

## A Framework of Strategy Formulation to Improve Competitive Advantage in Sustainable Manufacturers and their Supply Chain

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**Abstract.** The objective of this research is to provide a framework to guide manufacturers that compete in environmental sustainability, as well as their supply chains, to formulate a business strategy to improve competitive advantage. It is a theoretical study based on literature review and in the model of *Campos e Armas da Competicao* – CAC, in Portuguese (Fields and Weapons of the Competition). The contribution of this research is to present a study of the many factors that can influence the formulation of a business strategy, helping the responsible for such formulation to reach competitive advantage in sustainable basis, mainly in a world where what is at stake is not only the success of the companies, but the future of our planet, of our own humanity.

**Keywords:** Strategy, Sustainability, Competitiveness, Advantage, CAC

### 1 Introduction

The academic research to bring competitiveness to the manufacturers has involved many researches and researchers along the time [1], [2], [3], and there is still much to be studied.

Theories are proposed to help companies to understand their internal and external environment, as well as to give tools, so that entrepreneurs, executives, leaders, and the responsible for the management of these companies can reach their goals.

From the theory of the Scientific Administration of Taylor, the Classic Theory of Fayol, to the Systems Theory, Contingency Theory, Administration by Objectives, Virtual Administration, and many others [4], much has been developed. However, little attention was given to the resources to maintain the activities of these manufacturers, and to the excessive consumption of water, raw material or energy to keep production running [5], and to the waste generated by the operations.

The social and environmental impact of operations in the surroundings of the manufacturers was, then, considered of less importance [5]. The Lean Manufacturing, for example, does not care whether the many trucks to keep the Just-in-Time in operation contribute to increase the greenhouse gases emissions [6], [7], the rise of the pollution level [8], [9], the waste of non-renewable fuel, or the traffic in the cities.

Conscious of this situation, the sustainable manufacturers appeared, seeking to produce in a way that can reduce the environmental impact – through the cleaner production – reducing the use of energy, raw material, water and the waste generated [10], but keeping their competitiveness.

This new paradigm of sustainability is not so easy to follow [11], as it is necessary to invest to generate or buy new technologies, to establish new standards of operations, and also to maintain low costs.

These manufacturers that compete in sustainability, and their supply chains, need to position the strategy [12], [13] to reach a competitive advantage.

The objective of this research is to provide a framework to guide manufacturers that compete in sustainability, as well as their supply chains, to formulate a business strategy to improve competitive advantage, helping the responsible for such formulation to reach a competitive advantage, mainly in a world where what is at stake is not only the success of the companies, but the future of our planet, of our own humanity.

### 2 Theoretical Background

This chapter aims to bring a theoretical background of sustainability and strategy.

## 2.1 Sustainable Development and Sustainability

According to the Report of the World Commission on Environment and Development Our Common Future, also known as the Brundtland Report, sustainable development can be considered the development that supplies the requirements of the present generation, without impacting the possibilities of the future generation to reach their own demands [14]. Sustainability is the ability to establish and maintain adaptive capacity [15].

## 2.2 The Model of *Campos e Armas da Competicao* - CAC (Fields and Weapons of the Competition)

The model of *Campos e Armas da Competicao* – CAC, in Portuguese (Fields and Weapons of the Competition), is a quantitative and qualitative model developed by Contador [2] to represent how companies compete, as it is helpful to understand the reasons for a company to be more competitive than a competitor, and how to formulate the competitive strategy of a company. CAC [2] has been validated through extensive research, made for ten years using quantitative variables, in companies of various economic segments.

Accordingly to CAC, for the company to be competitive there is no more relevant condition than having high performance only in those few weapons that give to the company a competitive advantage in the field of the competition chosen for each pair product/market [2].

**Field of competition** is the imaginary *locus* of dispute in the market between products, or between companies, looking for the customer preference, in which the company seeks to achieve and maintain competitive advantage, such as price and product quality, and represents a product or a company attribute that the customer values. A combination of some of the 14 fields of competition portrays the competitive business strategy and the product positioning strategy.

**Weapons of competition** is any activity done or resource managed by a group of employees with homogeneous functions, used by the company to achieve/maintain competitive advantage, such as advertising, information technology and automation of the production process, and does not interest to the customer. The origin of the competitive advantage is in the weapons of the competition. A set of relevant weapons represents the operational competitive strategy of the company.

**Competitive advantage** is a position of superiority recognized and valued by the client that takes a company to be more competitive than a competitor or itself in earlier time, and is represented by a combination of some fields of competition.

Two other constructs of CAC must be defined because they are used in this paper. **Intensity of the weapon** is the degree of effectiveness of the use of the weapon, or its potency, valued at five levels.

**Relevant weapons** are the subset of the weapons of the company that provide high competitive advantage in its chosen field to compete and must have high intensity, justifying a high investment to achieve significant competence.

The **formulation of competitive business strategy** by CAC is to segment the market, to define a product suitable for each segment and to choose a combination of one or two of the competition fields, and one or two adjuvant fields for each pair product / market. The definition of **operational competitive strategies** by CAC is to identify the relevant, semi-relevant and irrelevant weapons of the competition and adjuvant fields and define the intensity of these weapons.

## 3 Methodology

For the research we used a literature review in order to suit the framework of CAC model of strategy formulation, presented in Fig. 1, with the specific competitive context that the sustainable manufacturers and their supply chains face in their daily operations.

Database used: (1) Web of Science, (2) Science Direct and (3) EBSCO.

The research was divided in five phases.

### 1<sup>st</sup> Phase

We analyzed the 54 papers reported in the Journal of Cleaner Production no. 96, 2015, that published the best papers presented in the 4th International Workshop Advances in Cleaner Production, held in Sao

Paulo, Brazil, 2013, under the theme: “Integrating cleaner production into sustainability strategies”, when we selected 8 papers.

**2<sup>nd</sup> Phase**

Using the Web of Science database we selected:

- a) Period of time: 2000 to 2015;
- b) Criteria of selection: more than 80 citations;
- c) Keywords (using logical operators): strategy AND (formulation OR formation OR making OR formulating OR process);
- d) Number of papers selected: 12.

**3<sup>rd</sup> Phase**

Using the Web of Science database to try to reach the state of the art, we selected:

- a) Period of time: 2013 to 2015;
- b) Criteria of selection: more than 10 citations;
- c) Keywords (using logical operators): (“strategy formulation” OR “strategy process”) AND (business) AND (operation);

Number of papers selected: 3 (excluded the ones from the 2nd Phase).

New attempt:

- d) Keywords (using logical operators): (“strategy formulation” OR “strategy process”) AND (business) OR (operation).

Number of papers selected: 3 (new ones).

**4<sup>th</sup> Phase**

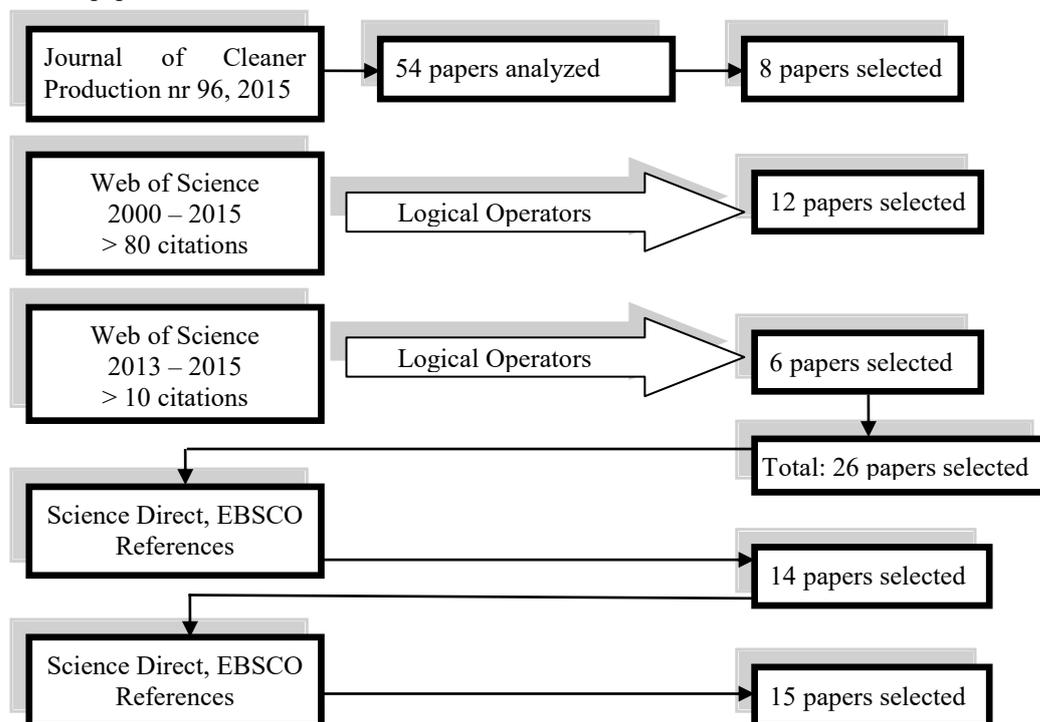
From these 26 papers (Phases: 1<sup>st</sup> to 3<sup>rd</sup>) and using their references, we selected through Science Direct and EBSCO other 14 papers frequently cited that lead to the classic authors.

**5<sup>th</sup> Phase**

Reading the classic authors and their references, we selected through Science Direct and EBSCO more 15 papers of interest for this research.

Total of papers read: 101

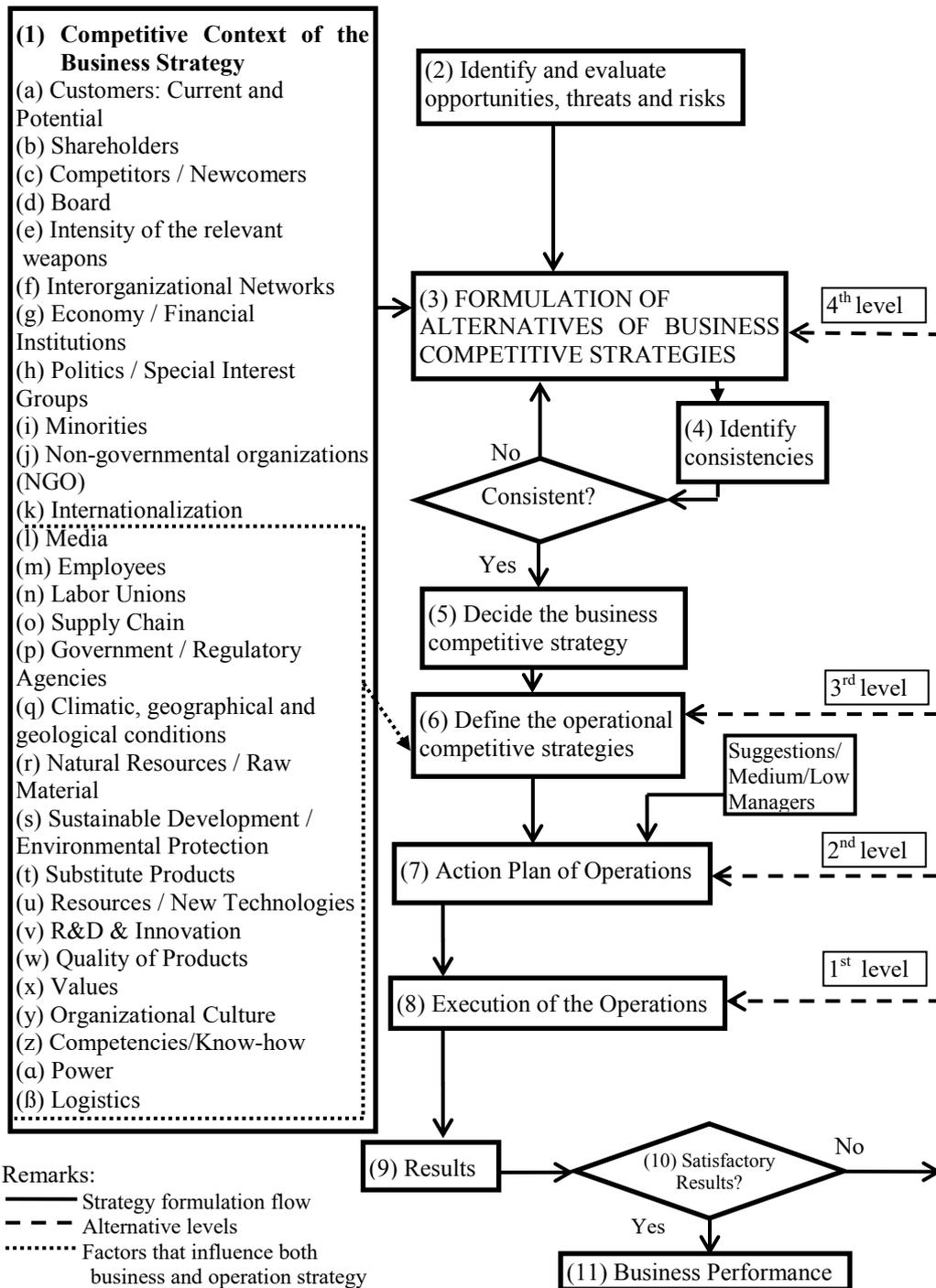
Total of papers selected: 55



**Figure 1:** Methodology adopted (Total papers analyzed: 101. Total papers selected: 55).

#### 4 The process of the strategy formulation

In Fig.2 we present the framework, based on literature review and CAC model of strategy formulation.



**Figure 2:** The formulation process of the business and operational competitive strategy for sustainable manufacturers and their supply chains (Source: Adapted [2], p.344)

#### 5 Discussion

These 55 papers selected were used to suit the framework of the CAC model of strategy formulation with the specific competitive context for sustainable manufacturers and their supply chains (Fig.1), showing the many factors that can influence the formulation of a business strategy, some cited in the literary review generically as stakeholders [16].

To formulate the business strategy it is necessary to (1) understand the competitive context that involves to evaluate: (a) current and potential clients; (b) current and potential competitors; (c) organizational values, culture and capabilities that are considered by some actors as the roots of competitive advantages [17].

The (d) internal and external politics that can impact the company is of importance [18], and so are the groups of special interests, (e) the labor unions, and the (f) media that can try to guide the public opinion against or in favor of the company [16].

Economy and financial institutions (g) are of relevance to supply the capital to the development of innovation and/or new processes, necessary to the companies that compete in sustainability, and (h) minorities [19] that can press the public opinion.

From this point on, the following factors have effect on the formulation of the business strategy, and also on the formulation of the operational strategies.

The (i) interorganizational networks, voluntary arrangements between companies [20], can impact the company, and also the Government (j) and its regulatory agencies that specify the rules under which the company and their products can operate.

The (k) supply chain is of vital relevance, as it provides the supply necessary for the operations, through the coordination of the material flow, production and inventory planning.

Sustainable manufacturers focus additionally in being supplied by a supply chain also compromised with sustainability, committed to waste-reducing and other clean production practices; not forgetting that the competitiveness must be kept by responsiveness to demand/market change, and by reduced operations costs [21], what can be a challenge if you do not have a framework to guide to formulate a strategy that can provide competitive advantage, such as the one proposed.

Climatic, geographical and geological conditions (l) are important characteristics to be evaluated in a world of climate change, and so are the natural resources (m), analyzing their maintenance or finding alternatives for the future.

Resources, new technologies, research, development and innovation (n) are of special interest, as new competitors can come with them, such as high tech companies like Apple and Google, competing in the automotive industry with all-electric and autonomous cars [22].

After this analysis, it is important to (2) identify and evaluate opportunities, threats and risks with which the company is involved, as well as the demands and expectations of the (o) shareholders and (p) board; and also check the (q) intensity of the relevant weapons, which is the analysis of the resources that the company has to maintain or achieve a competitive advantage.

At this point (3), alternatives of business strategies can be formulated, their (4) consistency identified, and (5) then the business competitive strategy decided. Aligned to that, the (6) definition of the operational competitive strategies is made. Suggestions of the staff and the medium and low managers can help to guide the (7) action plan of operations and its (8) execution can be elaborated.

From the (9) results (productivity, service, quality, return on investment [19] and others), it can be necessary to redefine the execution, or the plan of operations, or the operational competitive strategies, or the business competitive strategy. We propose four levels of analysis for doing so, going from one level to the next one only if the cause of the unsatisfactory results is not found in the level analyzed: (1st) analyze if the execution of the operations is the responsible for the unsatisfactory results, if not (2nd), check the action plan of operations, if it is all right, (3rd) study if the operational strategies are adequate or not; and only last (4th), analyze all the formulation process again, proposing new alternatives of business strategies.

## 6 Conclusion

This research presented a framework (Fig.1) to guide sustainable manufacturers and their supply chains to formulate a business strategy to improve competitive advantage, based on the *Campos e Armas da Competicao* – CAC, in Portuguese (Fields and Weapons of the Competition) model of strategy formulation, and on a literature review that comprised 55 selected papers.

The contribution of this framework is to show the many factors that must be taken into account, some quoted in the literary review generically as stakeholders [16]; and the level of complexity involved in the formulation of the business and operational strategy process of manufacturers that compete in environmental sustainability.

The decision to follow a strategy depends on the interpretation, interaction and integration of these many factors that can lead to different strategies, and consequently, to different results.

This framework differs from classical study [23] as we propose that technology involves the business strategy as well as operational strategies, and also that the economic factors must be thought since the formulation of alternatives of business strategies, what requires a stronger alignment of operational strategies to business strategy than suggested by classical authors [23], [24].

We agree that the strategy can be changed when the results are not consistent with it [23], but we suggest four levels of analysis for doing so, going from one level to the next one only if the cause of the unsatisfactory results is not found in the level analyzed.

Strategy formulation is a complex task, and we hope this paper can provide tools so that entrepreneurs, executives, leaders, and the responsible for the management of the companies that compete in sustainability and their supply chains, can be guided to formulate a strategy that can reach competitive advantage.

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