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A case study of control strategy based on intellectual capital management

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Determining and managing intellectual capital has become a key objective in organisations in order to ascertain its value and gain competitive advantages. In this paper, we develop a tool used on a sample of companies that makes possible to estimate, predict and manage this capital. We started with a disaggregated model of intellectual capital and used subjective and objective indicators to measure its components. Then, for valuation purposes, we considered this capital to be obtained from the difference between market and book value. We built a tool with qualitative and quantitative information that provides new indicators and measures of intangible control. The results provided a prototype model that facilitates dynamic strategic analysis, making it possible to perform strategic simulations with little information. In addition, the paper provides insight into the structure of future intellectual capital, thereby making it possible to consider balance strategies.

Key words: Intangible, intellectual capital, management, measurement, strategic planning.

INTRODUCTION

The terms intangible assets, intellectual capital (IC) or knowledge have been used increasingly over the last few years. They refer to a large set of factors which are sources that generate benefits in organisations both in the present and the future. Different names have been given to this idea: terms such as intellectual capital, intellectual assets, intangible resources, intangible assets, hidden assets, immaterial assets, bottom of commerce and intangible capital have been used as synonyms. However, these terms are frequently used interchangeably without a clear definition when they are not always used in the same way, a variety of applications being observed.

Some authors believe that the use of these terms depends on context. Lev (2003) indicated that these terms are used indistinctly; intangible in accounting literature, knowledge assets by economists and intellectual capital by specialists in the area of business management and in legal literature. However, they essentially refer to the same thing: a source of future benefits that has no physical substance. Sánchez et al. (2000), Vickery (2000) and Cañibano et al. (2002) consider that while the terms intangible elements and intellectual capital have identical meaning, they are usually employed in different contexts. Intangible is used generally in the field of accounting, whereas intellectual capital is more frequently found in the literature on human resources. Nevertheless, it is necessary to contemplate another position whereby intellectual capital can be considered either the sum of all the intangible

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elements an organisation owns or only some of them.

In this sense, we will consider intellectual capital as hidden assets that either do not appear on traditional balance sheets or, if they do appear, do not display their true value and which are responsible for the present and future results of organisations. As a result, different studies have shown the importance of intangibles as determinants of the competitiveness and growth of firms. They are differentiating factors that are difficult and slow to accumulate. Moreover, few are transparent and they are difficult to imitate and replace, are hardly transferrable on the market and have alternative uses without losing value. They also appreciate with use, generate increasing yields and produce significant externalities and synergies (Fernández et al., 1998; Navas, 2001; Nomen, 1996; Camison et al., 2000; Salas, 1989; Lev, 2003). Really, the development of new strategies for knowledge management is a complementary tool for long-term decision making based on a resource that generates a benefit: knowledge. This element is vital and companies try to define, measure, value, control and manage it properly. However, the majority of management models or systems are confined to the descriptive analysis of indicators. In some cases they can also describe a process of relationships that supports a recursive and static strategy. This process is emphasized during periods of bonanza, while the opposite occurs systematically during periods of recession.

On the other hand, the specialised literature shows clear evidence of organisations needing their survival to be based on aspects other than short term benefits, investing in factors that will generate future worth being a must. The first link in the chain, in this sense, is captured by models such as the Skandia Navigator, conceived to estimate market value, rather than book value and based on hidden intellectual capital. For this reason, this paper presents a tool conceived to use the hidden factors in an organisation to manage knowledge that is random, but at the same time motivates and standardises an information system, beyond accounting data, to solve the strategy using the indicators and their synergies that feed back into the system. We thus create a navigation panel for organisations that is not only descriptive, but also managerial. This enables us to simulate scenarios in order to control the strategy and estimate the real market value of organisations and, therefore, their intellectual capital.

The system considers that market value can be calculated by adding book value and that generated by the hidden assets stemming from human resources and the structure of the organisation (clients, processes, innovation and image). In facts, we depart from the idea in Edvinsson and Malone (1999): intellectual capital is the difference between market value and book value. It allows us to establish the first hypothesis:

H₁: A direct relationship exists between the difference

between the market value and book value of an organisation and its intangible assets.

The proposed intangible management and control tool is based on a decision making system in a neural network and uses an econometric model that is being employed in its totality in an architectural organisation with an international market, allowing more suitable strategies and policies to be adopted. In addition, the proposed tool is valid for any other small and medium-sized enterprise (SME) by making some adjustments to the indicators for the management purposes of each organisation. This was confirmed by a survey of 325 companies in the Spanish autonomous region of Castilla-La Mancha as part of a research project aimed at estimating local income (Baños et al., 2007). In this sense, we underline papers such as Rodriguez et al. (2006) with a model for measuring intellectual capital within SMEs in correlation with the key factors for the successful implementation of knowledge management (KM) and the intangible asset analysis for SMEs by St-Pierre and Audet (2011). This management tool makes it possible to control and simulate strategy planning on the basis of two more hypotheses:

H₂: Intangible assets may be badly planned when the relationship in H₁ is not relevant.

H₃: The structure of intangibles and their relationships with extra book value remain in the future, making it possible to forecast, simulate and manage intangible assets.

In this sense, Chen et al. (2004) demonstrate that a relationship exists between managerial results and intellectual capital and its components, for which reason it is necessary for enterprises to manage and improve their IC from an integrative perspective.

This article provides a standard decisional support information system that could be applied to SMEs for strategic control at low cost. In fact, further discussion details the method and model, which is subsequently applied step by step to a service sector company in Spain. The paper concludes with a discussion of the possibilities of the results for strategic management.

MATERIALS AND METHODS

The availability of information is a vital element of the management system of a company when providing data, results of actions and comparisons that make the functions of learning and communication possible. Therefore, the management system depends on the information system in order to make decisions. Within this information system, the accounting system will receive the data regarding operative subsystems (commercial, financial, etc.) as input, will process them in greater or lesser detail and will finally produce analytical documents (annual accounts and other statements) as outputs. The accounting information system receives and issues information not only from outside the organisation, but also from within.

For these reasons, the accounting system can be initially considered to represent the economic information aimed to improve communication among the different economic stakeholders involved. It is vital for firm development to provide the data necessary to make decisions and to plan strategies that are more suited to management control. However, there are other elements or variables that exert a direct or indirect influence on accounting information, such as the structure of existing relationships in the company, management policy and individual interests. For this reason, it is necessary to have instruments that are capable of integrating financial and management data in order to facilitate the decision making process.

The financial system has traditionally been responsible for measurement and control, using the accounting system as a basis (annual accounts, budgets, economic-financial analyses). As a result, excessive emphasis is placed on short term results, which leads to companies investing little in intangible (long term) assets that generate future growth, such as the improvement of processes, human resource development, information technologies, databases and systems, relations with clients and market development. Therefore, adopting a long term strategy demands an information system to make measuring these hidden assets easier. In this sense, Mouritsen (2004) studies how intellectual capital is widely accepted as part of a strategic and political agenda for transformation and growth.

For this reason, this paper focuses on establishing an instrument or method called 'integral analysis', which analyses whether the organisation is heading in the right direction so that both short and long terms decisions are effective. Integral analysis is based on various company information systems (the accounting system figures prominently) in order to create a new management system through the incorporation of a simulator. It focuses on a group of measures selected deliberately and applied to attain and communicate a shared view of the organisation's strategy for the future that has been previously confirmed by the management team. In order to do so, the method incorporates, in addition to the traditional economic and financial approach, structural, management and strategic analysis of intangibles, simulators and tools to quantify the relationships among the various perspectives. The companies that are more aware of the shortfalls of the accounting system indicated, choose to increase their number of internal indicators to try to measure hidden potential coined as intellectual capital. Furthermore, results are usually kept as internal information for management purposes and in some cases are published in reports. For this reason, being aware of the value of hidden intangible assets or intellectual capital is vital for strategic management. Models have since been developed to measure intangibles, bearing in mind that one sole method does not exist.

In this sense, conceptual models such as that by Tjänesteförbundet (1993) figure prominently, along with the invisible balance promoted by Arbetsgruppen (1998) and Sveiby (1997), who propose their "intellectual assets monitor" and those others that have been more practically applied in business and even act as support for development in the field of macroeconomics. In regard to the latter, it is worth highlighting the Skandia navigator proposed by Edvinsson and Malone (1997) and the balanced scorecard by Kaplan and Norton (1997) and Bontis (2001). Among its variants, it is worth highlighting the model by Green and Ryan (2005). This study investigates the adequacy of existing intangible asset models and defines and codifies common principal valuation drivers of intangible assets for use in enterprise balanced scorecard valuation practices of information technology firms.

All of them have acted as inspiration for the method proposed in this paper, although this model overcomes certain limitations suffered by the former. The navigator incorporates a deterministic and descriptive approach, whereas integral analysis allows a stochastic and temporal approach with a measurement system open to specific indicators. Meanwhile, the balanced scorecard contemplates an incomplete strategic picture due to the prior consideration of a strategy as optimum and not monitoring it beyond compliance with indicators. In this sense, integral analysis explains how to build indicators with a dynamic alert system, as it projects or simulates future actions, taking into account adjustments and monitoring benefits. In addition, this method quantifies

intangible capitals and correlates them with the strategy, indicating which need to be strengthened or where to avoid excessive growth.

Further, we propose a method for measuring intellectual capital. It comprises all the future benefits that an organisation will generate. These benefits will be the result of aspects related to human capital and structural capital, such as: innovation capacity, client relations, process quality, products and services, enterprise culture and communication and image (marketing), which allow a firm to make the most of its opportunities. On the other hand, given the complexity of the factors with these implications in the organisation and even the difficulty that classification entails, it is difficult to specify all the components, which is why, bearing in mind all these, we present the following equality based on the first hypothesis:

$$\text{Intellectual capital} = \text{human capital} + \text{structural capital} + \text{non explicit capital}$$

a. Human capital: captures workers' knowledge, skills, motivation and training as well as the remuneration system and hiring policy that allow the firm to have the most suitable employees for the future.

b. Structural capital: defined as the sum of capitals stemming from internal processes, relations, communication and innovation and research, development and innovation. Structural capital captures all the future benefits of the structure of the organisation.

i. Internal process capital: the objective is to ascertain the level of quality of company processes, products and services, which yield a competitive advantage.

ii. Relational or commercial capital focuses on relations with suppliers and customers, as well as their degree of satisfaction, customers that are gained or lost, market share, etc. That is to say, this capital quantifies customers' perception of the organisation.

iii. Communicational (marketing) capital captures the resources the company channels to external communication by way of marketing: advertising, public promotion of sales, public relations and/or personal selling.

iv. Research, development and innovation capital. This denotes the organisation's potential to innovate in the future. In order to measure this potential, we must ascertain what investments are made to develop new products, new technologies, system improvements, etc.

c. Non explicit capital: This refers to the human and structural capitals not covered by the other categories due to being of little importance, restrictions in terms of quantification and even a lack of knowledge on behalf of the manager, but which as a whole should be taken into account.

Therefore, intellectual capital can be measured by establishing different components and presenting suitable indicators that can be applied and compared to other companies. The framework used must be able to combine the past, present and future of the organisation, meaningfully capturing the capacity of the company to produce sustainable benefits and enabling the management to achieve different strategies in balanced fashion, without placing more emphasis on any one strategy with respect to others. Table 1 presents a standard model applicable to companies in general with special emphasis on a sample of companies (SMEs), the type of company to which the model has been applied.

Processing and quantifying these factors becomes a fundamental tool for control that we can strengthen by making it dynamic, analysing how indicators have evolved. In this sense, we have advanced towards determining each of these factors or components in monetary terms, by presenting the computation of generic indicators to measure these capitals. These indicators could be added to and adapted by each company, on the basis of the activities characterised by the sector the company belongs to (open and flexible model). Table 2 displays the indicators for each of the components of intellectual capital, differentiating two types:

Table 1. Basic components of intellectual capital for SMEs.

Component	Intangibles	Indicator	
Human capital	Remuneration systems	Remunerations	
	Hiring systems	Temporality	
	Social climate	Social benefits	
	Labour formation	Labour dysfunctions	
	Motivation	Training	
	Organisational flexibility		Satisfaction and motivation
			Productivity
			External rotation (abandon)
			Internal rotation (promotion)
Structural capital	Internal process capital	Quality evaluation system: processes, products and services	
		Prevention and evaluation costs Non-quality costs External and international quality systems	
	Relational or commercial capital	Customer portfolio	Market share
		Customer satisfaction and fidelity	Customer satisfaction
		Supplier portfolio	Supplier quality
	Marketing capital	Enterprise marketing: (public advertising, promotion, relations, personal selling)	Advertising expenses by product Distribution
		Contracted media potential	Media potential
	Research, development and innovation capital	Investment in: new technologies, new products and services	Research and development Productivity
		Investment in and improvement of the enterprise information system	Internal rotation (promotion) Potential mobility
		Skills or competences	Connectivity
Non explicit capital	Intangible assets not considered by the above capitals	Indicators not included in the above groups	

i. Absolute indicators: measured in monetary units and unrelated to other variables, for example, investment in training in a certain period.

ii. Efficiency indicators: percentage indices that range from 0 to 1, 0 indicating the least favourable situation and 1 the most favourable. A labour climate index of 0.80 would be near optimum for the work relations of employees.

As regards the issue of how to determine their value, generally speaking, the absolute indicators are obtained from the organisation's accounting information system (accounting statements, internal ratios, control of costs, etc.). The efficiency indicators, on the other hand, are provided by a system of internal measurements based, among others tools, on questionnaires that render quantifications of subjective aspects that affect the value of the company, or on objective elements not measured by traditional methods. These measurements offer the possibility of performing a descriptive and evolutionary analysis of the company's intellectual capital. As a result, we can obtain the variations of the different indicators by sector or for different periods of time. Once quantified, they will be selected and summed into one or several absolute values (C) with their corresponding filters or efficiency indicators (i) for each intangible. Thus, the product will

determine the final value of the component or intangible asset (I) of intellectual capital: $I = \sum C \cdot i^1$.

RESULTS

Among the applications of this management tool, we illustrate the process using the company that pioneered its development "GOP, Plan Office". This limited company carries out promotion work, planning, control and the execution of works and projects in the field of architecture and urban development. The trademarks that set this company apart include professional precision, process quality, adaptation to customer needs and optimum response time inside deadlines and

¹ Method of measurement used in the Skandia Navigator by Edvinsson and Malone (1999) and in the Integral Analysis by Nevado and López (2002).

Table 2. Specified indicators of intellectual capital for SMEs.

Component	Indicators	
	Absolute (C)	Efficiency (i)
Human capital $I_H = (C_H \cdot i_H)$	Investment in training	Temporary/permanent Motivation index Promotion index Absenteeism index
	Qualified wage mass	Training index (utility and assimilation) System of Remuneration index (monetary and kind) Labour Climate index.
Internal process capital $I_P = (C_P \cdot i_P)$	Quality, Prevention and Evaluation Costs	Customer satisfaction index Workflow index
	Environmental investment	Implementation of Norms of International Organisation for Standardisation (ISO)
Relational or commercial capital $I_C = (C_C \cdot i_C)$	Work carried out by companies (subcontracting). Ii. Competition preparation costs ^a	Volatility index (percentage of portfolio of the first customers)
		Satisfaction of customers index Quota of market E- commerce index Competing gain index
Marketing capital $I_M = (C_M \cdot i_M)$	Expenses of communication and marketing	Company image index Quota of market
Research, development and innovation capital $I_{RDI} = (C_{RDI} \cdot i_{RDI})$	Investment in computer science equipment.	Technological index Connectivity index
	Investment in R&D&I Indicator of development.	Knowledge Management (KM) index Attendance to customers index E-commerce index

^aFor companies that obtain their client through a competitive bidding process. This also applies to the competition gain index

budgets.

The company was founded fifteen years ago and has grown constantly since then, despite not being exempt of periods of recession. The long term trend displays strong initial growth, a staff crisis in 1998 and 1999 before another period of understanding between workers from 2000 onwards, achieving an intermediate position in the sector with its main indicators recording favourable trends. Its strategy based on quality and research and development led the company to audit this strategy and the guidelines to follow in order to elaborate a plan to maintain and position the company in the sector in 2002, by applying this management tool. One of the initial premises necessary before applying the mathematical model is to use a valuing difference as a basis: Would you sell your company for the amount displayed in accounting records? The answer will probably be “no”. There is generally a series of intangibles that would raise

the sale price, that is, what we can label “extra book value”. We will use this value to determine intellectual capital by relating it to the set of human and structural factors as earlier discussed, filtering any errors stemming from the mathematical process or the market, such as speculation, or cyclical factors of the economy.

The result will be a powerful management tool that will not only determine the value of hidden assets in the company, but will also help in the process of strategic decision making. The procedure illustrated in Figure 1 will be tested carefully on the chosen company. In order to do so, we divide the process into three connected phases:

1. Information generation: this phase entails considering information needs. Here we target the knowledge of the organisation (culture) and extract data from the different information systems, such as the accounting system, as

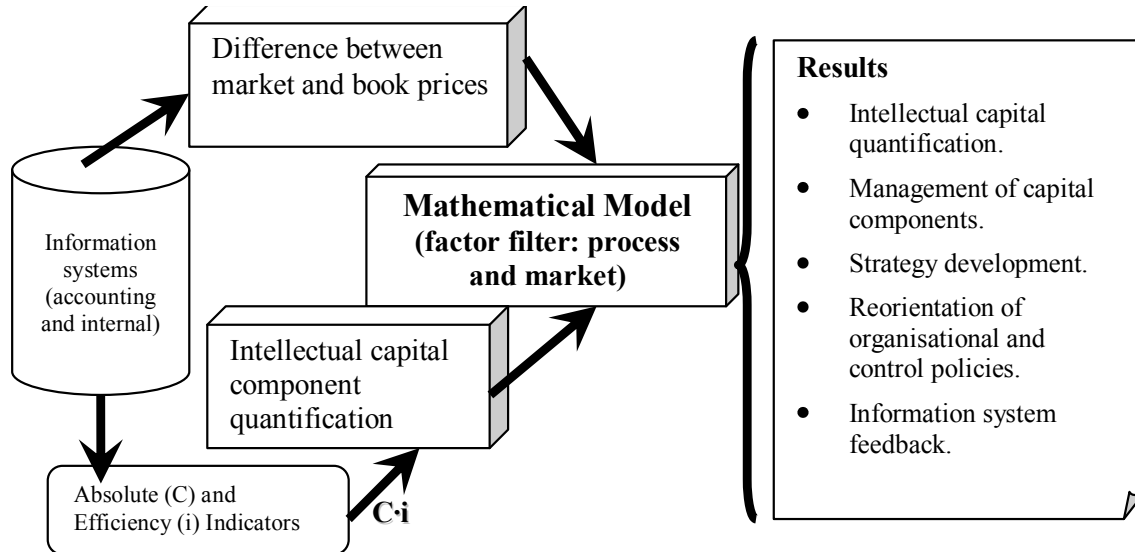


Figure 1. Application of the management tool.

well as developing new systems (questionnaires, interviews; Table 3). For example, in the case of internal information system for GOP, we have two processes of information generation:

a) Personnel questionnaire. Sample population: employees. Objective: data generation for human and structural capital. Organisation into four groups: 1. Remuneration, schedule, motivation and satisfaction; 2. Space, work climate, organisational chart and strategies for the future; 3. Image of the company and employee integration; 4. Historical valuation of the three previous groups. Method: indirect, survey.

b) Interview to partner-executives. Sample population: executives. Objective: data generation and past trend in structural and human capital, market valuation of the company. Organisation into three groups: 1. Evolution of indicators: motivation, promotion, social action, training, remuneration, work climate, participation and technology. Evaluation of quality policies; 2. Market value and evolution; 3. Data and evolution of other indicators: corporate image, employee stability and flexibility. Method: direct, two-stage (Delphos); 1st stage: personal interview, 2nd stage: interview executive team. The objective is to build an initial data bank that will make it possible to quantify the components of intellectual capital and determine extra book value, which is necessary to specify the mathematical model. (Figure 2 as example of training index).

2. Development of the mathematical model: in this phase statistical-econometric techniques are applied to quantify the relationship between the components of intellectual capital (human, process, relational, marketing and R&D&I) and extra book value (difference between

market and book value). The analysis implements techniques that filter both the effects of the market (speculation, cyclical crises, etc.) and also procedural errors (intangibles not considered, estimation or computational errors, etc.) in accordance with Equation (1):

$$VECD_t = \beta_0 + \beta_1 I_{Ht} + \beta_2 I_{Pt} + \beta_3 I_{Ct} + \beta_4 I_{Mt} + \beta_5 I_{RDit} + (FE + e + \varepsilon)_t \quad (1)$$

where 'VECD' denotes deflated extra book value; 'I' are the intangibles (H: human, P: process, C: relational, M: marketing and RDi: research, development and innovation capital); FE are speculative factors; e the error due to the accounting model; and ε , the random disturbance that is distributed a priori as white noise. Finally, the parameters β measure the relationship between extra book value and each intangible asset. According to this model, the estimation of extra book value is what constitutes intellectual capital.

i. The process always demands conditions for information. There must be more observations than parameters to be estimated. More specifically, more than 10° of freedom are required for results to be reliable. In the case of GOP, we had to change data frequency to biannual at the beginning due to a lack of sufficient historical data. As regards the indicators, we only include those that provide suitable information about intangibles and which allow satisfactory comparisons to be made. We therefore needed to perform a selection process. Finally, the monetary values must be adjusted using the price deflator. By way of example, Table 3 shows the resulting database for 2008 (the complete database

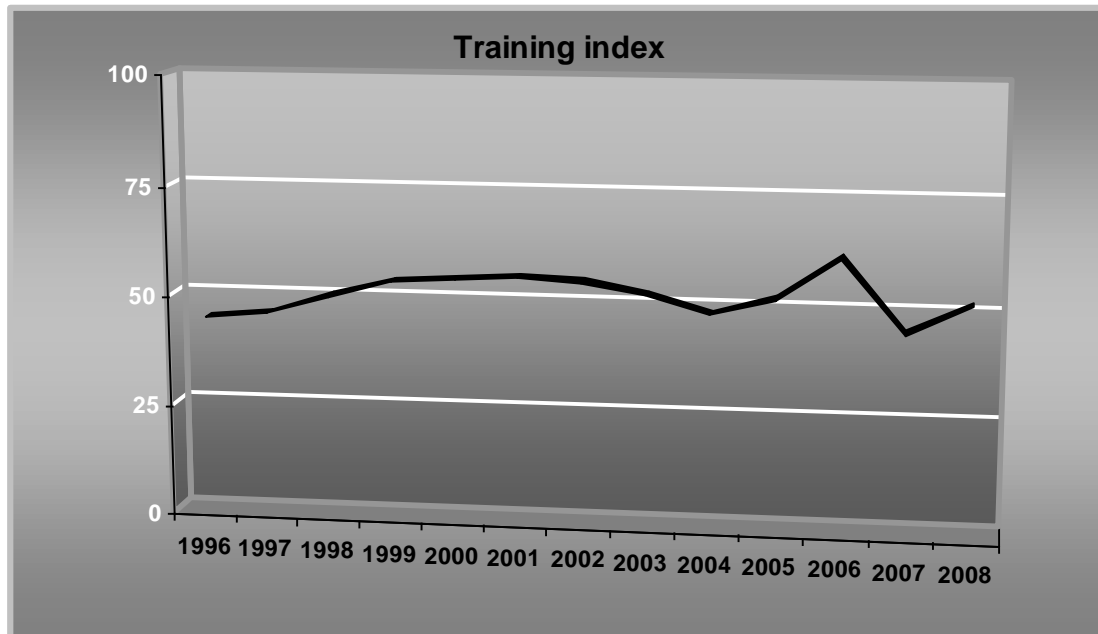


Figure 2. GOP' training index. We obtain the training index from the combination of the results of group 1 of the questionnaire (remuneration, schedule, motivation and satisfaction) and group 1 of the interview (evolution of training indicators).

Table 3. Database. GOP, 2008 (€ 2006).

Variable	2008-I	2008-II
Book value	1,353,018.69	1,353,018.69
Market value	2,158,508.09	2,158,508.09
Intellectual capital	805,489.40	805,489.40
Qualified wage mass	599,188.28	599,188.27
Investment in training	5,342.00	5,342.00
1-(Temporary/permanent)	0.7932	0.7932
Motivation index	0.5219	0.5624
Promotion index	0.4192	0.4029
Social action index	0.3582	0.3700
Training index	0.4857	0.5188
System of remuneration index	0.3591	0.3907
Labour climate index	0.5514	0.5382
Costs in quality	99,291.98	99,291.98
Suggestion index	0.5442	0.5456
Work carried out by companies (subcontracting)	377,093.19	377,093.19
Competition preparation costs	136,231.47	136,231.47
Volatility index	0.8121	0.8270
Competition gain index	0.1226	0.1226
Satisfaction of costumers index	0.7085	0.7085
Expenses of communication	25,310.35	25,310.35
Company image index	0.6458	0.6341
Investment in computer science equipment.	11,437.00	11,437.00
Indicator of development	46,869.00	46,869.00
Investment in R&D&I	64,563.00	64,563.00
Technological index	0.6096	0.5946

comprises biannual observations from 1996 to 2008).

ii. Generating the components of intellectual capital. We now focus on quantification: using the database generated as a basis, we add the absolute indicators (generally as a sum or arithmetic mean) and the efficiency indicators (arithmetic or weighted mean) for each component according to the classification in Table 2. We then proceed to obtain a valuation from the product of both ($C \cdot i = I$). In order to illustrate this

$$I_H = \text{Wage Mass} * [(\text{temporal } i. + \text{motivation } i. + \text{system of remuneration } i. + \text{social action } i. + \text{climate } i.) / 5] + \text{training investment} * [\text{training } i. * 0.5 + \text{promotion } i. * 0.25 + \text{motivation } i. * 0.25]$$

iii. Model estimation: finally, with the aid of specialised software and using precise technical knowledge, we estimate the mathematical relationship indicated between extra book value and the components of intellectual capital:

Market value-Book value = Extra book value = f (Human Component, Structural Component, non explicit capital, market and speculation factors).

process, the calculation of the human intangible is included (I_H), in this case, using wage mass and investment in training as absolute indicators and a weighted average of the indicators of temporary hiring, motivation, remuneration system, social action, work climate, training and promotion as efficiency indicators. The latter are obtained from interviews and/or surveys conducted in the organisation:

3. Extraction of results. The basic information yielded by the tool would be the quantification of intellectual capital. After estimating the relationship between the components and extra book value, the model values the difference between market and book value after filtering for errors and speculative factors: intellectual capital. Due to being a temporal relationship, biannual observations in this case, we can ascertain how it has evolved over a given period the model for GOP history (1996-2008) estimate next informations:

$$VECD_t = 234004 - 1.79 IH_t + 12.83 IP_t - 0.50 IC_t + 22.35 IM_t + 2.49 IRDi_t + r_t$$

(1.51) (-1,83) (7.04) (-2,16) (6.05) (1.29)

^AR² = 0.95; d = 1.32; n=26: (1996.1- 2008.2)

where 'VECD', is the deflated extra book value, 'I' are the components or intangible assets (H: human, P: process, C: relational, M: marketing and R&D&I: Research, development and innovation capital) and 'r' denotes the filter estimates by ordinary least squares. The numerical value that accompanies the intangible (parameter) is the increase or decrease in intellectual capital for each Euro the intangible is increased. T statistics are in brackets.

The estimation of the model these conclusions are based on explains 95% of the variable, assuming, therefore, 'non significance' of factors not specified in the model, speculative factors and errors made, that is to say, a reduced error (filter r).

As far as the values of the parameters are concerned, they indicate that the best managed policies are image with 22.35€ for each Euro generated in this intangible, followed by quality and innovation and development. On the other hand, both human resources and clients are poorly dimensioned (they have negative signs) and are therefore those which most need a change of strategy see data and graph of VECD in Figure 3). The application shows a consolidated structure, similar to that in previous periods. The fall in intangibles is justified by the severe crisis suffered by the sector and anticipated

by the model. Strategically, the company defended itself by sensibly cutting some costs that generate future benefits. Nevertheless, the maintenance of intangibles is optimum as the situation moderated comparatively in line with the sector.

DISCUSSION

The results obtained allow us to develop an information system to support decision making for strategic organisational management, raising the following possibilities of the tool.

Management of components or intangibles

The equation or estimated relationship provides parameters that quantify the relationship between each component (human and structural) and extra book value, which will allow us to measure the strengths and weaknesses of the composition of the intangibles of the organisation based on the estimated results. Figure 4 shows the dynamic matrix SWOT.

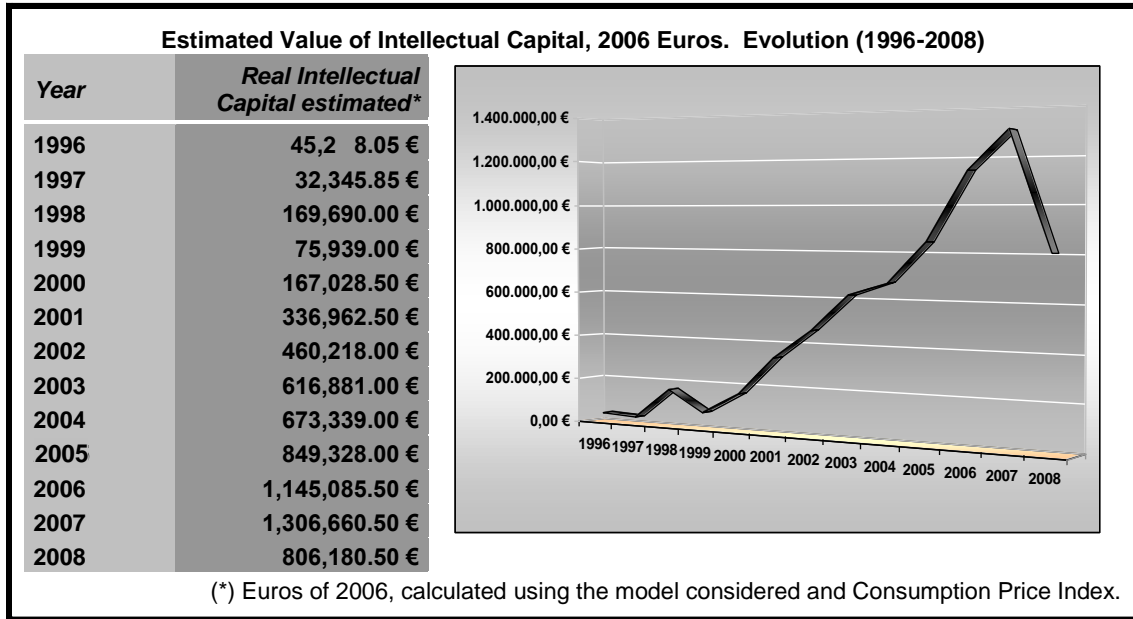
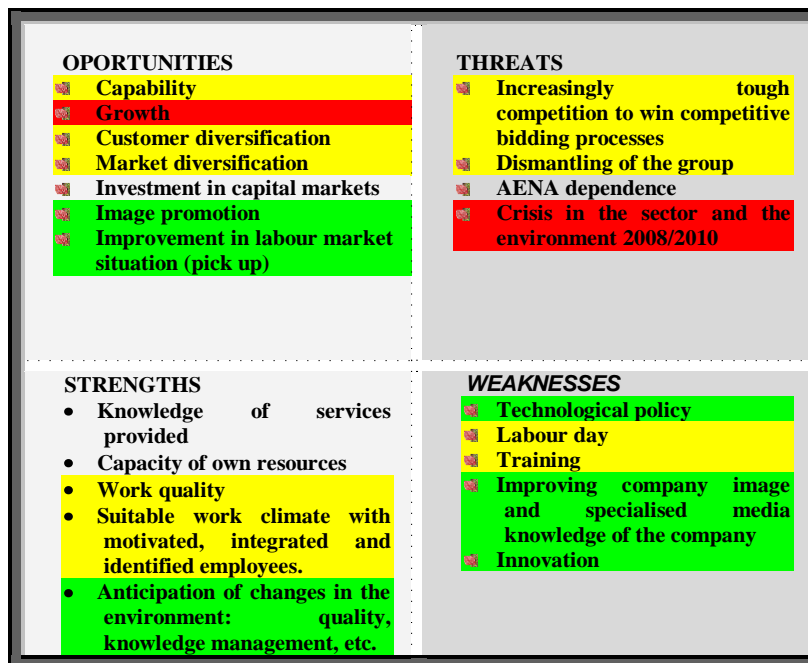


Figure 3. Phase 3-Results.



Source: Own elaboration.

Note: Better ■ Caution ■ Worse ■

Figure 4. GOP SWOT dynamic matrix (2007-2008).

Development of strategies

This focuses on analysing all the information obtained during this process: information systems, study of

enterprise culture, results of the model; and more importantly, their coherence, which will make it possible to form an opinion about the various strategies followed by the organisation and how valid they are in terms of

achieving profits in the future. We will therefore be able to analyse each intangible asset using their indicators, the structure in the model and the trends of the strategy over previous periods. For example, in GOP, two fundamental strategies are observed: quality or process capital, which has been common to the entire structure since 1996, and external image, a new strategy that was consolidated in 2005. With respect to human resources, there has been an improvement in recent periods, but it is still over-sized, evidencing possible staff cuts for 2009. Finally, innovation and development perform well in terms of achieving technological objectives, while relational capital is revealed to be somewhat over-sized, indicating the need to diversify clients and improve some external indicators of portfolio capacity. Strategic reorientation and control is an optimum tool for decision making. This instrument is also capable of control and accurately determines fulfilment of tasks set by the management.

In the case of control, it is advisable to ascertain that the mathematical relationship can provide quantitative answers for different strategic scenarios anticipated by the management team, that is to say, *policy evaluation* or conditioned forecasts. In short, it is a control tool that makes it possible to address issues such as: how much intellectual capital would increase following a 2% rise in process capital in 2008, but which also explains how process capital should be increased. That is to say, what indicators should be improved and to what extent?

In addition, a three-year simulation has also been performed for GOP with three anticipated growth scenarios (optimistic, pessimistic and the trim). These data on intangibles and the real value of the company are constructed by the model with only 10 indicators that the management team must forecast as a scenario.

Feedback from information systems

It is necessary to underline the importance of the process being dynamic. Once the report for exercise X has been concluded, all this information must be reabsorbed by the information systems: a) accounting systems, by incorporating filtered data from the analysis in the annual report on the annual accounts; and b) internal systems for exercise X+1, by introducing dynamic comparative analyses of intangibles and indicators, as well as the different degrees of fulfilment of the designed strategies and the replacement of the intangibles or components that are managed poorly. In summary, the main advantage of this tool is its permanence over time (maintenance), which makes it possible to determine the position and evolution of intellectual capital, which is undoubtedly a competitive advantage in management with respect to the competition.

Therefore, the scope of this tool (integral analysis) essentially lies in making enterprise strategic maps

dynamic. These maps advance from a resource-based approach to a simultaneous approach, which aims to optimise the future value of the organisation. Thus, it allows for dynamic management, that is to say, involving the real participation of time and reorientation with the aim of optimising value for all the stakeholders.

The method therefore surpasses the strategic maps elaborated using the balanced scorecard, as it allows to quantify the relationships in order to be able to optimise intellectual capital and, as a result, the value of the company. In addition, the tool makes it possible to verify whether or not the strategies that have been established are the correct ones, by way of an evaluation that we could call a 'strategy audit': indicating whether the strategy is the right one or whether it should be changed.

Furthermore, it illustrates the road map towards achieving it (strategic planning). The instrument can also perform simulations to aid decision making. In doing so, we will determine whether or not the strategies adopted were the right ones or, more importantly, a commitment for the future or strategic design can be introduced by a business executive who can control its benefits step by step and even determine whether or not it is worthwhile in regard to the status quo before this commitment is made (Figure 5).

Conclusions

The importance of intangibles and measuring them to determine the real value of companies has become one of the objectives of accounting. In order to respond to this need, we present a model that estimates the structure of intellectual capital in a company and determines the importance of the different intangibles, making it possible, among other things, to establish different policies to increase intellectual capital in order to achieve greater market value.

This tool therefore provides a response to the main question posed by business management: Are we growing well? Moreover, this response has been tested using H₂ and H₃. The answer for the architecture studio analysed is affirmative; the policy of quality and innovation is the way forward for growth and to increase the value of this organisation, although perhaps the most remarkable result is that, according to all the indicators of the model, investment strategies relating to such fundamental capital as human resources have been neglected and the organisation has failing to dimension this aspect optimally over the last few years. Hence, the company now has a tool in sync with its real situation and which makes it possible to consider different scenarios with few information requirements. As a result, it provides guidance regarding future behaviour and perhaps more importantly, it expresses the structure of intellectual capital in order to be able to consider equilibrium strategies.

The strategies and policies to be adopted have been

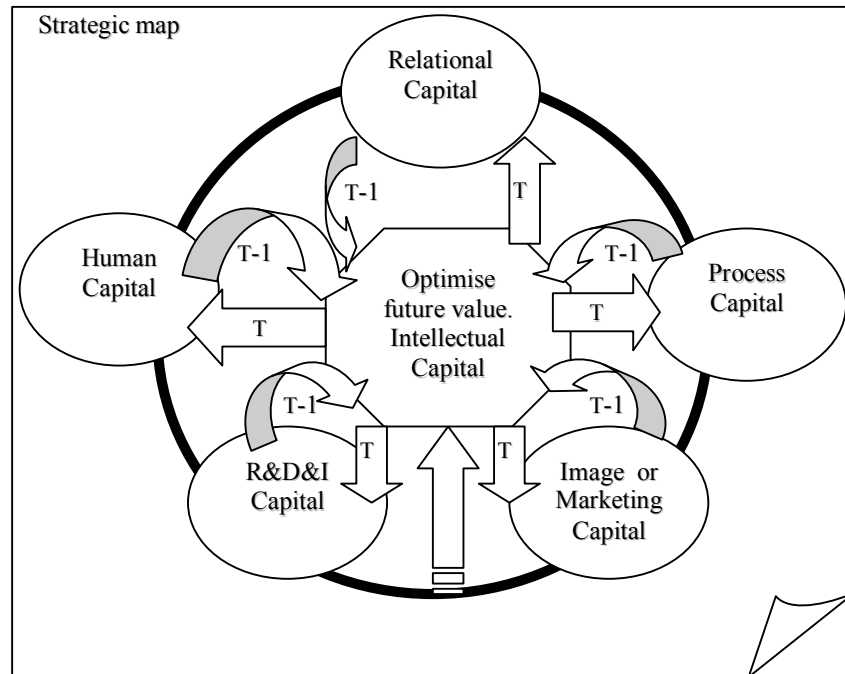


Figure 5. Dynamic model of strategic maps.

set out briefly here and are currently being implemented. However, this article omits specific details as this is not the objective of the paper.

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