

Title

Intellectual Capital and productivity: revising policies to support financing innovation in SMEs

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Abstract

SMEs face severe difficulties in accessing the external financing that supports their innovative activities. One important reason for this is that the innovative capacity of most SMEs is extensively based on intangibles and that there are no international or national standards for reflecting the value of these. This means that financial institutions are reluctant to include them in their risk analyses. The objective of this paper is to show how SMEs can benefit from using a commonly agreed Intellectual Capital report for financing innovation activities. Thus, policies encouraging management and reporting on intangibles may also foster innovation in SMEs. The paper is based on the results of 9 case studies with SMEs from various sectors applying the InCas (Intellectual Capital Statement made in Europe) methodology, and a survey with a response from 231 companies. The results show that managing intangibles pays off in terms of productivity, which provides grounds for including IC management among the innovation policy objectives.

Keywords

Intellectual capital; intangibles; innovation; knowledge management; services, productivity.

Introduction

The existence of a positive relationship between innovation, competitiveness, and economic growth has been widely recognized and, as a result, in recent decades, fostering innovation has become pivotal to many national and international policies. Determining why some companies are more innovative than others, which are the contextual factors that promote an innovative climate, or detecting the barriers that firms have to overcome to innovate, are key questions that we need to solve if we are to develop effective and efficient policies.

Lack of financial resources has been highlighted in many studies (COTEC, 1999; Galia and Legros, 2004; Iammarino et al. 2009; Savignac, 2008) as being among the main barriers that companies face when trying to innovate and the current financial crisis has made matters worse. A recent study (Sánchez and Salazar, 2010) showed that the reluctance of Spanish financial institutions to finance innovative projects is linked to the difficulty of most firms, especially SMEs, to show their innovative potential and their capacity to transform it into economic results. Since the majority of their assets are of an intangible nature and, as a consequence, not reflected in the company's financial information which is released periodically, financial institutions cannot use it as input for their risk assessments.

There is no question of the key importance of intangibles such as human resources capabilities, organizational know-how, technological knowledge, contacts with clients and providers etc, for the innovative potential of a company. However, the value of these intangibles has, as yet, not been adequately measured and reported in the Balance sheet or in the Profit and Loss Account. This failure can cause serious distortions both in capital markets and company management (Cañibano et al. 2000; García-Ayuso, M. (2003)

The first aim of this paper is to test the possibility of obtaining relevant information on the key intangibles in SMEs, and to contribute to the definition of an Intellectual Capital Statement that is useful both for the internal management of intangibles in a company and for external diffusion. Accordingly, the document, which would complement current financial statements, would enable financial institutions to make investment decisions based on more reliable and thorough information than is currently available. The second aim is to test whether IC management pays off in terms of productivity.

The paper is structured as follows. First, we present a short overview of the framework that supports the subject of our study, linking our research questions to the calls of diverse international institutions. Then, we define the objectives and methodological steps and thirdly, the main results obtained. We finish with some conclusions.

1. Intangibles and innovation in the international framework

The central role intangibles play in generating innovation and economic growth has been widely acknowledged. In fact, the OECD (2010a,b) points out that investment in intangible assets and increased multifactor productivity have been responsible for more than two thirds of the growth in work productivity in many OECD countries. What is more, some studies show a positive correlation between these two factors (Hao et al., 2009), proving the key importance of intangibles as a trigger for growth. Backing up these findings is the World Bank which estimates that investment in these assets is the main source of wealth. All this has triggered an interest in the analysis, measurement and management of intellectual capital and in the management of knowledge, not only within academia, but also in the policy arena. Two recent examples of the increasing interest in measuring intangibles are the "World Intellectual Capital Initiative" (WICI-www.wici-global.com), a network of university teachers, financial analysts and institutional representatives, and the "International Integrated Reporting Committee" that aims to create an "Integrated Report" showing company assets and actions, and explaining how it creates value (www.theiirc.org).

The OECD has showed great concern for the micro- and macro-economic analysis of intangibles since as far back as 1988, developing diverse studies and reports (e.g. OECD, 1992, 2002), and holding international conferences (e.g. in Amsterdam 1999, or in Ferrara 2005). In keeping with this interest, the last edition of the Oslo Manual (OECD, 2005) was an

especially relevant milestone, since it recognized the importance of non-technological innovation, which is closely intertwined with investment in intangibles. In 2010, the OECD renewed its interest in these issues, launching a new project titled “New sources of growth: intangible assets”. The objective of this project, whose results will be made public in February 2013, is to advance in the development of adequate measurement mechanisms, to broaden understanding of the nature and dynamics of intangibles, and to create policies that incentivize investment in them.

The European Commission, concerned about the distance still separating Europe from competitors such as USA, has also given more importance to innovation policies. The insufficient investment in human resources (e.g. education, mobility), R&D, or infrastructures, and the difficulties for many innovative companies to access financing are serious problems that lie behind this under-performance (EC, 2009). As is widely recognized, financing innovative SMEs is usually more difficult in any case (EC, 2010a: 24), but with the effects of the current financial crisis these companies, which make up 99% of the productive fabric of the European Union, have been even harder hit. With these challenges in mind, the European Commission has launched an initiative, the Innovation Union, in which innovation is pivotal to Europe 2020 strategy (EC 2010b: 2). This initiative recognizes that a framework should be created that answers the specific needs of SMEs, and the increasing importance of non-technological innovation, which is especially relevant to service companies.

The distances separating EU countries regarding innovation are also of concern to the European Commission. The case of Spain stands out especially: not only because its innovative performance and rhythm of growth are below the European average, but also because it is highly heterogeneous, with performance levels varying considerably from region to region (EC, 2010a: 16). In this regard, the Commission emphasizes that it is vital to improve the individual performance of each member country, by developing instruments that both cover the mentioned deficiencies, eliminating the barriers that hinder financial resources, and also foster private investment in R&D and innovation (EC 2010b).

Developing new standards and regulations is indispensable and, to avoid possible negative effects (Walz, 2007), it is important that they are based on rigorous studies.

2. Objective of the study and methodology

In recent decades numerous proposals have been made to bridge the serious information gap in current accountancy systems that do not satisfactorily assess the value of intangibles (Lev, 2001; Amir et al. 2003; Cañibano y Sánchez, 2004). As a result, different mechanisms have been suggested to assess and value companies’ strategic intangibles (e.g. Kaplan and Norton, 1992; Sveiby, 1997; Edvinsson and Malone, 1997). The Intellectual Capital Statement (InCaS), developed within the European Commission’s 6th Framework Programme by a number of institutions and led by the Fraunhofer IPK Institute, is another example of these intellectual capital assessment models.

As already outlined, the objectives of this paper are to test whether SMEs can elaborate information on their intangibles that clearly reflects their quantity, quality and the degree of management, and test whether IC management has any effect on the company’s productivity. We have addressed the following research questions:

- What are the main intangibles that companies manage? Are all the intangibles managed as systematically as one another? How efficient is this management?
- What kind of information on intangibles would financial institutions need if they were interested in financing innovation projects without tangible support?
- Is there a correlation between the management of key intangibles and productivity?

In this paper, our intention is also to go some way towards meeting the recommendations posed by international organizations, mentioned in the previous section. Specifically, we believe that this exercise addresses the following key recommendations:

- a) Creating new instruments that bridge existing financial gaps, with an emphasis on innovative SMEs.
- b) Developing an instrument that is useful for the internal management of innovation in companies in diverse sectors.
- c) Developing a common language for firms, financial institutions and public organizations that allows a value to be put on the intangibles of those companies requiring financing.
- d) Establishing a value creating dialogue between the governmental organisms in charge of developing new innovation policies and public financing of innovation, the private financial institutions and SMEs.
- e) Developing best practices for the assessment of those intangibles that are key to innovation, for example by creating standards.

To address these issues we have combined both qualitative (multiple case study and interviews) and quantitative methodologies (survey). We have also applied the InCaS model mentioned above, which was specifically designed to be implemented in SMEs which are the object of our study. Taking into account the business model of the organization, the InCaS methodology enables the firm to rapidly detect the intellectual capital that has a greater impact on value creation. It allows for the assessment of each intangible factor, offering a visualization of the strengths and weaknesses of the organization, and the interactions among factors. It also assesses business processes and strategic objectives and can prioritize actions and projects taking into consideration, for example, their impact on results. The main advantages of the InCaS model for the purposes of this study are the following: 1) it is implemented by formally accredited external experts in collaboration with the companies, thus assuring the quality and trustworthiness of the results, 2) the Intellectual Capital Statement (ICS) that stems from the implementation of the model is verifiable by the IPK institute so the value of the exercise and its credibility is enhanced, for example, for financial institutions. Among all the possibilities that this model offers, we have selected a few instruments to be applied to the case study companies and the sequential survey, choosing the 14 intangibles (Table 1) and 48 indicators that occur most often in intellectual capital reports.

Table 1: List of intangibles included in the analysis

Classification	Analyzed intangibles
Human Capital	<ol style="list-style-type: none"> 1. Professional competences 2. Social competences 3. Employee motivation 4. Leadership skills
Structural Capital	<ol style="list-style-type: none"> 5. Internal cooperation 6. ICT and explicit knowledge 7. Product innovations 8. Process innovations 9. Management tools
Relational Capital	Relationships with: <ol style="list-style-type: none"> 10. Clients 11. Providers 12. External collaborators 13. Other partners 14. Financial sector

Understanding how a company works and how the different components of its intellectual capital influence its activities requires an in-depth analysis of its values and processes and for this task qualitative methods are recommended (Yin 1994). As a consequence, the first phase of our analysis has consisted of 9 case studies with SMEs from different sectors (e.g. machinery, health, consultancy, logistics, IT, electronics, carpentry) and sizes (from 2 to 150 employees), all located in the Madrid region in Spain.

Between March and June 2011, interviews were conducted with top management in selected companies, which allowed us to measure: a) the *impact* that each of the analyzed 14 intangibles have on the company results; b) the level of company *satisfaction* with the stock and actual state of each intangible; and c) the *degree to which* the 14 intangibles *are systematically managed*. Concerning this last point, we have identified three situations, based on the existence

of 48 indicators which correspond to the different intangibles: 1) *systematic management*: the specific indicator already existed or the company had the data to build it easily, 2) *“in mind” management*: company managers had in mind the information on the indicator, and 3) *not managed*: the information was not available or was considered irrelevant.

In order to go into the analysis more thoroughly, the indicators have been classified into the following three groups according to the effort involved in their elaboration: a) *basic indicators*: normally existent, as their calculation is part of the company's regular activity; b) *intermediate indicators*: their elaboration requires additional effort and awareness of their importance which, in turn, reflects the firm's interest in the management of intangibles; and c) *advanced indicators*: this group is especially significant because the existence of this kind of indicator shows a high level of intellectual capital management. For each of the analyzed 14 intangibles we have selected one representative advanced indicator.

In parallel with this process, we have conducted interviews with 5 Spanish financial institutions, both public and private, in order to assess the relevance/usefulness of the intellectual capital indicators for their risk analyses. These interviews have provided key inputs to the study since they have brought to the fore issues regarding the precise information on the projects for which financing is requested. Additionally, we have also discussed the overall results of the study and the value of the proposed ICS.

Finally, to verify the results of the case studies, we launched a survey to a sample of 2.500 companies, and obtained 231 valid responses.

3. Results

3.1. Case studies

As already described, the interviews provided information about the impact of and satisfaction with 14 intangibles, for the 9 selected firms. In order to avoid possible bias (Paulhus, 1991; Johnson et al. 2009), we have not analyzed the ratings in absolute terms but from a relative perspective. By doing this, we have considered an intangible to have significant impact on results or considerable satisfaction with the stock when it is rated higher than average for all the analyzed variables in a company.

The model has allowed us to analyze the companies in terms of the systematical management of their intellectual capital. In our sample, all of them declared that they elaborate (or have the necessary information for) more than 40% of the 48 indicators analyzed in this study. These results are not specified in our case study since they cannot be extrapolated but, with this information, the model allows comparisons to be made between companies and can identify those that manage their intangibles more systematically and those that do not.

We have also analyzed whether the degree of systematized management varies substantially if we take into consideration the three groups of indicators; basic, intermediate, and advanced. As was expected, the basic indicators that are systematically managed are more numerous (81%) than intermediate indicators (40%) and considerably more than the advanced indicators (35%) whose management is more laborious. This means that companies more systematically manage the indicators which require less effort to calculate.

Moreover, we have gone further into this analysis by analyzing how efficient the management of the company's intangibles is. As a result, we can talk about “efficient management” when the intangibles with a high impact on the results of the company are systematically managed, which is proven by the availability of indicators related to the specific intangible. On the other hand, when an intangible is considered of high impact and is not systematically managed we consider it to be at risk. Because of the high correlation between these two variables, we have only focused on the relationship between the impact and the degree of systematized management of the intangibles.

This information can be used to create an index that allows companies to be ordered according to their intellectual capital management efficiency and could be of interest to financial institutions, as a ranking can be produced.

The *efficiency index* is created by two factors:

- f) Proportion of intangibles that are systematically managed
- g) Proportion of efficiently managed intangibles, that is, systematically managed among the high impact intangibles

With the information provided by this index we can say that a company systematically managing a considerable number of its intangibles, but mainly focusing on low impact intangibles, is less efficient than one mainly focusing on the intangibles with greater impact on its results.

3.2. Financial institutions

The interviews conducted with the 5 financial institutions have allowed us to evaluate the importance that managing the selected intangibles has for them and for assessing projects in need of financing. In this respect there is a particular result that stands out: financial institutions show a greater interest in basic indicators; those that are more easily elaborated and that are available to most companies. Rated lower are the intermediate or advanced indicators, even though these show greater management capabilities.

We find two explanations for this somewhat expected result: first, the information that is currently available to and used by financial institutions is what the companies more usually provide; and, second, financial institutions perceive that the intermediate and advanced indicators are less reliable.

These results indicate the need for standardized measurement and assessment methodologies that would provide verifiable information about the more advanced indicators, since these are the ones that better reflect the efficiency and effort the company makes to manage its key intangibles. This step would require public intervention to help setting the standards and the verification process.

3.3. Survey

In order to verify the results of the case studies, we have launched a survey to a larger sample of enterprises.

The quantitative analysis is based on a sample of 231 firms, most of which are small (fewer than 50 employees) from the service sector.

We use two models. The first one allows us to study the impact of systematic management in relative productivity:

$$Y = b_0 + b_1L + b_2g_1 + \dots + b_{2+m}g_m + b_{m+3}s_1 + \dots + b_{m+k+2}s_k + \varepsilon$$

where Y is the relative productivity (or business success), measured by the ratio between the productivity of the firm (turnover per employee) and industry average productivity; L is the number of employees; $\{g_1, \dots, g_m\}$ are m dummy variables indicating if each of the m indicators of IC are systematically obtained by the firm; $\{s_1, \dots, s_k\}$ are k dummy sector variables (constructed using two-digit NACE-2009 classification), b indicates the parameters to be estimated by the model, and finally, ε is a vector of *iid* disturbances. This model can be estimated by OLS.

The second model used in the analysis is as follows:

$$Y = b_0 + b_1L + b_2G + b_3s_1 + \dots + b_{k+2}s_k + \varepsilon$$

where Y is the relative productivity (or business success), measured by the ratio between the productivity of the firm (turnover per employee) and industry average productivity; L is the number of employees; G is the index of systematic management of IC (contained in the interval $[0,1]$) obtained calculating the percentage of indicators systematically managed by the firm; $\{s_1, \dots, s_k\}$ are k dummy sector variables (constructed using two-digit CNAE-2009 classification), b are the parameters to be estimated by the model, and finally, ε is a vector of *iid* disturbances. This model can be estimated by OLS.

Set out below are the three hypotheses guiding the analysis:

Hypothesis 1. There is a direct relationship between the systematic management of IC and business success.

Hypothesis 2. There is a direct relationship between the systematic management of IC, measured by Intermediate/Advanced indicators, and business success.

Hypothesis 3. Unlike the case of Advanced indicators, there is no significant relationship between the management of intangibles, measured by Basic indicators, and business success.

The first hypothesis is analyzed through model one, and second and third hypotheses through model two.

The results of model one are summarized in Table 5¹. In order to simplify presentation, the results for control variables are omitted.

Table 5. Model 1

Asset	Indicator	Coefficient	t-statistic	P-value
Professional skills	Average seniority	0,31 *	1,8	0,074
	Qualification of employees	0,11	0,6	0,578
	Days/hours of training	0,20 *	1,8	0,078
	Evaluation of professional skills	0,09	0,9	0,356
Social skills	Number of incidents or conflicts between employees	0,26 **	2,6	0,011
	Evaluation of social skills	0,10	1,0	0,309
Employee motivation	Studies of employee satisfaction	0,26 **	2,5	0,014
	Percentage of employees who respond to surveys	0,21 **	2,0	0,046
	Absenteeism	0,34 ***	2,9	0,004
Corporate culture	Number or percentage of people who know and understand the values of the company	0,11	1,1	0,282
Leadership skills	Performance evaluation of executives	-0,03	-0,3	0,772
	Days/hours of internal training for executives	0,03	0,3	0,780

¹ It is important to keep in mind that table 5 shows the relationship between the *management* of the different intangibles in each company, and hence the availability of the different indicators, and the relative productivity of the company, and not the relationship between the results of each indicator and productivity. To give an example, this means that firms that manage their social skills (intangible asset) by calculating the number of incidents between employees (indicator) are more likely to have greater productivity than their industry average..

Asset	Indicator	Coefficient	t-statistic	P-value
Internal cooperation	Number/hours of meetings between people from different departments	0,20 **	2,0	0,045
	Number/hours of work of improvement teams	0,07	0,6	0,529
	Quality of internal collaboration and knowledge transfer	0,18 *	1,7	0,093
Product Innovation	Percentage of revenues coming from products/services developed in the last 3 years	0,20 *	1,8	0,081
	Number of design or development projects	0,05	0,3	0,736
	Number of patents	-0,01	-0,1	0,914
	Number of registered trademarks	0,01	0,1	0,895
Information Technologies	Revenue from licenses (patents, know-how, trademarks, etc.)	0,05	0,5	0,608
	Satisfaction with ICT owned by the company	0,07	0,7	0,494
Process Innovation	Number of improvement proposals implemented	0,17	1,6	0,114
	Savings resulting from the improvement proposals	0,12	1,2	0,249
Management tools	Quality of tools and software for decision-making	0,16	1,6	0,117
	Number or percentage of employees with remuneration linked to performance	0,17	1,6	0,121
Customer Relationships	Customer structure	0,12	0,9	0,348
	Customer satisfaction	0,22 **	2,1	0,036
	Number of customer complaints, resolution time	0,26 **	2,3	0,020
	Dependence on customers	0,30 ***	2,6	0,009
Relations with suppliers	Structure of suppliers (new, lost, average seniority of suppliers, etc.)	0,13	1,1	0,276
	Dependence on suppliers	0,19	1,5	0,126
	Complaints to suppliers (number and resolution time)	0,19 *	1,8	0,069
	Satisfaction with suppliers	0,19 *	1,9	0,061
Relations with external partners	Structure of external partners (new, lost, average seniority, etc.)	-0,01	-0,1	0,921
	Dependence on external partners	0,04	0,3	0,736
	Claims of external partners (number and resolution time)	0,16	1,6	0,115
	Satisfaction of relations with external partners	0,18 *	1,7	0,097
Relations with other institutions	Number of meetings or projects involving other institutions	-0,13	-1,2	0,216
	Percentage of people in the company that relate with other institutions	-0,05	-0,5	0,617
	Satisfaction of relations with other institutions	0,00	0,0	0,982

Note: Symbols (*), (**) and (***) stand for 90, 95 and 99% confidence, respectively.

Given these results, we can accept hypothesis 1 only for certain indicators. Regarding the assets analyzed, the cases of “Employee motivation” and “Customer Relationships” are worth noting, as the existence of most indicators is significantly related to productivity. Similarly, but with less confidence, systematic management of indicators related to “satisfaction” with customers, suppliers and external partners is also important in reducing the uncertainty associated with productivity.

The results of model 2 are presented in Table 6. As in the case of Table 5, to simplify presentation, results for dummy sector variables are omitted.

Table 6. Model 2

Variable	Equation 1			Equation 2			Equation 3			Equation 4		
	Coefficient	t-statistic	P-value	Coefficient	t-statistic	P-value	Coefficient	t-statistic	P-value	Coefficient	t-statistic	P-value
C	0,29	1,3	0,194	0,41	1,8	0,074	0,24	1,0	0,310	0,35	1,4	0,160
Size	0,00	-0,9	0,367	0,00	1,6	0,101	0,00	-1,2	0,233	0,00	1,2	0,230
Timespan of the business	0,03	4,4	0,000	-	-	-	0,03	4,4	0,000	-	-	-
<i>Systematic IC Management</i>												
Basic	-	-	-	-	-	-	0,35	1,6	0,117	0,43	1,9	0,061
Intermediate and Advanced	0,31	1,9	0,056	0,38	2,2	0,028	-	-	-	-	-	-

Equation 1 and 2 are two different specifications to test the significance of the impact of Intermediate and Advanced indicators on productivity. In Equation 2 we simply eliminate the variable Timespan of the business in order to avoid correlation problems with the variable Size. The same is done for the case of Basic indicators in Equations 3 and 4.

Given these results, we accept hypothesis 2, which states that there is a direct relationship between the systematic management of IC and business success, with a confidence greater than 95%. This is because the p-value associated with Intermediate and Advanced indicators (see Equation 2) is lower than 0,05. This result allows us to say that the use of Intermediate and Advanced indicators reduces uncertainty regarding the probability of business success.

On the other hand, following the same line of argument used in the previous paragraph, we cannot accept the hypothesis that Basic indicators are significantly related to business success with a confidence greater than 95% (see Equation 4). However, we must be cautious about this statement because we are not far from the acceptance frontier.

Conclusions and relevance of the research

This research throws some light on the impact that managing intangibles has for SMEs. In this respect, the companies used in the case study stated that the exercise had helped to detect areas in need of improvement. In addition, it is also interesting to see that, as shown in the survey, there is a correlation between the systematic and efficient management of intangibles and business success.

The exercise has been proven useful as a complement to current financial reports by providing valuable information on intellectual capital. The resulting IC Reports could be a useful guide to financing innovation activities and with the methodology, which allows an index of IC management efficiency to be developed, financial institutions could find it of great interest.

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