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SPRING INTELLECTUAL CAPITAL REPORT
Analysis of Comunidad de Madrid

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SPRING INTELLECTUAL CAPITAL REPORT
Analysis of Comunidad de Madrid

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A Project developed by Fundación para el Conocimiento madri+d
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regions.



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Analysis of Comunidad de Madrid

SUMMARY

INTRODUCTION	114
--------------------	-----

First Part (117)

chapter I

THE CONCEPTUAL FRAMEWORK AS A CONTRIBUTION TO THE INTELLECTUAL CAPITAL ANALYSIS	118
--	-----

chapter II

METHODOLOGICAL APPROACH: REGIONAL IC MODEL	122
1. IC-SPRING Regional Intellectual Capital Model Proposal (123)	
2. Model Structure: Characteristics and Aspects (123)	
3. Model management principles (131)	

Second Part (133)

chapter I

THE APPLICATION OF THE IC-SPRING MODEL FOR THE CM	134
---	-----

Introduction

sicr



SPRING INTELLECTUAL CAPITAL REPORT
Analysis of Comunidad de Madrid

The objective of this document, output from the Fundación para el Conocimiento madr+d's participation in the PAXIS action, is the creation of the first methodological approach on intellectual capital at the regional scope, in this case in the Madrid region (CM), as a reference in the Spanish territory, taking into account its European dimension and replication.

The set of shared experiences within the PAXIS framework has made it possible to create a solid base for forthcoming approaches in this area, presenting a tool that facilitates reflection and decision-making processes, particularly in the scope related to entrepreneurship and business creation policies.

The analysis of Intellectual Capital for CM aims to create a common point of view on the range of realities generally analysed in a fragmented way, but offering the possibility of a convergent and relational study, a perspective that enriches the strategic reflection about the region.

The new economy profile oriented the SPRING project towards the consideration of measuring the innovative capacity of a region as a way to compete, helping management change and clearly showing the value of such capabilities.

In relation to the identification, measurement and management of Intellectual Capital, public and private organisations are key players as drivers/users of such methodologies. One of the main applications is the promotion of the entrepreneurship culture in the region to develop and boost support for the creation of (especially new technology based firms).

This summary presents a theoretical first part, detailing the conceptual frame of Intellectual Capital since, for many, this area is considered emergent in this respect.

The second part, focused on those results related to the application of the Regional Intellectual Capital Model (created for SPRING, IC-SPRING model), includes exhaustive statistical information compared with other complementary regional analysis, providing a new perspective on the CM reality.

Consequently, in the second part, the model's outputs are focused on a set of general considerations for improving regional intellectual capital to lay the groundwork for an enhanced entrepreneurship environment.

The set of indicators described for each part of the IC-SPRING model aims to be a first proposal for understanding and collecting valuable information on the basic intangible

assets for regional innovation development, new technology based firms, and the entrepreneurship culture.

This summary is structured according to the Intellectus Model ^{®1} which integrates the international experiences related to the identification and measurement of Intellectual Capital, taking into account the importance of analysis rather than measurement, that is, the processes and actions to improve intangible assets.

In the regional dimension, the Intellectual Capital analysis aims to be a strategic instrument with great added value for considering the most supportive environment for entrepreneurship and entrepreneurs, stressing the interpretation of different aspects related to the region's potential for innovation.

From this point of view, through its participation in the SPRING project, the Fundación para el Conocimiento madri+d ha focused its efforts towards collaboration with SPRING partners to develop a model proposal that can be used in other environments thereby facilitating the future extension of the model at a European scale.

¹ The methodology is a consequence of the conceptual analysis of the different elements that integrate the intellectual capital framework, an exercise carried out by the Knowledge Society Research Centre (CIC) in collaboration with SPRING partners for Fundación para el Conocimiento madri+d, owner of the final methodological approach. Several workshops defined a general structure and a specific treatment for each capital, taking into account the existing state-of-the art and offering new ideas and improvements for creating the above-mentioned Intellectus Model [®]. This Intellectus Model [®] has been used successfully in diverse applications at public and private organizations, a key point for becoming an interesting reference and its consideration as regional tool, taking into account a revision based on international experiences.



First Part

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Chapter I

THE CONCEPTUAL FRAMEWORK AS A CONTRIBUTION TO THE INTELLECTUAL CAPITAL ANALYSIS

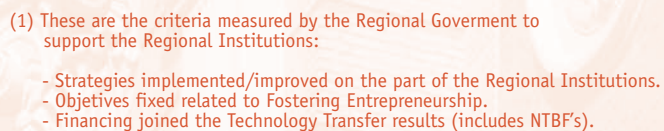
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Analysis of Comunidad de Madrid

Support for innovation capabilities requires a strategic- thinking framework that contemplates the analysis of intangible assets. This scope provides a structured basis for considering the different key factors that, in this case, support entrepreneurship policies.

NTBF support Policy assessment and follow-up SPRING-madri+d model
Source: Fundación para el Conocimiento madri+d, 2005



Consequently in the SPRING Project, CM implemented a methodology to identify and measure the regional Intellectual Capital with the objective of defining supporting strategies to create new technology based firms, facilitating profiling and the selection of appropriate instruments.

From the Public Sector standpoint, management of regional intangible assets aims to:

- Create a *positive* environment for entrepreneurship.
- Foster this environment through the creation of new technology based firms.
- Improve public management through the implementation of more complete management schemes.

This set of issues establishes a double optic: firstly, the regional public sector as the driver (push action) of a strategic reality; secondly, the user task, in the line of quality policies aimed at improving efficiency and performance.

Support for entrepreneurship is linked to the promotion of a culture that self-employment and a risk-taking spirit, taking into account the development of different attitudes and skills. Control and monitoring of such dynamics can be achieved through the analysis of the existing social perception on the entrepreneur phenomenon².

Support for entrepreneurs requires a multidimensional approach that promotes not only human capital but also external resources and flows derived from the networks as key issues for knowledge sharing. Thus, external support must not only be considered from an economic or training scope, but must also take into account infrastructures, laboratories, spaces for interaction, etc.

Intellectual Capital is the basis for creative approaches and, therefore, is considered an essential aspect for innovation policy because of the need for identifying and measuring the key elements that have an impact on the entrepreneurial spirit and the creation of business.

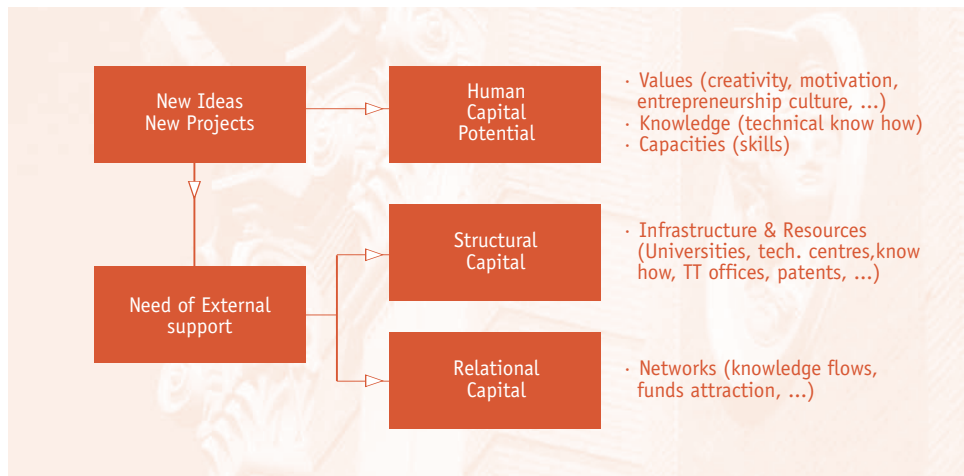
Management of such key factors is best achieved by defining a model addressing three main issues: human capital, essential for creating new ideas and projects, and structural and relational capital, involved in the necessary external support.

In the first instance (human capital), creativity and innovative ideas require specific values, culture, motivation, knowledge and skills, factors that mainly managed through training programmes.

² Projects such as the Global Entrepreneurship Monitor are developed within this thematic area.



FIGURE 2



With respect to the other two capitals, external support is linked to the regional presence of (general and specific) infrastructures and actions to support the innovation processes, that is, infrastructures such as Universities, Technological Centres, Technology Transfer Offices, etc. These are the key players, developing their activities within network dynamics where knowledge flows through communication channels generate regional marketing actions and the possibilities for attracting foreign investment.

Chapter II

METHODOLOGICAL APPROACH: REGIONAL IC MODEL

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Analysis of Comunidad de Madrid

2.1 IC-SPRING Regional Intellectual Capital Model Proposal

The identification of the regional value (inside the trend related to the development and integration of the “knowledge regions”) is necessary for creating tools that support the measurement of the key variables that promote regional competitiveness, progress and welfare.

The public management agenda is developing this area as a part of the new trend in public management trend that aims to facilitate the region’s sustainability and future development. Thus, intangible assets management at the regional level (based on information and knowledge) is essential for generating value and social welfare based on the “intelligent region” approach.

In this sense, the regions’ role in the Knowledge Society is increasing the need for models to control the most important variables for understanding the power of information and knowledge.

The identification of the different drivers, such as knowledge, infrastructures, the degree of connection, productivity, social cohesion, as part of capitals, that is, human, structural, and relational capital, would be an essential part of the model.

The methodology should look for a standard approach that makes it easier to compare the different regions and identify the best practices.

2.2 Model Structure: Characteristics and Aspects

Following the conceptual structure of the Intellectus Model ®, the regional proposal contemplates five capitals or basic related components:

Regional Human Capital

- a. Regional Human Capital. Related to the knowledge (explicit and tacit, individual and social) of individuals and regional groups, and their capacity for generating such knowledge. The main aspects of this capital involve the knowledge held by individuals or groups, as well as their capacity to share and learn with other agents in order to benefit at the regional level.
 - a.1 Values and attitudes. Represent knowledge of the motivations that lead individuals to do certain things. This knowledge, which refers mainly to a person’s mental model - such as point of view, paradigms, beliefs and state of mind - conditions the person’s perception of the world bears a strong relationship to the regional “environment” This element comprises the main measurable variables:

- a.1.1 The feeling of belonging and commitment: the feeling or circumstance of identifying with and feeling that one is part of a region.

Proposed indicators:

- Number of Associations.
- % of participation in elections.
- Number of social programmes.

- a.1.2 Motivation & Satisfaction: Motivation involves the desires, aspirations and strengths that increases a person's ability to carry out his/her tasks. In this sense, satisfaction is the level of connection and participation in tasks, based on a good balance between contributions and rewards.

Proposed indicators:

- Number of regional labour strikes.
- Unemployment index.
- % of families with high or very high economic difficulties.
- Tax pressure (% over maximum limits)
- Quality of Life index.
- Income per capita (month).
- Non-stable employment index.

- a.1.3 Creativity: the process that fosters new ideas and, consequently, develops inventiveness.

Proposed indicators:

- % of population over 65.
- Total number of foreigners.
- Number of foreigners from E.U.
- Number of foreigners from East Europe.
- Number of foreigners from Latin America.
- Number of foreigners from North Africa.
- Number of foreigners in urban centres.
- Number of new businesses created.
- Managerial Dynamics.
- Number of new businesses (CDTI data)
- Evolution of new business index.

- a.2 Skills. Refers to knowledge that enables an individual to perform his/her tasks or job successfully. The main variables involved in achieving these skills can be measured:

- a.2.1 Formal education: a body of explicit knowledge that an individual possesses independently of his/her job.



Proposed indicators:

- % of the population with basic education (25-69 years old).
- % of the population with secondary education (25-69 years old).
- % of the population with university degrees (25-69 years old).
- % holding a job who have a university degree.
- Number of university students in Social Sciences.
- Number of university students in Technical Sciences.
- Ranking of the best cities (employee's qualification).

a.2.2 Specialised training: knowledge pertaining to a specific area that is obtained from carrying out a task in an organisation.

Proposed indicators:

- % use of internet for training in company.
- Number of participants in lifelong learning programmes.

a.3 Capabilities (*know-how*): refers to knowledge relating to the performance of specific tasks. Specifically, capability is defined as the talent developed in a region as the result of experience and practice. Capabilities involve the following measurable variables:

a.3.1 Communication and leadership (*exchange of knowledge*): ability to transmit and receive information, as well as to share the region's knowledge with other territories. In this sense, this also implies the ability to have an influence in the national and international reality (leadership).

Proposed indicators:

- Number of fairs and congresses.
- Number of projects with CM leadership in the VI FP.
- % of headquarters of top 500 companies.

a.3.4 Experience: knowledge acquired through practice.

Proposed indicators:

- Number of regional knowledge management initiatives.

Regional Structural Capital

b. Regional Organizational Capital. Related to explicit or tacit, formal or non-formal intangibles for efficiently structuring and developing the region's organizational activity.

b.1 Structure: formal organizational modes and processes consisting of the following measurable variables:

b.1.1 Regional Structure. Set of issues characterizing the region.

Proposed indicators:

- % of population working in the service sector.
- GIP per capita.
- Number of companies in the region.
- % of companies with 0-5 employees.
- % of companies with 5-50 employees.
- Managerial density (for every 1000 people).
- % BAV from service sector.
- % of population working in high tech sectors.
- % of companies in the ICT sector (over national data).
- Number of employees in ICT sector.

b.2 Infrastructure. System of services and assets supporting regional activity.

b.2.1 Communication. Set of channels enabling communication within the region.

Proposed indicators:

- % of population using the internet.
- % of population using a computer.
- % of homes with personal computers.
- % of homes with internet access.
- % of homes with telephones.
- % of homes with mobile telephones.
- % of companies with computers.
- % of companies with intranet.
- % of companies with internet access.
- % of companies with an e-mail address.
- % of companies with web page.
- Number of companies with quality certifications.
- Number of certified entities and laboratories.
- Number of centres with public internet access.
- Regional ICT budget (million euros).

b.2.2 Transport. The regional transport system allows a higher level of interactions that facilitate the transfer of knowledge.

Proposed indicators:

- Kilometres of subway lines.
- Regional Transport Infrastructure budget (million euros).



b.2.3 Basic Services. Set of basic public services related to education, health, finances, etc.

Proposed indicators:

- Number of regional Universities.
- Number of regional Public Research Centres.
- Number of hospitals.
- Number of hospitals per 100,000 people.
- Number of bank offices.

b.3 Social Cohesion. Cohesion is an important element for creating a feeling of commitment in the region.

b.3.1 Social Protection. Public support for social related aspects is an important factor for regional cohesion.

Proposed indicators:

- Number of hospital beds per 10,000 people.
- Healthcare employees per bed.
- Index of beds occupation.

b.4 Regional Support and Environment. The description of the industrial environment and support programs is an important part of organizational capital.

b.4.1 Industrial Environment. Regional activity is characterized mainly by the industrial context.

Proposed indicators:

- Industrial environment index.
- Managerial trust index.
- Regional Managerial trust indicator.

b.4.2 Support Programs (Public & Private). Set of public or private programmes supporting the regional industry.

Proposed indicators:

- Number of Public Units with “service letters”.
- Number of City Councils with One-Stop Services.
- Number of Euro-One Stop Services.
- Number of reciprocal guarantees societies.
- Number of venture capital investors.
- Number of companies participated by Madrid Venture Capital.

- c. Regional Technological Capital. Related to the set of intangibles directly involved with regional technological development activities, in addition to taking into account the existing regional system for promoting the improvement of the knowledge base needed for the development of future innovations.

- c.1 R&D + Innovation (R&D&I) Effort. The R&D&I effort is a key variable for the creation of new knowledge and the improvement of regional intellectual capital.

- c.1.1 R&D&I Investment. Public support for R&D&I makes it possible to identify the regional strategy in this field.

Proposed indicators:

- R&D&I investment (% of GIP).
- % of Managerial R&D&I investment (over national data).
- Number of R&D&I specialized companies.
- Number of regional Public Research Centres.
- Number of Science-Technology Parks.
- % of venture capital investment (over national data).
- Regional Technological Innovation budget (million euros).
- Number of Technological Centres.
- Number of centres for the dissemination of technology.

- c.1.2 R&D&I Researchers. The human capital involved in the R&D&I activity is essential for innovation.

Proposed indicators:

- Number of R&D researchers in companies (full-time).
- % of researchers in companies (over national data).
- Number of R&D researchers (total).
- % of researchers working in technological sectors.
- Number of researchers involved in R&D services.
- Number of research groups in Madrid.
- Ranking of innovative European regions.

- c.1.3 R&D&I Projects. The development of R&D&I projects reflects the level of innovative solutions.

Proposed indicators:

- % of national funds for R&D projects.
- % of national funds for special actions.
- % of PROFIT programme funds.
- % of PROFIT –ICT programme funds.
- % of CDTI funds.



- VI FP returns
- Number of projects presented in the VI FP.
- Number of European projects with Madrid participation.
- % of innovative companies collaborating in R&D (up to 19 employees).

c.2 Regional Development. Regional development is closely related to R&D&I, and this subject can be measured in terms of results.

c.2.1 R&D&I Development. R&D&I activity developed in the region can contribute to obtaining regional patents, a very important factor for leadership and returns.

Proposed indicators:

- Number of OPEM inventions.
- Number of USPTO registered patents (Madrid).
- Number of patents.
- Number of technological patents.
- Number of required patents.
- Number of required patents per million people.
- Number of registered patents.
- Number of registered patents (over national data).
- % of scientific articles (over national data).
- Number of Experimental and Technical publications.
- Number of Social Science publications.
- Number of companies Science-Technology Park incubators.
- Scientific production.
- Number of publications per 10000 people.
- Number of regional Technology Transfer Offices (TTO).
- Number of contracts with National Public Administration through TTO.
- Number of contracts with Regional Public Administration through TTO.
- Number of contracts with national companies through TTO.
- Number of contracts with foreign companies through TTO.
- Number of companies using technological centres services.
- Number of contracts for TTO –sponsored training.

Regional Relational Capital

d. Regional Economic Capital. Consists of a set of relationships with the main agents involved in the regional economic activity.

d.1 Activity Relationships. Relationships involved in the regional economic activity are fundamental for knowledge transfer.

d.1.1 Public Sector Relationships. The system of relationships is supported by the public sector through a set of services, especially in the quality field.

Proposed indicators:

- % of companies using online services with the Public Units.
- % of companies using complete online services.
- % of one-Stop services.

d.1.2 Economic & Financial Relationships. The interactions among companies and export and import activities are important factors for intellectual capital based on the relational approach.

Proposed indicators:

- Number of exports.
- Number of imports.
- Ranking of best cities to attract business.
- Export/import ratio (technological dependency).

d.1.3 Tourism. Tourism is a key issue for knowledge transfer and the regional marketing.

Proposed indicators:

- Number of hospitality facilities.
- Hospitality offer.
- % occupancy.
- Number of “nights” at hotels.
- Number of museums and collections.

e. Regional Social Capital. Relationships developed by the region with other social agents involved in regional activities, expressed in terms of integration, commitment, co-operation, cohesion, connection and social responsibility as key elements for social welfare.

e.1 Social & Sustainable Relationships. In addition to economic activity, relationships with the social context are essential for measuring regional intellectual capital since the relational scope is a wide component with links not only in business but also in social groups and activities.

e.1.1 Environmental Relationships. Sustainability enables the region to create knowledge based on strategy rather than on physical assets.

Proposed indicators:

- Number of managerial environment-related organizations.
- Number of certified companies (ISO 14001).
- Environmental quality ranking.



e.1.2 Media Relationships. Regional marketing sets the foundation for promoting interactions and knowledge transfer in the region.

Proposed indicators:

- % penetration of daily newspapers (over up 14 years old).
- % penetration of magazines (over up 14 years old).
- % penetration of TV (over up 14 years old).
- % penetration of Internet (over up 14 years old).

2.3 Model management principles

Adaptation of the Intellectus Model ® to the regional dimension translates the model's original variables by identifying a set of key indicators that are generally readily available from different statistics organizations.

The model is based on the need to create a concise frame for defining indicators that, from a general point of view, meet certain basic specifications.

TABLE

Basic aspects in the design of indicators

• Principles of use	<ul style="list-style-type: none"> • Permanence in time • Indicator aggregation • Management transparency
• Indicator characteristic	<ul style="list-style-type: none"> • Simplicity • Objectivity • Strategic character
• Classification categories	<ul style="list-style-type: none"> • Dynamic criteria <ul style="list-style-type: none"> · Intangible activity indicator · Intangible asset indicator • Functional criteria <ul style="list-style-type: none"> · Efficiency indicators · Effectiveness indicators · Innovation indicators · Organizational balance indicators • Global criteria <ul style="list-style-type: none"> · Global indicators · Specific indicators
• Intangible audit and indicator validation system	<ul style="list-style-type: none"> • Relevance • Correspondence • Solidity • Exactness • Precision • Comparison

TABLE

Basic aspects in the design of indicators (continuación)

- | | |
|--------------------------|----------------------|
| • Indicator benchmarking | • Internal |
| | • Competitive |
| | • Non competitive |
| | • Recognised optimum |

In this sense, the elaboration of indicator guidelines is especially relevant in order to define the Indicators, Objectives and Method for its calculation.

This approach makes it possible to define principles for managing the model, and creates a general basic frame for expanding its use.

Second Part

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Chapter I

THE APPLICATION OF THE IC-SPRING MODEL FOR THE CM

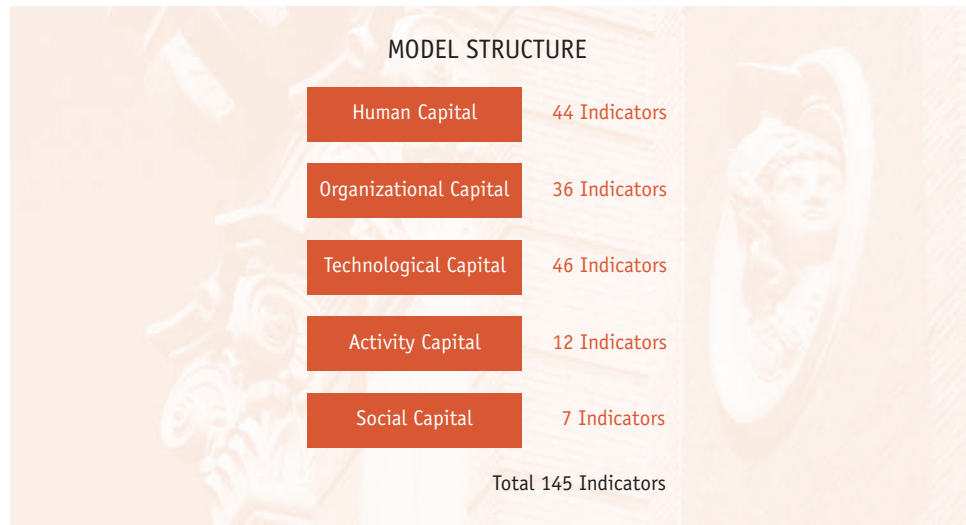
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The entire model structure for the next IC management was used in defining the actual CM, obtaining 145 indicators broken down as follows:

FIGURE 3



The dimension of the model has to be considered above all taking into account the regional reality and the contextual analysis.

From the beginning, the CM is characterized by a high number of opportunities for the creation of new technology based firms and the importance of the service sector as the driver of the regional economy.

The analysis of the different capitals from the model structure, however, has made it possible to draw conclusions on the regional reality:

a) Human Capital Conclusions. Obviously, human capital is the driving force behind entrepreneurship, the source of new ideas and business. Human Capital in CM is characterized by:

- High potential of regional human capital with a high level of expertise.
- Regional capacity for attracting people from other territories.
- Trend towards a lifelong learning culture.
- Existence of regional approaches for knowledge management.
- Absence of an entrepreneurial culture due to the lack of an educational pattern and a social perception quite at odds with the values that characterize self-employment and business creation.

b) Organizational Capital Conclusions for CM:

- Significant access to general (transport, education, etc.) and other more specific R&D related resources. Nevertheless, results are less positive within the scope of the level of ICT and even negative with respect to healthcare facilities.
- There is a positive managerial environment in CM considering the context and expectations over patterns of growth.
- Finally, there is evident public concern about the creation of programmes oriented toward the support of entrepreneurship and entrepreneurs.

c) Technological Capital Conclusions. The reality of new technology based firms is associated to knowledge generation derived from research and Project development. In this sense, the CM is characterized by:

- A high potential for R&D, with a specialized human capital, producing first class scientific results but without good levels of patents due to cultural or market related aspects.
- At the national scope, the CM is the leader in participation in R&D projects, however the profile is very focused on public support.
- Finally, the limited application, offer and demand (depends on the point of view) of R&D results has a regional consequence because of the impact of the brain-drain phenomenon on economic and social dynamics.

d) Activity Capital Conclusions. Concerning the relational point, contacts and networks with the public sector and economic or financial organizations are the pillars for the development of entrepreneurship, taking the CM to the next profile:

- The CM is the main location for direct foreign investment. This has a positive impact on the business-creation process.
- The trend is for the CM to become the first location option for Latin American entrepreneurs.
- Improvement of the region's positioning in international rankings with respect to the organization of congresses and fairs, particularly those related to business travel. Regional marketing, however, remains insufficient.
- General confusion concerning the different administrative areas hinders access to external resources.

e) Social Capital Conclusions. The elements of this capital, environment and media channels, have a positive impact for innovation and entrepreneurship, however, the CM presents negative results in this thematic area:

- A large number of companies in the region lack environmental certifications.
- Independently of the high penetration of media channels, contents are not focused on the valuation of self-employment or business creation.



In short, the analysis of the CM and its adherence to the IC-SPRING Intellectual Capital model presents a range of strategic issues with respect to entrepreneurship and entrepreneurs which have been summarised in the final document published by Fundación para el Conocimiento madri+d.

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18. VI Programa Marco para Pymes
19. Indicadores de Producción Científica y Tecnológica de la Comunidad de Madrid (PIPCYT) 1997-2001
20. GEM. Global Entrepreneurship Monitor. Informe ejecutivo 2004. Comunidad de Madrid
21. NANO. Nanotecnología en España.

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