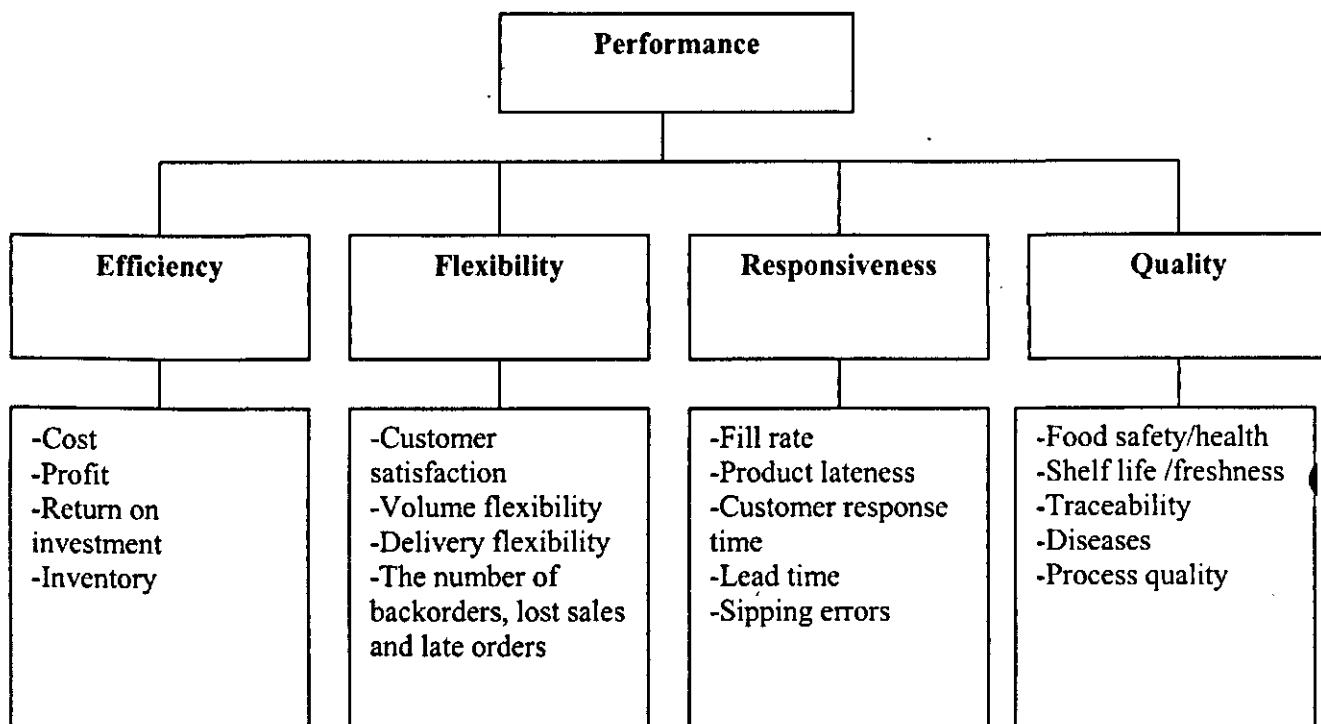


Diagram 1. Conceptual framework on agri-food supply chain performance measurement system

The next step is to conduct interviews with experts (managers) of each link of tomato chain. The interviews are carried in Dutch tomato supply chain. Breeder: Rijk Zwaan, growers: IKZ certified growers, wholesaler: Weyers, distribution center: Meurs, Essen, Dortmund, Mechelheim and supermarkets: Edeka (Germany).

These interviews shed a light on performance indicator selection and testing the current performance measurement frameworks. The method used for interviews is depth interview. Depth interviews belong to personal interviews and have a qualitative nature, which means it contains subjective elements (Lancaster et al., 2002). This kind of interview belongs to the informal question–conversations method. A list of questions is used to lead conversation. Ranking methods are used to rank preferences for measurement frameworks as well as for indicators.

Expected results

Analyzing the interviews will lead to development of a new performance measurement framework for agri-food supply chains. This new conceptual framework will be developed based on literature review and expert opinion and tested on a Dutch tomato supply chain, resulting in both a theoretical and an analytical framework that is practically preferred by decision makers.

Preliminary Conclusions

The development of more integrated supply chains was not followed by simultaneous development of supply chain performance indicators and metrics in order to assess the effectiveness of a particular chain organization and thus achieve a fully integrated supply chain. To fill this gap in research a conceptual framework on agri-food supply chain performance have been developed, which is tested on a Dutch tomato supply chain. Based on results of interviews a new research framework will be developed which meets the criteria of inclusiveness, universality, measurability and consistency and will be applicable for use in agr-food supply chains.

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