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Proposal of a Customer-Oriented Sustainable Balanced Scorecard for Agri-food Supply Chains

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Abstract This work aims to propose a Customer-Oriented Sustainable Balanced ScoreCard (COSBSC) for Agri-food Supply Chains (ASC). Balanced Scorecard (BSC) is one of the most widespread performance measurement systems used. In ASC contexts, the inclusion of sustainability issues (mainly environmental and social) is a relevant issue not only because companies are subject to many public legislation constraints but also because final clients are becoming more concerned about purchasing sustainable products and services and force upstream the ASC to meet certain levels. This fact leads the ASC companies to adopt customer-oriented strategies in which sustainable aspects are of special relevance when managing their businesses more efficiently. For that purpose, in this work a research on BSC models is developed, along with sustainability issues specifically addressed by ASC. Then a proposal of a COSBSC for ASC is presented.

Keywords: Balanced ScoreCard, Agri-food Supply Chain, Sustainability

1 Introduction

Many tools are used by companies for implementing strategies through the adoption of Performance Measurement Systems (PMS). One of the most widely used and known PMS is the Balanced ScoreCard (Kaplan and Norton, 1992).

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The balanced scorecard (BSC) may also be used to measure the performance of supply chains. In fact, some authors argue that the integration of supply chain oriented measures requires a BSC adaption (Liebertruth, 2017).

However, there is still a lack of universal performance measurement instruments for various types of supply chains (Gunasekaran et al., 2004), as each of them hold some specific characteristics that in many cases are not addressed by BSC.

Additionally, supply chain sustainability issues have become very influencing in the companies strategies and management, and in some cases they are only partially addressed by BSC or even the BSC overlooks its management.

Sustainability issues in Agri-food Supply Chains (ASC) are becoming more relevant mainly due to two factors. Firstly, the increasing number of public legislation rules and technical specifications to be met and, secondly, the growing awareness throughout the different ASC members (producers, processors, distributors, retailers...) mainly as a consequence of final clients concern about purchasing sustainable products and services. These factors force the different ASC members to adopt customer-oriented strategies in which the introduction of sustainable aspects will be very relevant. Not introducing them may lead to sales volume losses and contracts reduction and therefore to unsuccessful strategies, even being very competitive financially.

The former leads to propose in this work a performance measuring system based on the BSC, but suitable to be implemented in ASC, where just a little attention has been paid by researchers (Cardemil-Katuranic and Shadbolt, 2018; Bigliardi and Botani, 2010). The proposal will take into account the specific characteristics of the agri-food sector, mainly those regarding sustainability and its inclusion in an effective customer-oriented strategy. The result will be a Customer-Oriented Sustainable Balanced ScoreCard (COSBSC) for ASC.

The paper is structured as follows: in section 2, a brief literature review about the concept of BSC, focused on the ones developed for inter-enterprise domains is done. In section 3, the main characteristics of the Agri-food sector, and in particular those regarding "sustainability" issues are described. Then, section 4 makes a proposal of a customer-oriented sustainable balanced scorecard (COSBSC) to address ASC specific aspects. Finally, in section 5, some conclusions are exposed.

2. Balanced Scorecard in a supply chain context

Kaplan and Norton (1992) developed the balanced scorecard (BSC), a strategic management tool consisting in a performance measurement system (PMS) that aims to evaluate an organization from a multidimensional view combining financial and non-financial aspects. This tool allows, among other things, to put strategies into practice.

For that, four perspectives that are linked to each other are defined: financial, customer, internal business processes and learning and growth. In **Figure 1** a general framework of BSC (Kaplan and Norton, 1992) is depicted. As it can be observed, BSC determines for each perspective a set of objectives, setting targets for each of them. The definition of performance indicators will guide the decision makers to take the corresponding initiatives to fulfill these targets.

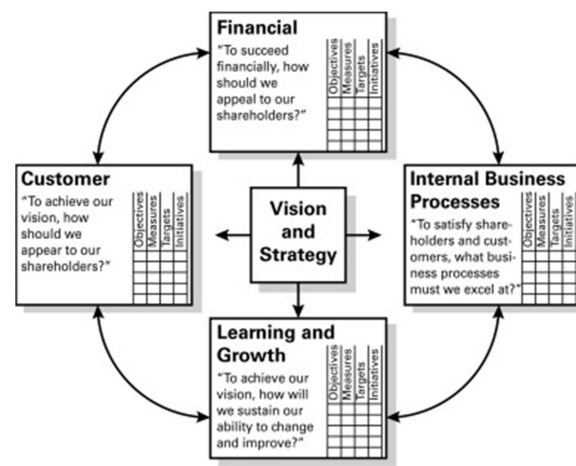


Fig. 1 The Balanced Scorecard Framework from Kaplan and Norton (1992)

However, this BSC was mainly conceived for intra-enterprise scenarios, as it did not reflect well the relationships among the different supply chain partners.

On the other hand, it is a fact that research in the field of supply chain performance measurement has received increasing attention by the scientific community, due to the need of developing integrated PMS, taking into account all the partners (i.e. the immediate supply network as well as the total supply network) with which a company interacts (Bigliardi and Botani, 2010).

Some later works made a step forward aiming to re-characterize the original Kaplan and Norton (1992) BSC so it could also be suitable for inter-enterprise contexts. Most of them argued that the integration of supply chain oriented measures required an adaption of the four perspectives.

These works arisen during the last twenty years and addressing supply chain performance measurement systems (SCPMS) have run in parallel with the increasing advances in information and communication technologies (ICT). These ICT have allowed that the collection, analysis and sharing of information throughout the supply chain becomes easier and therefore that SCPMS are more realistic.

Maestrini et al. (2017) made a precise synthesis of the state of the art and conducted a systematic review of the literature about SCPMS. They concluded that studies that truly investigate performance measurement beyond a single firm's boundaries were still limited and that they mostly focused in the suppliers' site.

Among these SCPMS may be pointed out the ones developed by Brewer and Speh (2000), Bititci et al. (2005), Folan and Browne (2005), Alfaro et al. (2007), Gunasekaran et al. (2004), Chan and Qi (2003), Angerhofer and Angelides (2006), and Gruat et al. (2007).

3. ASC characteristics: importance of sustainability

The term agri-food supply chains (ASC) has been associated to describe the activities from production to distribution that bring agricultural or horticultural products from the farm to the folk (Prima et al., 2016).

On the other hand, it is widely accepted in the literature that three broad dimensions characterize the term “sustainable”: economic, environmental and social.

It is taken for granted that the **economic** dimension is vital for the companies businesses survival, and that provide cost competitive products/services is mandatory.

This is not the case of the other two dimensions:

- **Environmental:** it encompasses input oriented (energy and natural resources) and output oriented indicators (waste and pollution) (Brandenburg et al. 2014).
- **Social:** it mostly encompasses issues related with intangible aspects such as culture, social communities, lifestyle, politics, health, human rights, and communities’ aspiration (Wang et al. 2011).

What mainly differentiates ASC from other supply chains is the limited products shelf-life and the importance that consumers give to aspects such as quality and health. These issues together with other sustainability aspects makes ASC more complicated to manage than other supply chains in the sense that the application of cost-effective strategies in an isolated manner may fail if sustainable policies are not implemented.

Near future is indicating ASC companies that successful strategies will be those that meet tight regulations and have closer monitoring and awareness of sustainability issues. It must not be forgotten that Agri-food products will finally be consumed by humans.

4 Proposal of a Customer-Oriented Balanced ScoreCard for ASC

BSC tool (in its original form) ignores most of the previously addressed sustainability aspects, which in turn are key components when developing a customer-oriented strategy in SC contexts, and more particularly in the ASC.

According to Kalender and Vayvay (2016), three possible scenarios to implement a sustainable strategy in BSC are possible:

1. Environmental and social aspects can be integrated in the existing four standard dimensions.
2. An additional perspective can be created to take social and environmental aspect into account.
3. A specific environmental or social scorecard can be formulated.

It is believed by the authors that the first scenario is the most suitable and convenient for ASC contexts where environmental and social aspects are so relevant and successful sales strategies will strongly depend on the degree that these sustainability aspects are met.

This work aims to propose a Customer-Oriented Sustainable Balanced ScoreCard (COSBSC) tailored either for the ASC or individually for each of its members. As aforementioned and justified it integrates those sustainability aspects into the basic four perspectives of BSC, and more particularly in the Customer one. As it was pointed out in the introduction, it is a fact that ASC customers have been giving a growing importance in the last decade to be provided by sustainable suppliers, what it makes that traditional BSC Customer perspective is no longer complete if it lacks sustainability. It must be noted that the inclusion of sustainability aspects in the same Customer perspective, will result in a better trade-off with the cost effectiveness strategies (economical perspective).

It is not the scope of this work to focus on the other three perspectives: financial, internal business processes and learning and growth. In the remaining of this paper, only the customer perspective of the COSBSC (Table 1) will be addressed in depth. The structure of the proposal comprises the following dimensions:

1. **Sub-Perspective:** it puts together the different set of similar objectives to be weighted in the Customer perspective. This field is enriched with the introduction of sustainability (environmental and social) aspects which complement the more traditional ones (product/service-related).
2. **Objective:** it comprises the different objectives included in each sub-perspective: product/service, environmental and social. Common objectives in each sub-perspective aim to measure the following aspects:
 - Product/service: quality, reliability, reactivity and flexibility.
 - Environmental: suppliers control, environment conservation, energy efficiency, water management, soil management, pollution control, crop protection, variety & seasonality, animal welfare and waste management.
 - Social: nutrition, authenticity and traceability, safety and health, equality and diversity, community engagement, employment and training, fair and ethical trade and SME's inclusion.
3. **Family:** it comprises those products that can be grouped under the same "objective policy" (the level of aggregation must be agreed). Holding the same policy means that the same KPI's and targets are shared by them in a specific market. In **Table 1** two of them are considered, named as A

and B families. It has to be noted that there could be some objectives that can be common to the families and do not have to be disaggregated, such as, for example, the objective employment and training from the social sub-perspective.

4. **Market:** it makes reference to which customers (again the level of aggregation must be agreed) the families are sold. In Table 1 three of them are considered, named as 1, 2 and 3 markets.

Table 1 COSBSC proposal

Domain	COBSC Perspective	Sub-Perspective	OBJECTIVE	Family	Market	KPI	TARGET	Mandatory	Non-mandatory	KPI current value	INITIATIVES	
SC or SC member	CUSTOMER	Product/Service	Quality	A	1	a						
						b						
				B	2	a						
					1							
					3							
			Reliability									
			Reactivity									
			Flexibility									
			Suppliers control									
			Environment conservation									
			Energy efficiency									
			Water management									
			Soil management									
			Pollution control									
			Crop protection									
			Variety & Seasonality									
			Animal welfare									
			Waste management									
			Nutrition									
			Authenticity & Traceability									
			Safety & Health									
			Equality & Diversity									
			Community engagement									
			Employment & Training									
			Fair & Ethical Trade									
			SME's inclusion									
			FINANCIAL									
			BUSINESS PROCESSES									
			LEARNING & GROWTH									

5. **KPI:** it comprises the different key performance indicators defined to measure a specific objective. A specific objective for a certain family sold in a specific market is measured by one or more KPI's. In Table 1 the objective "quality" for the family A sold in market 1 is measured with two KPI's, named as a and b.
6. **Target:** it regards to the goal value that a specific KPI should reach. That value will normally be a minimum or maximum limit. Ranges of values are also permitted. It will be preferably numeric.
7. **Mandatory/Non Mandatory:** the targets could be mandatory for certain KPI's due to legislation issues or simply because some customers force their suppliers to accomplish them (contracts). Non-mandatory KPI's will be weighted according to its relevance.
8. **KPI Current Value:** it shows the real value that a determined KPI takes.
9. **Initiatives:** it comprises the actions that must be taken in case that the value of some KPI does not meet its previously defined target. These actions will strongly depend on the KPI relevance or weight and on the target gap.

The main contributions of the COSBSC are:

First, it helps to develop strategies very tailored to ASC contexts, where the sustainability aspects are extremely important. It was done integrating them into the customer perspective, together with traditional product/service-related objectives. In this way, a customer-focused strategy will never be successful if it lacks sustainable measures.

Secondly, the proposed customer perspective includes a set of objectives in each sub-perspective that cover the whole ASC. Therefore, it can be implemented by any ASC domain, either a member or the ASC (in case that there is a high degree of vertical integration). Depending on the selected domain, some objectives of certain sub-perspectives could not have sense and may be ignored.

Finally, it sets out clearly the sustainability objectives (environmental and social) that must be accomplished (either mandatory or not). These set of objectives were defined considering the Agri-food public legislation rules and some sustainable requirements included in some procurement policies in the private sector (DEFRA, 2014), as well as the study of the requirements which are covered by some independent assurance schemes (LEAF, 2016). These objectives targets will be finally weighted according to the selected strategy.

5 Conclusions

This work has proposed a Customer-Oriented Sustainable Balanced Scorecard (COSBSC) for Agri-food Supply Chains (ASC).

Nowadays, it is a must in ASC contexts the inclusion of sustainability issues if companies wish to implement successful customer-focused strategies.

The COSBSC developed could serve as a reference for the ASC to establish applicable sustainable strategies that can be measured with the proper performance indicators. Moreover it will allow applying real effective customer-oriented strategies as it clearly reflects how environmental and social aspects affect it.

Future research is being developed for validating the COSBSC in different ASC actors, such as producers, processors, distributors or retailers with different degrees of vertical integration.

Finally, this COSBSC is tailored for ASC and therefore some of the results can not be extrapolated to other contexts such as the fact of introducing sustainability aspects into de customer perspective or the definition of some objectives that are only suitable for ASC.

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