

# **Perspectives on non-financial indicators as a strategic**

## **management accounting tool: A French inquiry**

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#### **Abstract**

In this article, we present the evolution of management accounting and the strategic management accounting (SMA) concept. The balanced scorecard (BSC), a SMA tool, is quite famous in European countries. Its principle objective is to articulate planning decisions with control ones thanks to non-financial indicators. Contractual theories constitute the foundations of this tool. But in Northern Europe, some specific BSC are designed in the framework of knowledge-based theories.

We describe here the results of an inquiry conducted in France. Its aims are mainly:

- To test the usefulness of non-financial indicators in driving a firm's objectives,
- And to test the link between the use of non-financial indicators and the performance.

We demonstrate that the French managers associate non-financial indicators with strategic objectives. But we also conclude that they believe that there is no direct link between the use of non-financial metrics and the performance.

*Keywords:* Management accounting; Strategic management accounting; Balanced Scorecard; Non-financial indicators; Contractual and knowledge-based theories; Survey questionnaire

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## 1. Introduction

The influence of Anglo-Saxon scholars on management accounting and control is great. For Anthony (1965, p. 17), management control is "the set of accounting and financial verification tools based on predefined objectives"; in other words, a verification planning process. The strategic control concept emerged during the 1970s and has been developed since (Sarrazin, 1978; Schendel & Hofer, 1979; Horovitz, 1979). Strategic management accounting (SMA) is the notion of extending this concept to management accounting (Simmonds, 1981; Shank and Govindarajan, 1989; Bromwich, 1990). There has been growing research on this subject since the mid-1980s.

In a firm, a SMA instrument exists when it can connect strategic and marketing decisions to operational ones. The main reasons for implementing a SMA tool, according to the academic literature, lie in the evolution of the environment. This is described in successive stages: stable and predictable, unstable and difficult to anticipate and finally turbulent and unpredictable. As a consequence, scholars explain that management accounting tools must include external and leading non-financial indicators<sup>2</sup> and integrate them into the company's drive. These indicators need to be articulated with traditional financial indicators. SMA also receives considerable attention due to the increasing complexity of the decision-making process. Tomkins and Carr (1996, p. 165) explain that "...there is still no agreed comprehensive conceptual framework for what SMA is...", and it is still the case. In the SMA concept, we put together works insisting on marketing aspects (Roslender and Hart, 2003) and works

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<sup>2</sup> And more especially metrics concerning the competitive environment, the marketing positioning and human resources.

insisting on strategic dimensions (strategic cost management notion, Shank and Govindarajan, 1989).

Since the historical work of Johnson and Kaplan (1987), the vast majority of new management accounting tools has gained strategic and marketing dimensions. The most famous in Europe are activity-based costing (Cooper and Kaplan, 1988), activity-based management (Cooper and Kaplan, 1999), target costing, the customer profitability analysis, the BSC (Kaplan and Norton, 1996, 2004) and the use of non-financial indicators, and more recently, the beyond budgeting model (Hope and Fraser, 1999) or the time-driven ABC (Kaplan and Anderson, 2004).

These tools mainly originate from the United States and have a great impact on European academics and managers. In this article, we examine the BSC and more especially the non-financial indicators. We conduct an inquiry:

- First, to test the usefulness of non-financial indicators in driving the firm's objectives. More precisely, we want to know if the reasons why using non-financial indicators differ from a contractual to a knowledge-based viewpoint and if the indicators chosen by a firm are coherent with the objectives defined.
- Second, to test the link between the use of non-financial indicators and performance.
- And third, to test the link between the use of non-financial indicators and the features of the firms.

This study aims to examine in what extent the increase use of non-financial indicators express the development of SMA practices in the French manufacturing firms.

## **2. Theories and hypotheses**

### *2.1. Critical perspectives on management accounting*

To analyse an organizational architecture<sup>3</sup> and its governance, we can distinguish between the contractual and the knowledge-based theories (Charreaux, 2004).

Contractual theories constitute the foundation for management accounting and SMA. They suggest a disciplinary approach to manage a firm. They refer to the agency and transaction costs theories. Brickley et al. (1997) and Zimmerman (1997) apply the contractual theories to the management accounting. From a contractual point of view, the objectives of management accounting are:

- To reduce conflicts and provide control (disciplinary aspects),
- To tie the strategy to resource allocation (budgetary aspects),
- To facilitate the firm's internal coherence (organizational aspects).

Some authors have proposed significant researches using heterodox approaches that we call the "knowledge-based theories". They refer to the organizational learning theory (Argyris and Schön, 1978; Nelson and Winter, 1982), the resource-based view (Penrose<sup>4</sup>, 1959) and the core-competences (Hamel and Prahalad, 1990). Simons (1995) for instance has built the interactive control concept and Scandinavian scholars have developed the intellectual capital notion, referring to the use of knowledge resources from a management control point of view (Mouritsen and Larsen, 2005). Knowledge-based theories postulate that knowledge is the main determinant of value creation. The resource-based view approach lies within the scope of evolutionist theories, which postulate that managing the evolution of technical and organizational processes builds the firm's competitiveness.

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<sup>3</sup> See Jensen and Meckling (1992) for developments about the organizational architecture theory.

## *2.2. The BSC and the use of non-financial indicators*

The BSC (Kaplan and Norton, 1996, 2004) is a SMA information system intended to articulate a company's strategies with its operational control (see figure 1). It groups together several financial and non-financial indicators that describe the company's strategy (leading indicators) and its performance (lagging indicators) (see figure 2). There are many executive information systems (EIS) concerning the BSC. For instance, Microsoft has developed the "Microsoft Office Business Scorecard Manager 2005"<sup>5</sup>. Now, about one American company out of two uses the BSC. An European inquiry (Jouenne et al., 2005) shows that 41% of the European companies questioned use a BSC (35% in France).

According to Kaplan and Norton (1996), the BSC helps to correlate lagging and leading metrics so that a link could be established between strategic and control management (See twenty strategic objectives (appendix part 1) and twenty indicators (part 2)). This is the reason why it is a SMA instrument.

Figure 1. The BSC: A SMA instrument.

So, a purpose of the BSC is to establish a causal chain between indicators and between strategic objectives. Kaplan and Norton (2004) call it the "strategy map". We can distinguish two types of indicators. The lagging indicators are historical and express passed results. The leading indicators express the objectives of the firm and are prospective.

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<sup>4</sup> Penrose develops the concept of capabilities so that we can also use the expression "Capabilities-based theories".

Figure 2. The main objective of the BSC: To link a company's strategy to its budgets thanks to several indicators.

Figure 3 represents an extract of the strategy map of a French insurance company. The arrows show possible correlations between several indicators: two leading indicators, the "customer satisfaction index" and the "average waiting time when a customer phones" and three lagging ones, the "market share growth", the "return on Sales rate" and the "return on investment rate". We can assume that when the "average phoning waiting time" decreases, the "customer satisfaction index" will increase and then the "market share". If the correlations are validated, than the strategy map demonstrates a link between operational and strategic and marketing management objectives.

Fig. 3. Extract of the strategy map of a French insurance company.

Kaplan and Norton have designed the BSC with a contractual point of view. It is disciplinary-centred, hierarchically constructed and the metrics insist on the respect of the objectives. A traditional approach to formulate the strategy (SWOT and Porter's models) is used; formulating and implementing the strategy are two different steps and value creation is fundamentally based on shareholder satisfaction.

In Northern Europe, we can observe some specific BSC called intellectual capital scorecards or intellectual capital statements (Roos *et al.*, 1997; Mouritsen, 2003). The Navigator, conceived by the Swedish insurance company Skandia, is the most famous one (Edvinsson and Malone, 1997). Although these instruments derive from the BSC,

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<sup>5</sup> See: <http://www.microsoft.com/office/solutions/scorecards>

they are conceived in the framework of the knowledge-based theories. They are more participative and the metrics insist on the development of knowledge and competences. The classical strategic process is reversed (Grant, 1991, p. 116). First, it consists of carrying out an internal analysis to detect the strategic assets; then measuring and characterizing the firm's skills and resources. In the end, the method suggests that an external analysis be completed, including the identified resources and skills. Mintzberg and Waters (1985) name this trend "the process strategy". They explain (1985, p. 270) how the formulation originates within the processes. They are both deliberate and emergent.

### *2.3. Hypotheses*

Widener (2005) tests (first point) the link between the strategic resources of a firm and the types of performance measures (financial and non-financial) used. She also tests (second point) the links between the strategic resources, performances measures and the performance of the firm. Globally, she finds a significant positive association between the use of certain types of performance measures and the strategic resources favoured<sup>6</sup>. But for the second point, the author finds differences between non-manufacturing and manufacturing firms. For the first ones, there is a significant positive association between the choice of strategic resources and the performance. It is not the case for the second ones. So, we decide to investigate the manufacturing firms concerning the use of non-financial measures, using knowledge-based and contractual theories. We also

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<sup>6</sup> In another research (2006, p. 198), the author finds that "...labor-intensive firms have a higher probability of placing emphasis on non-financial measures...", and that "...this relationship is moderated by the firm's pay structure". More generally, the author thinks that the findings are consistent with Kaplan and Norton (1996, p. 217), confirming that "firms use the performance measurement system to translate and communicate strategy throughout the firm."

believe that manufacturing companies could use non-financial metrics because of their complex organizational structures and production processes.

We conduct several tests in an attempt to validate four groups of hypotheses.

**H 1.** Non-financial indicators are useful tools in driving the firm's objectives.

**H 1.1.** Contractual motives (first part of the appendix) are positively correlated to contractual indicators (second part of the appendix).

**H 1.2.** Knowledge-based motives are positively correlated to knowledge-based indicators.

**H 2.** The way to use non-financial indicators is linked to the way to appreciate the firm's performance.

**H 2.1.** When shareholder's value and a contractual perspective are favoured in a firm, financial indicators are more important than non-financial ones.

**H 2.2.** When a knowledge-based perspective is privileged, non-financial indicators are more important than financial ones.

**H 2.3.** When an efficient allocation of the wealth between all stakeholders is favoured, financial indicators are no more important than non-financial ones.

**H 3.** The way to use non-financial indicators is linked to the way to increase the firm's performance.

**H 3.1.** The positive correlation between contractual motives (knowledge-based motives) and contractual indicators (knowledge-based indicators) lead to a foreseeable (unforeseeable) increase in the firm's performance.

**H 3.2.** The positive correlation between contractual motives (knowledge-based motives) and contractual indicators (knowledge-based indicators) lead to a short-term (long-term) performance increase.

**H 3.3.** The positive correlation between contractual motives (knowledge-based motives) and contractual indicators (knowledge-based indicators) lead to a rapid (progressive) performance increase.



**H4.** The features of firms managed by contractual approach differ from the features of firms managed by knowledge-based approach.

Fig. 4. Theoretical model.

### **3. Research method and results**

#### *3.1. Research method*

In 2005, we sent 1 000<sup>7</sup> questionnaires to executives of manufacturing firms. We analyse data from 96 survey responses. The survey instrument was evaluated in a limited pre-test by several business professors and managers from different firms. The sample is homogeneous. We have questioned managers with comparable responsibilities: chief executive officers for the smallest firms, responsibility center managers for bigger ones and quality and supply chain managers and plant managers for the biggest.

Table 1. Descriptive statistics: Use of non-financial indicators and company profile

##### *3.1.1. For the first group of hypotheses*

To validate the first group of hypotheses, we conducted three types of tests:

- First, a factor analysis with a “varimax rotation”,
- Second, a discriminant analysis (PCA: principal components analysis),
- And third, chi-squared tests.

In the questionnaire, we mix the contractual with the knowledge-based motives (first part of the appendix) and the contractual with the knowledge-based indicators (second

part). The motives (which refer to strategic objectives) and indicators were chosen based on a meticulous study of BSC experiences.

Some of the motives are contractual because they encourage the use of non-financial indicators:

- For worker incentive plans (motive g, see appendix, first part; Ittner and Larcker, 2002),
- As a control information system (motives e and n),
- As a performance measurement tool (motives c and f) (Perera et al., 1997),
- To adjust the strategy (motives a, i and p).

Some other motives are knowledge-based because they encourage the use of non-financial indicators:

- To improve knowledge and organizational learning (motives b, d and m),
- To increase skills and anticipate the evolution of the environment (motives f and q) (resource-based view),
- To influence behaviours and facilitate relationships (motives h, j, l and o).

For the last item, we used the research of Nonaka and Takeuchi (1995). They explain that organizational learning has a behavioural dimension.

### *3.1.2. For the second and third groups of hypotheses*

We conduct different tests to determine if there is a link between non-financial indicators and the performance (third and fourth parts of the survey).

Several management accounting scholars explain that a good managerial information system has a positive impact on performance (Kaplan and Norton, 1996, p. 21<sup>8</sup>). Some

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<sup>7</sup> The 1 000 firms were randomly extracted from a database called Kompass :<http://www.compass.com>

<sup>8</sup> They use a quite famous expression: “if you can’t measure it, you can’t manage it”.

inquiries try to test the link between non-financial indicators and performance. The results are quite contradictory. For instance, Ittner et al. (2003) (140 questionnaires analysed) test the theory that coherence between strategy and the use of non-financial indicators increase performance. They want to know if firms that connect non-financial indicators to their strategic objectives perform better. Their hypothesis is rejected. But Hoque (2004) shows that strategic choices increase performance when expressed by some non-financial indicators<sup>9</sup>.

In a first time, we verify the group of hypotheses H2. We first conduct a chi-squared test with hypothesis H0: a random distribution of the data. Next, we apply the Kolmogorov-Smirnov test for each hypothesis.

In a second time, we use the results concerning the first group of hypotheses to test if the possible link between non-financial indicators and a company's objectives is correlated with the way managers appreciate their firm's performance.

We execute several logistical regressions. The dependant variable is binary and corresponds to the answers (yes or no) given to the questions in the third part of the inquiry. The independent variable is a measure of the proximity (coherence) between the non-financial indicators selected by the managers (contractual and knowledge-based) and the objectives chosen (contractual or knowledge-based). We obtain two measures: *Proxcontr* for "contractual proximity" and *Proxknow* for "knowledge-based proximity". The score can vary from 0 to 10.

### 3.1.3. For the fourth hypothesis

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<sup>9</sup> Several fields studies also test the link between the use of non-financial measures and performance (For instance, Davis and Albright, 2004, find a positive impact of the non-financial metrics on the performance of a banking organization).

Based on the contingency theory, several inquiries attempt to validate a link between the use of non-financial indicators and variables like strategy, environmental uncertainty, human resources management and so on. In general, the results are positive. For example, Govindarajan and Gupta (1985) demonstrate that firms (sample with US industrial companies) with a “build” strategy are more likely to use non-financial indicators than firms with a “harvest” strategy. Dubé and Gosselin (2002) (Canadian sample) demonstrate that “prospector” firms use non-financial indicators more than “defensor” firms.

In relation to our theoretical model, we suppose that firms in which the main purpose of the management information system tools is to control opportunistic behaviours (contractual perspective) have specific features. They are different from firms in which the mission of the management information system tools is mainly to favour organizational learning and skills development (knowledge-based perspective).

We test five contingency factors (see appendix, part V): the type of strategy developed, the level of environmental uncertainty, the managers’ degree of autonomy, the type of organizational structure adopted and the characteristics of subordinate remuneration.

## *3.2. Results*

### *3.2.1. For the first group of hypotheses*

We conduct a factor analysis to see if two groups are discriminated (see table 2). As a result, we obtain two axes with a value above 2: the first for the knowledge-based perspective and the second for the contractual perspective. Motives h, j, l and o are

correlated with the knowledge-based axis, and motives k, n, p and r with the contractual axis (correlation > 0.5). The KMO (Kaiser-Meyer-Olkin) index is 0.753.

Table 2. Factor analysis

For the other tests, we keep motives of the two axes described. With the discriminant analysis, we try to determine if these motives can explain the number and types of indicators used (contractual or knowledge-based).

Now, we only present the results for the knowledge-based perspective.

Table 3. Discriminant analysis: Groups & sizes for the knowledge-based perspective

Table 4. Discriminant analysis: Groups & sizes for the contractual perspective

Table 5. Knowledge-based motives: Wilks' alpha and F-statistics (univariate: 2, degree of freedom: 89)

Table 6. Knowledge-based perspective: Values of the discriminant functions

Table 7. Wilks' lambda

Table 8. Knowledge-based perspective: Structural matrix

At this point, the results are quite positive. The first discriminant function explains 72.4% of the variance and has a value of 0.235 (Table 6). Items l, h and o are significant. The second function has a low value (0.090) and only explains 27.6% of the variance. The chi-squared test is significant (table 7: 25.945) below 5%. We can say that the two functions combined clearly distinguish the three groups (cf. table 3).

The structural matrix (table 8) shows that items l, o and h explain the first function quite well. We have conducted another analysis (dispersion diagram) that confirms our results. 57.6% of the observations (table 3) for the knowledge-based perspective are correctly classified. Improvement, compared to a random classification, exceeds 50%. We also obtain a positive analysis for the contractual perspective. So we conclude that the second hypothesis is confirmed (Malothra, 2004).

We carry out chi-squared analyses to complete our demonstration, splitting the answers into two groups. The first contains the answers that favour contractual indicators and the second that favour knowledge-based indicators. We prepare chi-squared tests for each. These tests show a difference between the two groups and the theoretical sample. They confirm our results.

### *3.2.2. For the second and third groups of hypotheses*

Concerning the second group of hypotheses (H.2.1, H.2.2 and H.2.3), the chi-squared test with hypothesis  $H_0$ : a random distribution of the data is not conclusive, so we globally reject the three hypotheses. Table 9 shows the results of the Kolmogorov-Smirnov test for the hypothesis H.2.1.

Table 9. Results of the Kolmogorov-Smirnov test for the hypothesis H.2.1

The higher value for D is 0.1902. The value of the threshold (5%) for seven observations is 0.486. So, the hypothesis H.2.1 is invalidated. The hypotheses H.2.2 and H.2.3 are also rejected. Thus, we do not demonstrate that there is a link between the way to use non-financial indicators and the way to assess the firm's performance.

To examine the third group of hypotheses (H.3.1, H.3.2 and H.3.3), we conduct other tests. We use the factor analysis (section 3.2.1) that demonstrates that motives h, j, l and o are correlated with the knowledge-based axis, and motives k, n, p and r with the contractual axis.

For the two groups of motives, the Cronbach's alpha is satisfactory (0.791 for the contractual perspective and 0.660 for the knowledge-based perspective). The mean score can vary from one to five. The calculated variables are centred and reduced. Then we multiply the two measures to evaluate the degree of coherence.

Table 10 shows an example. The indicator of coherence is negative when we do not observe proximity.

Table 10. Determining of the *Proxcontr* variable

The more positive the indicator of proximity, the more likely a person will answer "yes" to the questions in the third part of the questionnaire. But that is not enough. For instance, in the fourth line of table 10, we can see coherence (value: 0.191), but interest for contractual motives and contractual non-financial indicators is low (3 indicators). So we decide to only retain answers with a positive indicator of proximity and a number of contractual indicators above 5. With these conditions, we obtain 33 companies for the contractual perspective and 18 for the knowledge-based perspective. Table 11 shows the results for the contractual perspective and the hypothesis H.3.1.

Table 11. Results for the contractual perspective. Dependant variable: an increase in performance is foreseeable/unforeseeable

The coefficient is positive, but not significant (Chi-squared: 0.775, smaller than the theoretical chi-squared). We obtain the same results (a positive, but not significant coefficient) for the other dependent variables and for the knowledge-based perspective. So, we do not demonstrate a link between the way to use non-financial indicators and the way to increase the firm's performance.

### *3.2.3. For the fourth hypothesis*

To test the fourth hypothesis (that is to say five contingency variables), we conduct a factor analysis. The results are not conclusive, except for the managers' degree of autonomy. However, interpretation is difficult. So the fourth hypothesis is rejected. The characteristics of a firm do not explain the use of non-financial indicators.

## **Discussions, conclusions and future extensions**

In France, the evolution of management accounting is mainly influenced by Anglo-Saxon innovations. During the last years, the most famous one has been the BSC. In this article, we want to know how French managers felt about it. Do they see the BSC as a new trend or a truly useful managerial information system?

The results are globally negative except for the first group of hypotheses. There is a correlation between the choice of non-financial indicators and the motives behind them. As such, we demonstrate that the managers associate non-financial indicators with strategic objectives, which is the theoretical basis of the BSC as a SMA tool. But the positive results are contestable because the two axes of the factor analysis retained only



explain a bit more than 25% of the variance (see table 2). The other tests concerning the motives retained after the factor analysis are very satisfying.

But if we go deeper in the factor analysis, we observe three other axes with a value between 1 and 2. Indeed, these axes mix contractual and knowledge-based motives. But they express different types of perspectives of a BSC (see figure 5). The motives seem logically combined. So we can say that the indicators selected by the respondents are coherent with the objectives chosen.

Figure 5. A model of BSC as a result of the inquiry.

Therefore, the non-financial indicators are correlated with the firm's strategic objectives. This means that the French managers believe that non-financial indicators are a relevant SMA information system with which to drive a company.

But we also conclude that French managers believe that there is no direct link between non-financial indicators and the performance. Besides, it seems that a break exists between instruments used to manage (like the BSC) and financial performance measures. In our opinion, this partly shows that for most managers, the main determinants of performance are strategic choices, competitive advantages and marketing positioning and not management information systems.

For future extensions, the theoretical background of the inquiry could be improved introducing behavioural bias (Charreaux, 2005) and mimetism aspects. Longitudinal studies could also be helpful to go deeper in the motivations of managers. Contributions from other countries could lead to a comparative strategic management accounting research.

## Appendix

### Survey questionnaire

**First part:** For what reasons do you use non-financial indicators?

We separated the “Contractual” motives (contr) from the “Knowledge”-based motives (know).

The respondent does not have this information.

The following is a list of items that can explain why you use non-financial indicators. For each, please indicate if:

- 1: It does not at all explain why you use non-financial indicators
- 2: It explains a little why you use non-financial indicators
- 3: It partly explains why you use non-financial indicators
- 4: It explains quite well why you use non-financial indicators
- 5: it perfectly explains why you use non-financial indicators

I use non-financial indicators:

- a) To direct the managers’ attention to the strategic priorities that the chief executive officer has defined (contr)
- b) To modernize our information management systems (know)
- c) To measure that I have reached some of my strategic objectives (contr)
- d) To develop lean management: flexible organization and rapidity of the information flow (know)
- e) To evaluate the performance of my employees (contr)
- f) To appreciate the skills of my employees and their ability to innovate (know)
- g) To link the performance of my employees to their wages (contr)
- h) To develop reliable partnerships with some of our customers & suppliers (know)
- i) To report important information to management (contr)
- j) To improve the social climate at work and internal communication (know)
- k) To improve external communication (with shareholders, customers, lobbies, etc) (contr)
- l) To develop team spirit at work (know)
- m) To modernize the manufacturing processes (know)
- n) To justify a sanction (contr)
- o) To involve the employees, further their initiatives and capacity to control themselves (know)
- p) To test if my management is in line with my hierarchy and customers (contr)
- q) To anticipate the evolution of my environment and my customers’ expectations (know)
- r) To analyse the firm’s competitive environment (contr)

- s) To measure the organization's effectiveness (contr)
- t) To deliver a positive image of my company to the outside world (know)

**Second part:** Which types of non-financial indicators do you use?

We separated the "Contractual" indicators (C) from the "Knowledge"-based indicators (K). The respondent does not have this information.

The following is a list of indicators that are frequently present in a Balanced Scorecard. Please check those you use.

Indicators	Used	Not used
Labor efficiency variance (C)		
Administrative tasks/creative tasks (K)		
Market share (C)		
Public image (K)		
Material efficiency variance (C)		
Number of social conflicts (K)		
Training program efficiency (K)		
Shareholder & customer satisfaction (C)		
Speed of the information flow (K)		
Competitor comparisons (C)		
Cohesion of the working teams (K)		
Percent defective products shipped (C)		
Degree of technology evolution (K)		
Professional misconduct (C)		
Marketing positioning -level of success (C)		
Information management systems efficiency (K)		
Proportion of employees rewarded (C)		
Employee commitment level (K)		
Cycle time from order to delivery (C)		
Number of partnerships contracted since... (K)		

**Third part:** The link between the use of non-financial indicators and the way you heighten your company's performance.

In this part, we want to know if you think that the use of non-financial indicators as an information management system (Balanced Scorecard, for example) is connected with the way you improve your firm's performance.

- 1- Would you say that when you use non-financial indicators, it is foreseeable that your firm's performance will increase?
- 2- Would you say that the setup of non-financial indicators leads to a short-term performance increase?
- 3- Would you say that after deployment of non-financial indicators performance increase has been rapid?

**Fourth part:** The link between the use of non-financial indicators and your company's performance.

In this part, we would like to know if you think that the use of non-financial indicators as an information management system (Balanced Scorecard, for example) is connected with the increase in your firm's performance.

To optimize the performance of your business unit, do you think that it is better:

- 1- To favour financial indicators?
- 2- To favour non-financial indicators?
- 3- Place them on the same level of importance?

Your business unit performs at the highest level when:

- 1- The wealth of the shareholders is maximized?
- 2- There is an efficient allocation of wealth between all shareholders?
- 3- You have good knowledge of the process which enables this wealth?

**Fifth part.**

1. In your opinion, to perform well which type of strategy do you use?

<b>Offensive:</b> conquering new markets which requires innovation and differentiation skills	
<b>Defensive:</b> harvest strategies	

2. Would you say that the level of uncertainty in your firm is:

- |          |     |          |      |           |
|----------|-----|----------|------|-----------|
| 1        | 2   | 3        | 4    | 5         |
| very low | low | moderate | high | very high |

3. Would you say that the organizational structure of your firm is:

1

2

Hierarchical

Decentralized

4. Concerning the decisions listed below, would you say that your autonomy is (1- very weak, 2 – weak, 3- medium, 4- strong or 5- very strong)?

- a) To decide to launch a strategic project (new product, new market, ...)
- b) To manage that type of project
- c) To find funding for the project
- d) To recruit new employees
- e) To improve quality and customer relations
- f) To control the realization of strategic projects
- g) To choose an organizational structure
- h) To give your employees a financial bonus
- i) To give your employees a non-financial bonus
- j) To give individual incentives
- k) To give collective incentives

5. Concerning the types of rewards listed below, would you say that you give them to your employees (1- never, 2- rarely, 3- sometimes, 4- often, 5- very often)?

- a) Financial collective incentives
- b) Non-financial collective incentives
- c) Financial individual incentives
- d) Non-financial individual incentives

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Table 1

Descriptive statistics: Use of non-financial indicators and company profile

Proportion non-financial indicators /indicators	Profile of responding companies	Respondent job title	Size (number of employees)
[0-20%]: 6 firms	Instruments, electrical equipment and related products: 32	Plant manager: 34	10 to 49: 7
[20-40%]: 12	Paper & chemical products: 17 Plastic & rubber industry: 15	Responsibility center manager (division, business unit): 33	50 to 99: 4
[40-60%]: 29	Car industry: 11	Quality & supply chain manager: 13	100 to 149: 10
[60-80%]: 36	Primary metal industries: 10		150 to 200: 10
[80-100%]: 9	Textile products: 8	Chief executive officer: 13	> to 200: 63

\* The columns are independent. We have several non-responses: 4 for the first column, 3 for the second, 3 for the third and two for the fourth.

Table 2

Factor analysis

Factors: means (standard deviation)	Items coefficient correlation with the 1st axis	Items coefficient correlation with the 2nd axis
<b>1<sup>st</sup> axis: Knowledge based factors concerning working relations.</b> Value = 2,66 ( 13,32% of the variance) (a = 0,791) h) (see Appendix, first part): 3,40 (1,081) j): 3,27 (1,096) l): 3,77 (1,026) o): 3,77 (1,026)	<b>0,627</b> <b>0,811</b> <b>0,671</b> <b>0,715</b>	0,294 0,231 -0,065 0,046
<b>2<sup>nd</sup> axis: Contractuals factors.</b> Value = 2,36 (11,83% of the variance) (a = 0,660) k): 3,02 (1,179) n): 1,87 (1,034) p): 3,44 (1,195) r): 2,91 (1,121)	0,235 -0,088 0,228 0,225	<b>0,662</b> <b>0,676</b> <b>0,497</b> <b>0,605</b>

\*The analysis was realised with at least 94 answers for each item.

Table 3

Discriminant analysis: Groups &amp; sizes for the knowledge-based perspective

Groups & sizes	Motives	Means	Standard deviation
1 <sup>st</sup> group: 28 (0 to 1 indicator)	h j l o	3.11 3.18 3.21 3.32	1.227 1.307 1.134 1.124
2 <sup>nd</sup> group: 31 (2 to 3)	h	3.35	1.018



indicators)	j	3.23	0.990
	l	4.06	0.854
	o	3.71	1.131
3 <sup>rd</sup> group: 33 (4 to 10 indicators)	h	3.79	0.857
	j	3.36	0.994
	l	3.97	0.951
	o	4.15	0.870

Table 4  
Discriminant analysis: Groups & sizes for the contractual perspective

Groups & sizes	Motives	Means	Standard deviation
1 <sup>st</sup> group: 32 (0 to 5 indicators)	k	2.88	0.976
	n	1.69	0.896
	p	3.25	1.218
	r	2.59	1.160
2 <sup>nd</sup> group: 34 (6 to 7 indicators)	k	2.82	1.290
	n	2.15	1.105
	p	3.29	1.115
	r	2.79	1.038
3 <sup>rd</sup> group: 29 (8 to 10 indicators)	k	3.38	1.208
	n	1.76	1.057
	p	3.76	1.215
	r	3.38	1.049

Table 5  
Knowledge-based motives: Wilks' alpha and F-statistics (univariate: 2, degree of freedom: 89)

	Wilks' alpha	F-statistics	Meaning
h	0.929	3.418	0.037
j	0.995	0.239	0.788
o	0.871	6.581	0.002
l	0.902	4.836	0.010

Table 6  
Knowledge-based perspective: Values of the discriminant functions

	First discriminant function	Second discriminant function
Value	0.235	0.090
Variance %	72.4	27.6
Accrued %	72.4	100
Canonical correlation	0.436	0.287

Table 7  
Wilks' lambda

	From one to two	Two
Wilks' lambda	0.743	0.918
Chi-squared test	25.945	7.504
Degrees of freedom	8	3
Meaning	0.001	0.057

Table 8  
Knowledge-based perspective: Structural matrix

Motives for using non-financial indicators	1 <sup>st</sup> function	2 <sup>nd</sup> function
l	0.761*	- 0.366
o	0.628*	0.423
h	0.499*	0.454
j	0.122	0.144 *

Table 9  
Results of the Kolmogorov-Smirov test for the third hypothesis (fourth part of the questionnaire)

Number of respondents who answered Yes...	Distribution & proportion	Accrued proportion (A)	Theoretical distribution	Accrued theoretical distribution (B)	Differences (D=B-A)
...1	1 (1/7)	0.1428	0.333	0.333	0.1902
...2	3 (3/7)	0.5713	0.333	0.666	0.0947
...3	3 (3/7)	1	0.333	1	0

Table 10  
Determining the *Proxcontr* variable.

Average scores for items k, n, p, r (a)	Number of indicators chosen (b)	Centred & reduced scores for the motives* $c=(a-3)/1.58$	Centred & reduced scores for the indicators** $d=(b-5)/3.31$	Coherence indicator <i>Proxcontr</i> $c \times d$
4.75	0	1.107	-1.510	-1.673
4.5	2	0.949	-0.906	-0.860
2.5	3	-0.316	-0.604	0.191
4.75	10	1.107	1.510	1.673

\* For the motives, the score can vary from 1 to 5. The average is 3 and the standard deviation is 1.58.

\*\* For the indicators, the score can vary from 0 to 10. The average is 5 and the standard deviation is 3.31.

Table 11  
Results for the contractual perspective. Dependant variable: an increase in performance is foreseeable/unforeseeable

	B*	Standard deviation	Wald	Degree of freedom	Meaning
Proxcontr	1.554	1.765	0.775	1	0.379
Constant	-0.110	0.591	0.035	1	0.852

\* Coefficient of the dependant variable.

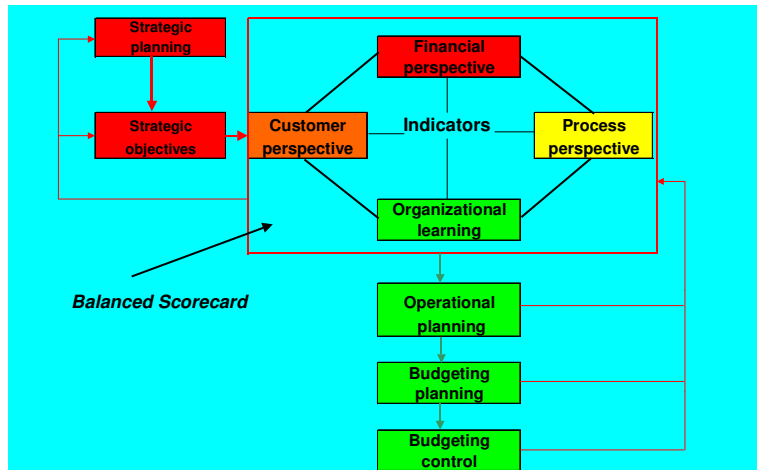


Fig. 1. The BSC: A SMA instrument.

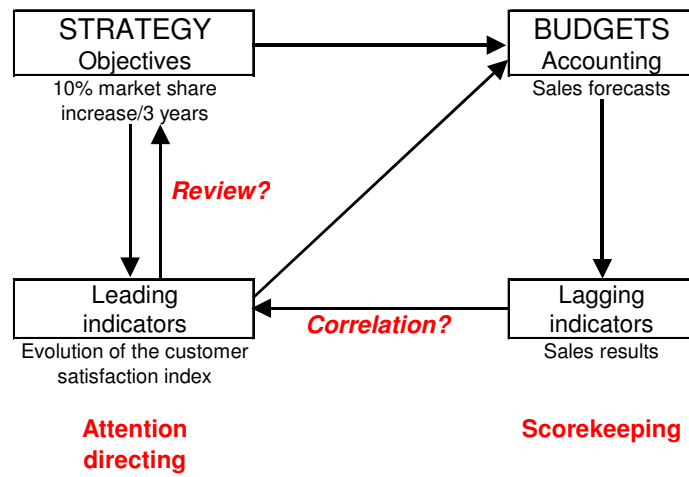


Fig. 2. The main objective of the BSC: To link a company's strategy to its budgets thanks to several indicators.

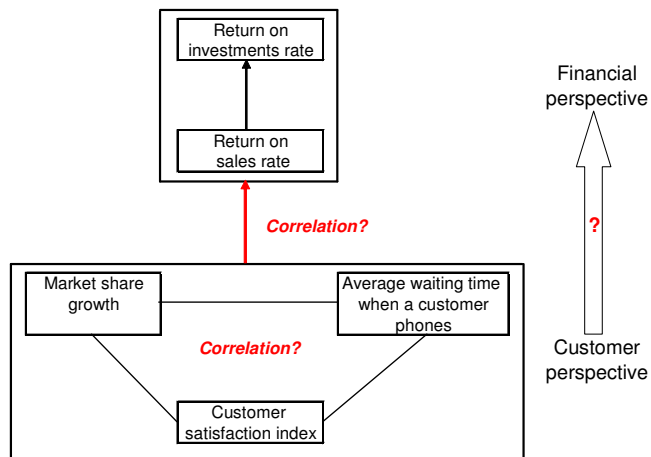


Figure 3. Extract of the strategy map of a French insurance company.

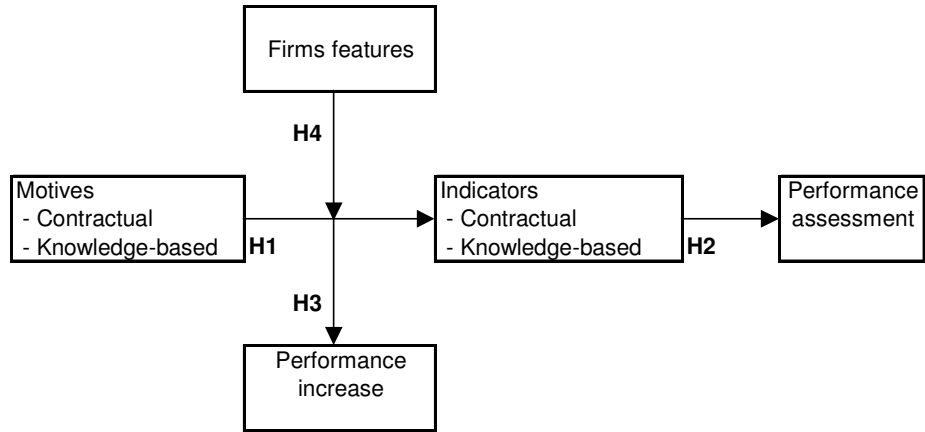


Figure 4. Theoretical model.

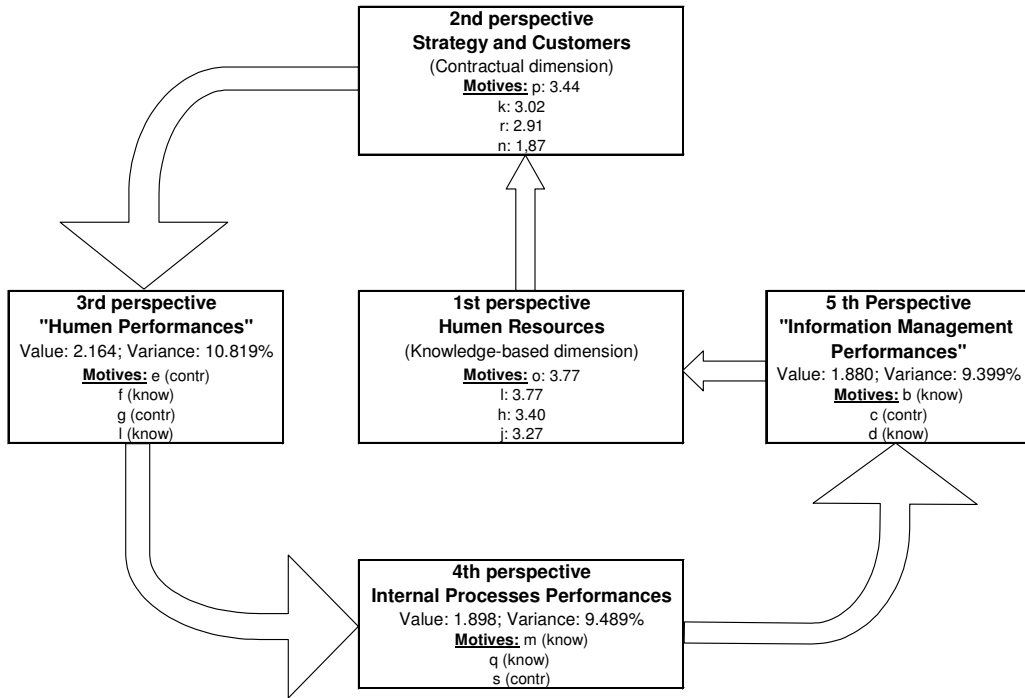


Figure 5. A model of BSC as a result of the inquiry.