

## **Value of bibliometric analysis for research policy: A case study of Spanish research into innovation and technology management**

BEATRIZ JUNQUERA, MARÍA MITRE

*Facultad de Ciencias Económicas y Empresariales, Oviedo (Spain)*

The primary aim of this paper is to assess the contribution to the international literature of Spanish scientific production in the research stream of innovation and technology management. For this purpose 72 articles published in the last decade in the most prestigious international journals in this research stream have been evaluated. From this analysis we have concluded that there has been a positive evolution from 1995 to the present time, as much from a qualitative as from a quantitative point of view. Likewise, we have found that research in this research stream is concentrated fundamentally on a reduced group of universities. Nevertheless, these do not focus exclusively on one or a few research subjects, but on a wide range thereof.

### **Introduction**

The purpose of this work is to carry out an exhaustive review of the literature published in international journals with two constraints: a) they must be specialized journals in innovation and technology management and b) papers must be written by researchers contracted by a Spanish institution. To this end, we have analyzed the articles published in the following publications: *International Journal of Technology Management*, *Journal of Product Innovation Management*, *R&D Management*,

---

Received July 17, 2006

*Address for correspondence:*

BEATRIZ JUNQUERA  
Facultad de Ciencias Económicas y Empresariales  
Avda. del Cristo, s/n, 33071 Oviedo  
E-mail: beatrizj@uniovi.es

0138–9130/US \$ 20.00  
Copyright © 2007 Akadémiai Kiadó, Budapest  
All rights reserved

*Research Policy* and *Technovation*.<sup>\*</sup> The period under consideration runs from 1995 to the present, representing a total of 72 published works. Their references are shown in the Appendix.

In order to achieve this aim, the structure of the present work will be as follows. Firstly, the methodology used in the article will be described. Secondly, the most relevant characteristics that define these papers will be presented. Afterwards, the bibliometric analysis as such will be presented. Finally, we shall present the conclusions allowing for a diagnosis of the state-of-the-art research within the research stream of science and technology management.

### **Methodology**

The methodology used in this work is based on the detailed analysis of the five specialised international journals with the greatest prestige at the present time, as manifest from their presence in the *Journal Citations Report* (2004 edition). The journals analyzed are the following: *International Journal of Technology Management*, *Journal of Product Innovation Management*, *R&D Management*, *Research Policy* and *Technovation*. Each issue of these journals was analysed and 72 articles were found in which at least one researcher was linked contractually to a Spanish institution.

In this paper we offer the most relevant results obtained from the current research. Firstly, a general overview of the situation is offered, which will then be analysed and interpreted in greater detail. For this purpose, Table 1 shows the distribution of international innovation and technology management papers by year and by journal (and at the same time a combined grouping based on both criteria). Likewise, the analysis results are discussed by universities and knowledge fields. In the second part of the article (bibliometric analysis as such) we discuss the subject matter approached in the seventy-two papers, their distribution according to the methodology used (hypothesis contrast, conceptual, etc.), the type of data used and the number of authors contributing to the articles. We also show which the main research objectives in every institution are. Finally, we discuss the implications of the previous descriptive data.

### **Most relevant features of the articles analyzed**

Under this heading the main features of the articles analyzed in the present article are shown. These are then catalogued, respectively, by annual distribution and journal (showing also their combined distribution according to both criteria simultaneously).

---

<sup>\*</sup> *Research & Technology Management* was also analyzed. However, this has not been included in the analysis, because no published work was found in which a researcher with contractual links to a Spanish institution took part.

At the same time, the relationship of the authors to universities and research issues is discussed.

*Annual distribution of the articles analyzed*

Table 1 shows the annual distribution of the articles published in the course of the years analyzed. As it can be observed, firstly, there was a period of eight years which can be classified, in practice, as years of inactivity. Afterwards, a considerable increase is found in 2003, which is even slightly greater in 2004. Although in 2005 a slight drop is perceptible, it must nevertheless be taken into consideration that not all issues relating to the 12-month period have been published yet. Consequently, it can be concluded that the scientific community in Spain engaged in the research stream of science and technology management is progressively increasing its participation in specialized international journals with an impact index in *Journal Citations Report*.

Table 1. Distribution of the number of published articles by years

Year	Number of published articles
1995	3
1996	4
1997	4
1998	6
1999	5
2000	5
2001	4
2002	5
2003	13
2004	14
2005	9
Total	72

*Distribution by journals of the articles analyzed*

Table 2 presents the distribution of these articles by journals. The two journals in which, by far, most of the papers have been published are, in this order, *Research Policy* and *Technovation*. At a considerable distance, the number of articles published in *International Journal of Technology Management* can be found. Presence in *R&D Management* is even less and in *Journal of Product Innovation Management* it is merely testimonial with just one paper.

Table 2. Distribution of the number of published articles by years and journals

Year	<i>Int. J. Technology Management</i>	<i>J. of Product Innovation Management</i>	<i>R&amp;D Management</i>	<i>Research Policy</i>	<i>Technovation</i>	Total
1995	0	0	0	1	2	3
1996	0	0	0	2	2	4
1997	3	0	0	1	0	4
1998	1	0	0	2	3	6
1999	1	0	2	1	1	5
2000	2	0	0	0	3	5
2001	1	0	0	2	1	4
2002	0	0	1	0	4	5
2003	1	1	0	8	3	13
2004	4	0	0	8	2	14
2005	2	0	2	1	4	9
Total	<b>15</b>	<b>1</b>	<b>5</b>	<b>26</b>	<b>25</b>	<b>72</b>

#### *Distribution by journals and years of the articles analyzed*

Table 2 shows, in addition to what is described in the preceding paragraph, the results by years of the articles published in each of the journals taken as reference. Thus, taking the analysis one step further, the evolution by years of publications in each of these journals must be examined, considering these on an individual basis. The evolution in *International Journal of Technology Management* has been practically linear, without appreciable variations over time. *Journal of Product Innovation Management* cannot be subjected to analysis, since only one study with Spanish authors has been published in this journal. Neither does there seem to be any clear evolution upwards or downwards in *R&D Management*. This tendency towards constancy is a characteristic feature also in *Technovation*. *Research Policy*, on the other hand, showed a spectacular surge in 2003, which continued in 2004.

#### *Detection of stable research groups in innovation and technology management*

If detection of current research groups in the research stream of innovation and technology management in Spain is set as an aim of this paper, there must first be an appraisal of the number of published articles by researchers from different centres and universities.\* Table 3 reflects the number of articles by staff from different Spanish institutions. Many of these have participated in one article or another of this kind. However, only one group of public universities has participated in a constant, systematic way in research related to this research stream. Two of these have done so on a large number of occasions: Universidad de Zaragoza and Universidad de Oviedo.

\* It must be taken into consideration that the total number of participations is greater than 72 (the total number of articles detected), since researchers under contract to different institutions may participate on the same article.

Others have participated, though to a lesser degree than the aforementioned two, on numerous occasions: Universidad Jaume I, Universidad Complutense de Madrid, Universidad Carlos III and Universidad de Granada.

Table 3. Number of published articles where researchers from different universities have taken part

Institution	Number of published papers
Centro de Información y Documentación Científica	1
CIEMAT	1
CSIC	2
IESE	1
Instituto de Empresas	1
Instituto de Investigación Médica	1
UNED	1
Universidad Alcalá	1
Universidad Autónoma Barcelona	2
Universidad Autónoma Madrid	3
Universidad Burgos	1
Universidad Cádiz	2
Universidad Carlos III	5
Universidad Complutense Madrid	6
Universidad Granada	4
Universidad Jaume I	7
Universidad Juan Carlos I	1
Universidad La Laguna	2
Universidad Las Palmas	1
Universidad León	2
Universidad Málaga	2
Universidad Miguel Hernández	1
Universidad Navarra	2
Universidad Oviedo	13
Universidad Pablo Olavide	1
Universidad País Vasco	1
Universidad Politécnica Barcelona	1
Universidad Politécnica Madrid	2
Universidad Rioja	1
Universidad Salamanca	2
Universidad Santiago	2
Universidad Zaragoza	14

#### *Grouping of the articles analyzed by fields of knowledge*

Table 4 shows the assignment of participating researchers to different knowledge fields in the 72 articles analyzed in the present study. It is worth pointing out the clear predominance of researchers from the field of Management. After these we can find those from the field of Economics, albeit lagging far behind. Finally, fields related only very tangentially have participated occasionally in research in innovation and technology management.

Table 4. Distribution of papers according to fields of knowledge

Knowledge field	Number of papers
Management	53
Economics	13
Technology	2
Others	4
Library Science and Documentation	
Biomedicine	
Centro de Estudios Sociales Avanzados	
Comparative Policy Unit	

### Bibliometric analysis

The main results of the bibliometric analysis of these 72 articles following below. We will analyze, respectively, their distribution according to the type of article, of the data used, of the number of authors and of the subjects dealt with, and finally we will reach conclusions regarding the present scene with respect to publications in the research stream of innovation and technology management.

#### *Distribution of the articles analyzed according to the methodology used*

Next there is an examination of the distribution of the articles published according to the type of methodology employed. Table 5 shows their distribution. A clear predominance of empirical research can be observed. Nonetheless, it should be pointed out the high number of conceptual articles in the research during the period analyzed. This suggests that the degree of development of the research in this field has gone beyond a merely embryonic stage, shown by the high number of studies with an empirical character. However, the significant amount of conceptual studies suggests the need for further discussion of a larger number of issues.

Table 5. Distribution of articles published according to methodologies used

Used methodology	Number of published paper
Conceptual	20
Descriptive	1
Method	1
Hypothesis contrast	49
Model	1

#### *Distribution of the articles analyzed according to the type of data used*

As regards the type of data, taking into consideration only studies of an empirical nature, models or methods, attention must be drawn to what Table 6 shows. The survey method is resorted to be predominant, whilst secondary data serve as a basis for a relevant group of studies. With respect to the subject matter dealt with, total dispersion was found, i.e. there is no specialization in specific subjects.

Table 6. Distribution according to the data used

Data used	Number of published papers*
Secondary	20
Primary from questionnaire	27
Case analysis	8
Panel data	4

\* The total is different from the number of papers except the conceptual ones because some papers used more than one kind of data.

*Index of co-authorship*

Table 7 shows the distribution of articles published according to the number of authors participating in them. From this it can be deduced that, in the same way as the articles published are not usually very long, it is also true that the most frequent ones are not those signed by a single author. Most common are groups of a somewhat limited size (two or three researchers in each case).

Table 7. Distribution of the published articles according to the number of authors

Number of authors	Number of articles
One	12
Two	34
Three	24
Four	2
Total	72

*Specialization by subject of the authors taking part in the articles analyzed*

It must also be pointed out that, nonetheless, the issues approached by the researchers of every university cover a diverse range of subject matter in many cases. That is, Universities have not opted for specialization in any specific subjects. Table 8 shows the issues approached in the articles produced in every university.

**Conclusions**

The aim of this paper is to analyze current research tendencies in the research stream of technology and innovation management in Spain. Taken into account for this purpose were all the articles published by researchers associated with Spanish institutions in the international journals with the greatest prestige specialized in this research stream – *International Journal of Technology Management, Journal of Product Innovation Management, R&D Management, Research Policy and Technovation* – from 1995 until nowadays. Seventy-two articles were found.

Table 8. Issues analyzed by the universities most involved in research

Institution	Issues
Universidad Complutense Madrid	Cooperation agreement Technical change Spillover effect Public financing Internacionalization of the innovative companies Use of information technologies
Universidad Carlos III	Innovation indicators Joint-ventures Public financing programs Technological forecasting Start-ups
Universidad de Granada	Research teams Organizational flexibility Scientific production
Universidad Jaume I	Organizational development Knowledge management Industrial districts Innovation indicators Influence on the export of the innovative activity Product innovation
Universidad de Oviedo	Organizational learning Barriers to imitation Technical change and productivity Sectorial differences Knowledge management Entrepreneurship ISO 9000 Public aid programs Intangible resources Technological substitution
Universidad de Zaragoza	Technology adoption Innovation cycles Physical demand Technology diffusion Entrepreneurs Product innovation Involvement of the suppliers into the innovative process University-firm relationships Spin-offs Technology substitution Telework

The main conclusions reached were those presented below. Firstly, there were eight years practically of stagnation. A considerable increase took place in 2003, which was even surpassed in the following year. The journals that researchers most turned to for publication were, in this order, *Research Policy* and *Technovation*. The number published in each journal has remained practically constant over time, except in the case of *Research Policy*, where this number has increased substantially, especially in the last few years. Most of the articles analyzed of authors are associated with the knowledge field of Management, although a large number belongs to the field of Economics; from



this an interest in issues of an economic nature and, more particularly, the role of innovation and technology in companies can be deduced. As regards the methodologies used, a clear predominance can be observed of those of an empirical nature, although a large number of articles of conceptual nature are still produced. This shows that research, while not having reached its maximum level of development, has already gone beyond the merely embryonic stage. This can be seen from the high number of articles of an empirical nature. The most usual number of co-authors of the articles is 2 or 3. The Spanish institutions with the greatest presence are Universidad de Zaragoza and Universidad de Oviedo. Nevertheless, there is also a noteworthy presence of Universidad de Jaume I, Universidad de Carlos III, Universidad de Complutense de Madrid and Universidad de Granada. At each of these, different authors have, however, dealt with diverse subject matter, i.e. there is no specialization in particular issues according to the university. Consequently, it appears that what has been published in this research stream is not a consequence of any planned action on the part of research group leaders within the different universities, but rather a product of the interest and work of individuals or groups of a small size with regard to a given field.

To summarize, it can be deduced that there has been a positive evolution both in quality and quantity of international scientific production in the research stream of technology and innovation management on the part of Spanish researchers. Nonetheless, certain deficiencies have been noted, especially the lack of planning in research activity within universities. This may be a subject of interest for future articles, i.e. how to rationalize this activity, what systems of incentives would be necessary and what ways of organizing this activity would be capable of promoting cooperation. Moreover, what we have seen up to now is but one facet of one of the dimensions of a system of science and technology. Nevertheless, to produce a reasoned report on the present situation of the latter requires an assessment not only of other questions related to the public system, but also the study of other dimensions of the system of science and technology, especially of the role of entrepreneurial world, which indeed is considered the weak link of the system in Spain. This evaluation must be the subject of future articles.

## Appendix

### Bibliographic data of the 72 papers analyzed in the study

- ACOSTA, J., MODREGO, A. (2001), Public financing of cooperative R&D projects in Spain: The Concerted Projects under the National R&D Plan, *Research Policy*, 30 : 625–641.
- ACOSTA, M., CORONADO, D. (2003), Science-technology flows in Spanish regions. An analysis of scientific citations in patents, *Research Policy*, 32 : 1783–1803.
- ÁGUILA, A. R. DEL, BRUQUE, S., PADILLA, A. (2002), The economic and organizational aspects of telecentres: The Spanish case, *Technovation*, 22 : 785–798.

- ALEGRE-VIDAL, J., LAPIEDRA-ALCAMÍ, R., CHIVA-GÓMEZ, R. (2004), Linking operations strategy and product innovation: An empirical study of Spanish ceramic tile producers, *Research Policy*, 33 : 829–839.
- ALFONSO-GIL, J., SAEZ-CALA, A., VINAS-APAOLAZA, A. I. (2003), Innovation processes in mature clusters of SMEs. A proposal for assessment indicators, *International Journal of Technology Management*, 26: 346–361.
- ÁLVAREZ-GIL, M. J., GONZÁLEZ DE LA FE, P. (1999), Strategic alliances, organisational learning and new product development: The cases of Rover and Seat, *R&D Management*, 29: 423–426.
- ÁLVAREZ, I., MOLERO, J. (2005), Technology and the generation of international knowledge spillovers: An application to Spanish manufacturing firms, *Research Policy*, 34: 1440–1452.
- ANTELO, M. (2003), Licensing a non-drastic innovation under double informational asymmetry, *Research Policy*, 32: 367–390.
- BAYONA, C., GARCÍA-MARCO, T., HUERTA, E. (2001), Firms' motivations for cooperative R&D: An empirical analysis of Spanish firms, *Research Policy*, 30 : 1289–1307.
- BAYONA, C., GARCÍA-MARCO, T., HUERTA, E. (2002), Collaboration in R&D with universities and research centres: An empirical study of Spanish firms, *R&D Management*, 32 : 321–341.
- BENEITO, P. (2003), Choosing among alternative technological strategies: An empirical analysis of formal sources of innovation, *Research Policy*, 32 : 693–713.
- BLANES, J. V., BUSOM, I. (2004), Who participates in R&D subsidy programs? The case of Spanish manufacturing firms, *Research Policy*, 33 : 1459–1476.
- BRÍO, J. A. DEL, JUNQUERA, B. (2002), Managerial environmental awareness and cooperation with public governments in Spanish industrial companies, *Technovation*, 22 : 445–452.
- BRÍO, J. A. DEL, JUNQUERA, B. (2003), A review of the literature on environmental innovation management in SMEs: Implications for public policies, *Technovation*, 23 : 939–948.
- BRITO, B. C., BESSANT, J., HERNÁNDEZ, G., ÁLVAREZ, A. (2001), A conceptual model for the development of technological management processes in manufacturing companies in developing countries, *Technovation*, 21: 345–352.
- BUENO, E., ORDÓÑEZ, P., SALMADOR, M. P. (2004), Towards an integrative model of business, knowledge and organisational learning processes, *International Journal of Technology Management*, 27 : 562–574.
- CAMISÓN, C. (1998), Total quality management and cultural change: A model of organisational development, *International Journal of Technology Management*, 16 : 479–493.
- CHIVA-GÓMEZ, R. (2004), Repercussions of complex adaptive systems on product design management, *Technovation*, 24 : 707–711.
- COOKE, P., GÓMEZ-URANGA, M., ETXEBARRIA, G. (1997), Regional innovation systems: Institutional and organisational dimensions, *Research Policy*, 26 : 475–491.
- DESMET, K., KUJAL, P., LOBO, F. (2004), Implementing R&D policies: An analysis of Spain's pharmaceutical research program, *Research Policy*, 33 : 1493–1507.
- ENTRIALGO, M., FERNÁNDEZ, E., VÁZQUEZ, C. J. (2000), Linking entrepreneurship and strategic management: Evidence from Spanish SMEs, *Technovation*, 20 : 427–436.
- ESCANCIANO, C., FERNÁNDEZ, E., VÁZQUEZ, C. J. (2002), Linking the firm's technological status and ISO 9000 certification: Results of an empirical research, *Technovation*, 22 : 509–515.
- FERNÁNDEZ, E., JUNQUERA, B., VÁZQUEZ, C. J. (1996), Government support for R&D: The Spanish case, *Technovation*, 16 : 59–65.
- FERNÁNDEZ, E., JUNQUERA, B., VÁZQUEZ, C. J. (1997), Sectorial influence on R&D policies of Spanish firms, *International Journal of Technology Management*, 13 : 554–562.
- FERNÁNDEZ, E., JUNQUERA, B., VÁZQUEZ, C. J. (2000), Typology and strategic analysis of intangible resources. A resource-based approach, *Technovation*, 20 : 81–92.
- FERNÁNDEZ, E., MONTES, J. M., PÉREZ-BUSTAMANTE, G. O., VÁZQUEZ, C. J. (1999), Competitive strategy in technological knowledge imitation, *International Journal of Technology Management*, 18 : 535–548.
- FLOR, M. L., OLTRA, M. J. (2004), Identification of innovating firms through technological innovation indicators: An application to the Spanish ceramic tile industry, *Research Policy*, 33 : 323–336.
- FLOR, M. L., OLTRA, M. J. (2005), The influence of firms' technological capabilities on export performance in supplier-dominated industries: The case of ceramic tiles firms, *R&D Management*, 35 : 333–347.

- FUENTEELSAZ, L., GÓMEZ, J., POLO, Y. (2003), Intrafirm diffusion of new technologies: An empirical application, *Research Policy*, 32 : 533–551.
- GALENDE, J., FUENTE, J. M. DE LA (2003), Internal factors determining a firm's innovative behaviour, *Research Policy*, 32 : 715–736.
- GALENDE, J., SUÁREZ, I. (1999), A resource-based analysis of the factors determining a firm's R&D activities, *Research Policy*, 28 : 891–905.
- GARCÍA-VALDERRAMA, T., MULERO-MENDIGORRI, E. (2005), Content validation of a measure of R&D effectiveness, *R&D Management*, 35 : 311–331.
- GIARRATANA, M. S. (2004), The birth of a new industry: Entry by start-ups and the drivers of firm growth. The case of encryption software, *Research Policy*, 33 : 787–806.
- GÓMEZ, I., FERNÁNDEZ, M. T., ZULUETA, M. A., CAMÍ, J. (1995), Analysis of biomedical research in Spain, *Research Policy*, 24 : 459–471.
- GONZÁLEZ, E., CÁRCABA, A. (2004), Efficiency improvement through learning, *International Journal of Technology Management*, 27 : 628–638.
- GONZÁLEZ, E., GASCÓN, F. (2004), Sources of productivity growth in the Spanish pharmaceutical industry (1994–2000), *Research Policy*, 33 : 735–745.
- HEIJ, J. (2003), Freerider behaviour and the public finance of R&D activities in enterprises: The case of the Spanish low interest credits for R&D, *Research Policy*, 32 : 445–461.
- JIMÉNEZ-CONTRERAS, E., MOYA-ANEGÓN, F. DE, DELGADO LÓPEZ-COZAR, E. (2003), The evolution of research activity in Spain: The impact of the National Commission for the Evaluation of Research Activity (CNEAI), *Research Policy*, 32 : 123–142.
- JIMÉNEZ-MARTÍNEZ, J., POLO-REDONDO, Y. (1998), International diffusion of a new tool: The case of Electronic Data Interchange (EDI) in the retailing sector, *Research Policy*, 26 : 811–827.
- JIMÉNEZ, J., POLO, Y. (1999), Kalman filtering as a tool to study the technological substitution in the telecommunications sector, *Technovation*, 19 : 735–746.
- JIMÉNEZ-MARTÍNEZ, J., POLO-REDONDO, Y. (2001), Key variables in the EDI adoption by retail firms, *Technovation*, 21 : 385–394.
- JIMÉNEZ-MARTÍNEZ, J., POLO-REDONDO, Y. (2004), The influence of EDI adoption over its perceived benefits, *Technovation*, 24 : 73–79.
- LLORÉNS, J., RUIZ, A., GARCÍA, V. (2005), Influence of support leadership and teamwork cohesion on organizational learning, innovation and performance: An empirical examination, *Technovation*, 25 : 1159–1172.
- LÓPEZ-EGUILAZ, M. J., PÉREZ, S. (1997), The measurement of technology transfer: Situation in Spain, *International Journal of Technology Management*, 13 : 153–164.
- MACHO-STADLER, I., MARTÍNEZ-GIRALT, X., PÉREZ-CASTRILLO, J. D. (1996), The role of information in licensing contract design, *Research Policy*, 25 : 43–57.
- MARTÍNEZ, Á. (1995), Innovation cycles and flexible automation in manufacturing industries, *Technovation*, 15 : 351–362.
- MARTÍNEZ, Á., PASTOR, A. C. (1995), University-industry relationships in peripheral regions: The case of Aragón in Spain, *Technovation*, 15 : 613–625.
- MARTÍNEZ, A., PÉREZ, M. (2003a), Cooperation and the ability to minimize the time and cost of new product development within the Spanish automotive supplier industry, *Journal of Product Innovation Management*, 20 : 57–69.
- MARTÍNEZ, A., PÉREZ, M. (2003b), Flexibility in new product development: A survey of practices and its relationship with the product's technological complexity, *Technovation*, 23 : 139–145.
- MARTÍNEZ, A., URBINA, O. (1998), Entrepreneurship networks and high technology firms: The case of Aragón, *Technovation*, 18 : 335–345.
- MOLERO, J. (1998), Patterns of internationalization of Spanish innovatory firms, *Research Policy*, 27 : 541–558.
- MOLERO, J., BUESA, J. (1996), Patterns of technological change among Spanish innovative firms: The case of the Madrid region, *Research Policy*, 25 : 647–663.
- MOLINA-MORALES, F. X., MARTÍNEZ-FERNÁNDEZ, M. T. (2004), How much difference is there between industrial district firms? A net value creation approach, *Research Policy*, 33 : 473–486.

- MORA-VALENTÍN, E. M., MONTORO-SÁNCHEZ, A., GUERRAS-MARTÍN, L. A. (2004), Determining factors in the success of R&D cooperative agreements between firms and research organizations, *Research Policy*, 33 : 17–40.
- NAVARRO, L., PASTOR, A. C., GONZÁLEZ, L. (1996), New methods of evaluating physical demand at work areas, *Technovation*, 16 : 595–599.
- NIETO, M., LÓPEZ, F., CRUZ, F. (2005), Absorptive capacity, technological opportunity, knowledge spillovers, and innovative effort, *Technovation*, 25 : 1141–1157.
- NIETO, M., PÉREZ, W. (2004), Technological assets accumulation and organisational structure in Spanish telecommunications equipment manufacturing companies: A case study, *International Journal of Technology Management*, 27 : 40–56.
- NIETO, M., QUEVEDO, P. (1998), Performance analysis of technology using the S curve model: The case of digital signal processing (DSP) technologies, *Technovation*, 18 : 439–457.
- NUENO, P. (1999), Alliances and other things, *R&D Management*, 29 : 319–322.
- ORDÓÑEZ, P. (2004), The nurture of knowledge-based resources through the design of an architecture of human resource management systems: Implications for strategic management, *International Journal of Technology Management*, 27 : 533–543.
- PALACIOS-MARQUÉS, D., GARRIGOS-SIMÓN, F. J. (2005), A measurement scale for knowledge management in the biotechnology and telecommunications industries, *International Journal of Technology Management*, 31 : 358–374.
- PÉREZ, M., MARTÍNEZ, A. (2000), Lean production and supplier relations: A survey of practices in the Aragonese automotive industry, *Technovation*, 20 : 665–676.
- PÉREZ, M., MARTÍNEZ, A. (2003), The development of university spin-offs: Early dynamics of technology transfer and networking, *Technovation*, 23 : 823–831.
- PÉREZ, M. P., SÁNCHEZ, A. M., LUIS, M. P. DE (2002), Benefits and barriers of telework: Perception differences of human resources managers according to company's operations strategy, *Technovation*, 22 : 775–783.
- QUINTANA-GARCÍA, C., BENAVIDES-VELASCO, C. A. (2004), Cooperation, competition, and innovative capability: A panel data of European dedicated biotechnology firms, *Technovation*, 24 : 927–938.
- REVILLA, E., SARKIS, J., ACOSTA, J. (2005), Towards a knowledge management and learning taxonomy for research joint ventures, *Technovation*, 25 : 1307–1316.
- SANZ-MENÉNDEZ, L., CABELLO, C., GARCÍA, C. E. (2001), Understanding technology foresight: The relevance of its S&T policy context, *International Journal of Technology Management*, 21 : 661–679.
- SANZ-MENÉNDEZ, L., CRUZ-CASTRO, L. (2003), Coping with environmental pressures: Public research organizations responses to funding crises, *Research Policy*, 32 : 1293–1308.
- VAQUERO, C., GARCÉS, M. I., RODRÍGUEZ-POMEDA, J. (2000), Impact of organisation and management on complex technological systems safety: The nuclear lessons, *International Journal of Technology Management*, 20 : 214–241.
- VARELA, J., BENITO, L. (2005), New product development process in Spanish firms: Typology, antecedents and technical/marketing activities, *Technovation*, 25 : 395–405.
- VENTURA, J., MARBELLA, F. (1997), An analysis of the process of packaging substitution in the drinks industry: The Spanish case, *International Journal of Technology Management*, 13 : 443–460.
- VERDÚ-JOVER, A. J., LLORENS-MONTES, J. F., GARCÍA-MORALES, V. J. (2005), Flexibility, fit and innovative capacity: An empirical examination, *International Journal of Technology Management*, 30 : 131–146.
- VIEDMA, J. M. (2000), ICBS: Intellectual capital benchmarking systems, *International Journal of Technology Management*, 20 : 799–818.