

# Determinants of Organisational Structures: An Empirical Study

**Fariza ACHCAOUCAOU**

University of Barcelona, Barcelona, Spain

E-mail: farizaa@ub.edu

**Merce BERNARDO**

University of Barcelona, Barcelona, Spain

E-mail: merce.bernardo@ub.edu

**Jose M. CASTAN**

University of Barcelona, Barcelona, Spain

E-mail: jmcastan@ub.edu

Phone: 0034 93 402 01 35

## *Abstract*

*This article analyses the main factors that determine the organisational structure of a sample of firms located in Catalonia, an autonomous region in the northeast of Spain. The variables studied were identified from among the factors considered in contingency theory and by incorporating elements of the strategic choice approach. After grouping the variables into two factors (related to internationalisation and customer-oriented aspects, respectively) the results revealed three groups of companies according to how they regarded the impact of these factors on organisational structures. In those groups that consider the variables of internationalisation to be modifiers of structure the organisational structures are of the 'complex classical' type, whereas simple forms predominate in the group that believes these variables do not modify their structure.*

**Keywords:** *organisational design, contingency, strategic choice*

**JEL classification:** L22, L25

## **Introduction**

It is widely accepted in theory that an organisation's optimal structure is contingent upon various situational factors. In practice, however, providing practical advice based on this understanding has been difficult (Nasrallah et al., 2009).

The present study addresses this issue by exploring the main factors that might determine the organisational structure of a sample of firms located in Catalonia (Spain). This initial descriptive study is part of a broader research project and represents a preliminary step towards a more prescriptive analysis.

The conceptual framework of the study is based on contingency or situational theory (Burns and Stalker, 1961; Lawrence and Lorsch, 1967) and the strategic choice approach (Child, 1972, 1997), in conjunction with organisational design models studied by Chandler (1966), Mintzberg (1984), Handy (1989, 1992) and Ghoshal (1990), among others. The taxonomy used was that proposed by Bueno-Campos (1995).

The framework of contingencies (denominated 'situational' by Lorsch [1977]) emphasises the need to study the influence of circumstances (contingencies or situations) on organisational structure and administrative behaviour, while the strategic choice approach shifts the focus to the decisions made by the organisation's leaders in terms of products and markets and their impact on organisational forms, i.e. it integrates strategy into the model and assumes that managers' perceptions, preferences and choices interact with the process of adjustment to the requirements of the environment in order to achieve objectives (Child, 1972).

Although the contingency framework has generated numerous (mainly empirical) studies of the different factors that contribute to organisational design, this research has mostly focused on describing their influence individually and in isolation. This type of analysis concludes that bureaucratic organisational structures are more appropriate in stable and predictable environments, while a less formalised and centralised organisational structure is more suitable in unstable and unpredictable environments (Burns and Stalker, 1961); furthermore, a functional hierarchy is argued to be desirable in situations where products are related in terms of technology, but with increasing diversity of products and markets (diversification), divisional structures (Galbraith and Kazanjian, 1986) are more desirable. Finally, more flexible (decentralised and divisional) organisational structures are needed in new markets, while over time, as the organisation acquires experience and tasks become increasingly predictable, a more centralised and functional structure is required (Hollenbeck, 2000).

Less common are studies such as those by Burton and Obel (1998), Brown and Eisenhardt (2004), Huberman and Hogg (1995) and Nasrallah et al. (2003, 2009), which take many factors into consideration and look at how their combination affects organisational change.

The present study aims to continue this second line of research and analyses the main factors that determine the organisational structure of a group of companies located in Catalonia (Spain). Specifically, it presents a preliminary analysis of potential constraints on certain elements (taken from contingency theory and the strategic choice approach) in relation to a typology of organisational models, the ultimate objective being to offer a kind of multidimensional analysis that takes a step towards a better understanding of organisational design, the relationships between business characteristics and the environment, and the behaviour of organisations.

Given these objectives the article is structured as follows. The next section provides a review of the literature so as to identify the environmental factors that

affect organisational design and the main organisational forms described in the previous literature. The subsequent methodology section describes the data and sample characteristics, while the fourth section presents the first descriptive results of this research. The final section sums up the findings and draws the corresponding conclusions.

### **Literature review**

One of the most common and relevant research topics in the field of contingency or situational theory involves analysing the effect of a set of mainly external factors on the design of an organisation in order to verify the most efficient organisational structures (Powell, 1992; Baligh et al., 1996; Forte et al., 2000; Pettigrew et al., 2000; Meilich, 2006).

This theory began with the work of Burns and Stalker (1961), who argued that the appropriateness of an organisational structure depends on environmental conditions. Aligned with this, Lawrence and Lorsh (1967) state that companies which match their internal characteristics to environmental requirements perform better. Accordingly, it is not possible to establish an ideal organisation for all situations (Galbraith, 1973).

The work of these authors reflects the main foundations of contingency theory:

- The focus is on the business environment, with less importance being ascribed to internal elements.
- The alignment between organisational designs and environmental factors leads to better performance.
- There is no optimal organisational form for all circumstances.

Traditionally the main environmental variables that have been considered under the contingency approach are an uncertain environment (Burns and Stalker, 1961; Hage, 1965; Lawrence and Lorsch, 1967), technology (Woodward, 1965; Perrow, 1967; Thompson, 1967; Hickson et al., 1969) and business size (Pugh et al., 1968, 1969; Blau 1970; Blau et al., 1971, 1976).

In contrast to this theoretical approach, which seeks to downplay a company's ability to influence its performance (in the form of adaptation to the chosen environment) in favour of a purely reactive response to the demands of the environment, the approach known as strategic choice gives greater importance to the effects of strategic decisions made within the company itself.

Although some authors in the field of situational theory (Chandler, 1966; Rumelt, 1974) considered strategy as the process by which an organisation adapts to environmental pressures but without being able to influence them, the strategic choice perspective places greater emphasis on the active role of leaders, the powerful impact they can have on organisational design, and how they respond to the situational factors that contribute to their preferences (Child, 1972, 1997; Miles and Snow, 1986).

In particular, Child (1972, 1997) criticises situational theory for ignoring the influence of leaders' perceptions, preferences and choices on organisational forms and identifies three key issues in shaping organisational structure:

1. The role of agency and choice in organisational analysis;
2. The nature of the organisational environment;
3. The relationship between organisational agents and the environment.

Thus, strategic choice extends the previous approach by seeking to explain the determinants of organisational design and by considering, in addition to the contingent environment factors, the vision of business leaders and the process through which strategic decisions are made.

The variables to consider in the present study were chosen from among the factors described by contingency theory, and by incorporating elements of the strategic choice approach. Many authors have noted the impact of these factors and elements on organisational structures, and the justification for using both approaches lies in the degree of complementarity between them (Peris et al., 2006). Indeed, in response to different environmental circumstances, the organisational structure is conditioned by decisions regarding the internal organisational level in general and design variables in particular (centralisation, standardisation and differentiation), both of which are governed by organizational leaders' perceptions and preferences in response to external contingency factors. The variables taken into account in this study are:

➔ *Decentralisation of decision making.* Following Menon and Varadarajan (1992), centralisation fosters a hierarchical organisational structure whereby ultimate power and decision-making is concentrated at the top rather than shared with lower levels of the organisation. Hollenbeck (2000) argues that one of the most widely-studied dimensions of organisational structure is centralisation, which deals with the aspect of vertical structure and refers to the degree to which decision-making authority and responsibility for coordination resides at the top of the organisational chart as opposed to being distributed throughout lower levels (i.e. authority is decentralised).

➔ *Customer orientation.* Auh and Mengue (2007) attempted to relate this factor to centralisation and concluded that as customer orientation demands a broad focus of authority and organisation-wide participation, it requires more decentralised and less hierarchical structures. Similarly, Jabnoun (2005) sought to identify the organisational structure that supports the implementation of customer-oriented total quality management. The results show that the dimensions of process network and organic structure support the implementation of customer-oriented total quality management, while risk aversion, mechanistic structure and complexity impede it.

➔ *Increasing the quality of products/processes.* Selto et al. (1995) address the issues of the best "fit" of organisational structure and controls for just-in-time and total quality management.

➔ *Locating production in other countries.* Sundaram and Black (1992) argued the need for better and newer applications of organisational theories to the

study of multinational enterprises (an entity which, viewed from the "home" (parent) perspective, produces and/or sells in at least one other sovereign "host" (subsidiary) country).

➔ *Globalised competition*. Karimi and Konsynski (1991) concluded that in a scenario of greater global competition, organisational forms allowing greater flexibility and coordination as key design variables are needed.

➔ *Intensifying competition*. Vroom (2006) attempted to elucidate how organisational design characteristics are related to the competitive behaviour of firms. Although previous research suggests that in cases of strategic substitutability, firms tend to choose organisational structures and compensation systems that commit the firm to behaving aggressively in the product market, thus reducing firm and industry profits, this author argues that simultaneous determination of organisational structure and compensation systems may enable firms to tacitly collude and achieve the perfectly collusive outcome despite the non-cooperative setting.

➔ *Liberalisation of the economy*. Snow (1992) proposed the network organisation structure as an organisational response to a context of globalisation, technology transfer and technological change, deregulation, changing workforce demographics, manufacturing advances, faster, lower cost communications and computer technologies, and greater social and political freedom.

➔ *New ways of thinking*. Birkinshaw (2002) examined the validity of knowledge as a contingent variable.

Accordingly, depending on the presence, direction and intensity of the forces exerted by various environmental dimensions and of decisions on how to manage the work, the division of activities and/or businesses in which the company is committed will be determined toward the production of different organisational forms.

In this regard, the most widely-known organisational models in the literature include the following: the linear (McMillan, 2002), the functional (Polenakovic and Kraleov, 1999), the adhocratic (Mintzberg, 1984), the line-functional (a mixed structure between the linear and the functional described by Bueno-Campos [1995]), the divisional (Chandler, 1966; Rumelt, 1974), the 'in matrix' (Ghoshal, 1990), the collegial (Richard, 2006), the federal (Handy, 1989, 1992), the 'in clover' (Handy, 1992) and the network (Van Wijk and Van den Bosch, 2000).

## **Methodology**

The methodology used in this study was qualitative, since semi-structured interviews with company managers were conducted. The objective was to obtain qualitative and quantitative information from each of the companies in the sample.

Given that this was a pilot study the sample consisted of 48 companies located in Catalonia, an autonomous region in the northeast of Spain. This

preliminary study sample will subsequently be increased in order to obtain more representative results.

The questionnaire used in the interview consisted of questions related to organisational structures and to what aspects could change them. For example, there were questions about the use of different information technologies, employee training and the number of hierarchical levels, etc. (for more information, see Aguer, 2003). Specifically, companies were asked to assess how the variables defined above (see also Table 1) had modified the organisational structure, rating the degree of modification on a Likert scale from 0 to 10, where 0 meant "not modified at all" and 10 meant "completely changed".

Having obtained responses from the 48 companies a multivariate analysis was then carried out in order to understand the behaviour of the variables studied. The sample size of this preliminary study was small, but the results obtained can be considered as an input for further work. Two analyses were applied: 1) an exploratory factor analysis that allowed the variables to be grouped in a theoretical rather than an observable factor; and 2) a cluster analysis that enabled groups of companies to be created that were related to organisational structures. Both analyses are described below.

#### *Exploratory factor analysis*

The aim of the exploratory factor analysis was to group the variables into a few latent factors, in which the most closely related variables are linked together in the same factor.

Two tests of the correlation matrix were applied: Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) test. For the first, the value of  $\chi^2 = 299.61$  (significance level: 0.000) confirmed the linear dependence between the variables, and thus the analysis could continue. The KMO (0.842) also confirmed that factor analysis was likely to generate satisfactory results (Visauta, 1998).

Two factors were extracted from the analysis. The KMO criterion was used to retain only those factors that presented eigenvalues of one or greater. These first two factors accounted for 76.44% of the initial variance, which represented a good proportion of information. Applying the method of Varimax rotation, loadings were obtained for each factor for each of the variables (see Table 1).

The first factor represents the variables that are more closely related to internationalisation, while the second concerns issues related to customer orientation. In the first factor, all variables have high loadings (above 0.70), especially "decentralisation of decision making" and "location of production in other countries." This factor measures whether these variables linked to internationalisation modify in some way the structure of the organization.

In the second factor the contributions were lower, and the biggest difference concerned the variable "increasing the quality of product/processes", which only makes a minor contribution. The three variables are related to customer orientation, since greater competition to meet customer expectations will help to

avoid losing a market share. Increasing quality will be important to obtain the product or service that satisfies customers.

### Results of exploratory factor analysis applied to the variables studied

**Table 1**

Items	First Factor	Second Factor
Decentralisation of decision making	0.952	0.149
Locating production in other countries	0.932	0.126
Liberalisation of the economy	0.865	0.355
Globalised competition	0.845	0.308
New ways of thinking	0.707	0.245
Customer orientation	0.090	0.831
Intensifying competition	0.245	0.821
Increasing the quality of products/processes	0.498	0.617

Extraction method: Principal components analysis  
 Rotation method: Varimax normalisation with KMO  
 Rotation converged in three iterations

The two factors obtained were then used as inputs for a cluster analysis, which aims to group organisations with a similar within-group (but different between-group) behaviour. This analysis is described below.

#### *Cluster analysis*

This analysis sought to classify the organisations according to their orientation, i.e. more strategic or more customer-oriented. The method employed was hierarchical (Johnson, 1967) and used distances to measure the similarity or dissimilarity between individuals.

The first step involved applying the single linkage method (Sneath, 1957) to detect outliers; this led to two respondents being excluded from the subsequent analysis (n = 46). The method used to obtain the groups was that of Ward (1963), this being one of the most robust methods and one that is able to create homogeneous groups with minimum variance. The outcome was a three-group classification. The model's goodness-of-fit was measured through the mean square of the eta ( $\eta^2$ ), which must be high. In this case, the value of  $\eta^2 = 0.613$  can be considered acceptable.

To complete the description of each group by adding information about its organisational structure, a contingency table was drawn up to determine whether there was a relationship between groups and structures. Here we used the classification of Bueno-Campos (1995), in which structures are grouped into three general forms: simple (linear, functional, adhocratic), complex classical (line-functional, divisional, in matrix, collegial) and complex new (federal, in clover,

network). The contrast was statistically significant at the 90% level, with p-value = 0.093. The description of each group is shown in the following section.

## Results

The results of the cluster analysis are as follows (see Table 2 for a summary):

### ▪ Group 1

Comprised by twenty organisations this is the largest group detected (43.50% of the sample). The organisations from this group consider that variables related to internationalisation have not modified their organisational structures; customer-oriented variables are also regarded not to have modified structures, although to a lesser extent.

The members of this group mostly present simple structures (45% of organisations), followed by the complex new form in 30% of the organisations. Complex classical forms are the least frequent (25% of organisations).

### Description of groups

**Table 2**

	Members	Internationalisation factor	Customer -oriented factor	Main organisational structures		
				Simple	Classical	New
Group 1	20	-1.03	-0.12	45%	25%	30%
Group 2	14	0.89	0.82	14%	50%	36%
Group 3	12	0.65	-0.71	25%	67%	8%

### ▪ Group 2

This comprises fourteen companies, representing 30.40% of the sample. Members of this group rate both factors at the same level in terms of modifying structure. For these organisations, internationalisation and customer-orientation factors have both changed their structure.

The predominant organisational form in this group is complex classic (50% of organisations). Complex new structures are present in 36% of organisations, while simple forms are the least common (14% of organisations).

### ▪ Group 3

This is the smallest group obtained and includes twelve organisations (26.10% of the sample). As in the previous group, both factors were rated similarly, although for these companies internationalisation factors were regarded as having changed their organisational structures, whereas customer-orientation factors were not seen as modifiers.

In this group only one organisation had the complex new form, whereas simple structures were present in 25% of the organizations and the complex classic form in 67%.



## Conclusions

The aim of this study was to analyse the main factors that determine the organisational structure of a sample of firms located in Catalonia (Spain). The conclusions to be drawn are as follows.

Firstly, it should be noted that this research is a pilot study, a first step in developing a larger project in the near future.

Secondly, three groups of companies were identified according to the different ways in which they regard the impact of variables that are determinants of change in organisational structures. These variables are grouped into two factors, the first related to internationalisation and the second to customer orientation. As regards the variables of which each factor is comprised it should be noted that "decentralisation" makes the largest contribution to the first factor, which reinforces Hollenbeck (2000)'s argument that this is one of the variables that has received the most attention in the study of organisational structures. However, the results are not consistent with the findings of Kamiri and Konsynski (1991), since the organisational structures most closely related to global competition are more complex classical, whereas they were expected to be new because they are more flexible. For the second factor, which emphasises customer orientation, and which according to Auh and Mengue (2007) is negatively related to centralisation (the first variable factor), customer orientation is the variable that makes the greatest contribution. Finally, for the variable associated with increased quality, the predominant structure in the present study is the complex classical form (Selto et al, 1995).

Thirdly, and with respect to the resulting groups, the first is the largest, comprising twenty companies (most with a simple organisational structure) which believe that internationalisation does not change their structure. The second group consists of fourteen organisations, the majority of which have a complex classical structure; these organisations do consider that the customer orientation and internationalisation factors modify their structure. Finally, the third group of twelve companies (mostly with a complex classical structure) also considers that internationalisation modifies their organisational structure. These findings indicate that for this sample the organisations which consider internationalisation to be a determining factor tend to be organised according to classical structures, while those that do not consider this factor to be determinant have a simple structure.

The present results will serve as the basis for future research with a larger sample, including variables related to confidence in the environment, the aim being to analyse the role of business networks in organisational structure.

## Acknowledgments

The authors wish to thank all the organisations that collaborated in the study and, in particular, the support provided by Professor Jaume Valls and Francisco Llorente from the University of Barcelona.

## References

1. Auh, S., Mengue, B. (2007) "Performance implications of the direct and moderating effects of centralization and formalization on customer orientation": *Industrial marketing management*, 36(8):1022-1034
2. Aguer, O. (2003) *El Desarrollo de las nuevas estructuras organizativas en el modelo actual de empresas de la nueva economía*, PhD Thesis. University of Barcelona
3. Baligh, H., Burton, R., Obel, B. (1996) "Organizational consultant: creating a usable theory for organizational design", *Management science*, 42(12): 1648-1662.3
4. Birkinshaw, J., Nobel, R., Ridderstrale, J. (2002) "Knowledge as a contingency variable: do the characteristics of knowledge predict organization structure?", *Organization science*, 13(3):274-289
5. Blau, P. (1970) "A formal theory of differentiation in organizations", *American sociological review*, 35(2):201-218
6. Blau, P., Falbe, C., McKinley, W., Tracy, P., (1976) "Technology and organization in manufacturing", *Administrative science quarterly*, 21(1): 20-40
7. Blau, P., Schoenherr, R. (1971) *The Structure of Organizations*, New York: Basic Books
8. Brown, S., Eisenhadrd, K. (2004) *Competing on the edge: strategy as structured chaos*, Thousand Oaks, CA: Sage Publications
9. Bueno-Campos, E. (1995) *Organización de empresas. Estructura, procesos y modelos*, Madrid: Pirámide
10. Burns, T., Stalker, G. (1961) *The Management of Innovation*, London: Tavistock
11. Burton, R., Obel, B. (1998) *Strategic Organizational Diagnosis and Design*, Boston, MA: Kluwer Academic Publishers
12. Chandler, A. (1966) *Strategy and structure*, New York: Doubleday
13. Child, J. (1972) "Organizational Structure, environment and performance: the role of strategic choice", *Sociology*, 6(1):1-22
14. Child, J. (1997) "Strategic choice in the analysis of action, structure, organizations and environment: retrospect and prospect", *Organizational studies*, 18(1):43-76
15. Forte, M., Hoffman, J., Lamont, B., Brockmann, E. (2000) "Organizational form and environment: an analysis of between-form and within-form responses to environmental change", *Strategic management journal*, 21(7):753-773
16. Galbraith, J. (1973) *Designing complex organizations*. Reading, MA: Addison-Wesley Publishing Co
17. Galbraith, J., Kazanjian, R. (1986) *Strategy implementation: structure, systems, and process*. Washington: West Publishing

18. Ghoshal, S. (1990) "Matrix Management: Not a Structure, a Frame of Mind", *Harvard business review*, 68(4):138-145
19. Hage, J. (1965) "An Axiomatic Theory Organization", *Administrative science quarterly*, 10(3):289-320
20. Handy, C. (1989) *The age of unreason*. Boston: Harvard Business School Press
21. Handy, C. (1992) "Balancing corporate power: a new federalist paper", *Harvard business review*, 70(6):59-72
22. Hickson, D., Pugh, D., Pheysey, D. (1969) "Operations technology and organization structure: an empirical reappraisal", *Administrative science quarterly*, 14(3):378-397
23. Hollenbeck, J. (2000) "A structural approach to external and internal person-team fit", *Applied psychology: an international review*, 49(3):534-549
24. Huberman, B., Hogg, T. (1995) "Communities of practice: performance and evolution", *Computational and mathematical organization theory*, 1(1):73-92
25. Jabnoun, N. (2005) "Organizational structure for customer-oriented TQM: an empirical investigation", *The TQM magazine*, 17(3):226-236
26. Johnson, S. (1967) "Hierarchical clustering schemes", *Psychometrika*, 32(3):241-254
27. Karimi, J., Konsynski, B. (1991) "Globalization and information management strategies", *Journal of management information systems*, 7(4):7-26
28. Lawrence, P., Lorsch, J. (1967) *Organization and environment*, Boston, MA.: Harvard Business Press
29. Lorsch, J. (1977) "Organization design: A situational perspective", *Organizational dynamics*, 6(2):12-14
30. McMillan, E. (2002) "Considering organisation structure and design from a Complexity Paradigm Perspective" in Frizzelle, G. and Richards, H. (eds.) *Tackling industrial complexity: the ideas that make a difference*. University of Cambridge: Institute of Manufacturing
31. Meilich, O. (2006) "Bivariate models of fit in contingency theory - Critique and a polynomial regression alternative", *Organizational research methods*, 9(2):161-193
32. Menon, A., Varadarajan, P. (1992) "A model of marketing knowledge use within firms", *Journal of Marketing*, 56(4):53-71
33. Miles, R., Snow, C. (1986) "Organizations, new concepts and new forms", *California management review*, 28(3):62-73
34. Mintzberg, H. (1984) *La estructura de las organizaciones*, Barcelona: Ariel
35. Nasrallah, W., Levitt, R., Glynn, P. (2003) "Interaction value analysis: when structured communication benefits organizations", *Organization science*, 14(5):541-557
36. Nasrallah, W.; Qawashem, S. (2009) "Comparing multi-dimensional contingency fit to financial performance of organizations", *European journal of operational research*, 194(1):911-921

37. Peris, F.; Peris, M.; Zapata, G. (2006) "Complementariedad de teorías en la administración eficiente del trabajo: un análisis microorganizativo", *Compendium: revista de investigación científica*, (7):75-94
38. Perrow, C. (1967) "A Framework for the Comparative Analysis of Organizations", *American sociological review*, 32(2):194-208
39. Pettigrew, A., Massini, S., Numagami, T. (2000), "Innovative forms of organising in Europe and Japan", *European management journal*, 18(3): 259-73
40. Powell, T. (1992) "Organizational alignment as competitive advantage", *Strategic management journal*, 13(2):119-134
41. Pugh, D.; Hickson, D.; Hinings, C.; Turner, C. (1968) "Dimensions of Organizational Structure", *Administrative science quarterly*, 13(1):65-105
42. Pugh, D.; Hickson, D.; Hinings, C.; Turner, C. (1969) "The Context of Organizational Structures", *Administrative science quarterly*, 14(1):91-114
43. Richard, H. (2006) "Workload allocation models and "collegiality" in academic departments", *Journal of organizational change management*, 19(1):38-53
44. Rumelt, R. (1974), *Strategy, Structure and Economic Performance*. Boston: Harvard Business School Press
45. Selto, F., Renner, C., Young, S. (1995) "Assessing the organizational fit of a just-in-time manufacturing system – testing selection, interaction and systems models of contingency theory", *Accounting organizations and society*, 20 (7-8):665-684
46. Sneath, P. (1957), "The applications of computers to taxonomy", *Journal of General Microbiology*, Vol. 17, No. 1, pp. 201-226
47. Snow, C., Miles, R., Coleman, H. (1992) "Managing 21st Century Network Organizations", *Organizational dynamics*, 20(3):4-20
48. Sundaram, A., Black, J. (1992) "The environment and internal organization of multination-enterprises", *Academy of management review*, 17(4):729-757
49. Thompson, J. (1967): *Organizations in action*. New York: McGraw-Hill
50. Van Wijk, R.; Van den Bosch, F. (2000) "Creating the N-form corporation as a managerial competence", *Advances in applied business strategy*, 6:199-214
51. Venkatraman, N., Henderson, J. (1998) "Real strategies for virtual organizing", *Sloan management review*, 40(1):33-48
52. Visauta, B. (1998). *Análisis estadístico con SPSS para Windows. Volumen II estadística multivariante*, McGraw Hill, Madrid, Spain
53. Vroom, G. (2006) "Organizational design and the intensity of rivalry", *Management science*, 52(11):1689-1702
54. Ward, J. (1963), "Hierarchical grouping to optimize an objective function", *Journal of the American Statistical Association*, 58(301):236-244
55. Woodward, J. (1965) *Industrial organization. Theory and practice*, London: Oxford University Press