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# Strategic responses to a high-turbulent environment

## The case of the French public hospitals

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### Abstract

**Purpose** – This paper aims to characterize the French public hospitals (FPHs) according to their strategic behaviour. Until recently, FPHs used to ignore strategic issues, for their mission was clearly defined by regulating authorities and their activities were quasi-automatically funded by the latter. This situation fundamentally changed as the environment of all "health care providers" became more demanding: FPHs have now to engage in a strategic process. The paper seeks to focus on the content of FPHs' strategies, and compare our results with standard findings of the strategic management literature, notably the strategic behaviour typologies established by Miles and Snow and Zaleznik and Kets de Vries.

**Design/methodology/approach** – A three-stage empirical approach is conducted, mixing qualitative and quantitative methods. The measurement stage, based on a questionnaire survey realized with the support of a professional union, gathered the answers of 276 FPHs' decision-makers, representing 51 per cent of the target population. This stage allows the formation of classes among these respondents, according to the environmental, organisational, and strategic features they describe.

**Findings** – The results are globally consistent with Miles and Snow's and Zaleznik and Kets de Vries' typologies. This is noteworthy since they were obtained in a different context and with different methodological approaches.

**Research limitations/implications** – This article tackles the issue of the universality of the strategic process.

**Practical implications** – Finally, implications for policy makers and hospitals' managers are drawn from the study.

**Originality/value** – What mostly differentiates the paper' results from the standard typologies is that FPHs can be separated according to the alliances criterion.

**Keywords** Generics, Organizational change, Hospitals, Public sector organizations, France

**Paper type** Research paper

### Introduction

Until recently, the mission of the French public hospitals (FPHs) was clearly defined by the regulating authorities and their activities were quasi-automatically funded by the latter (de Kervasdoué, 1996). This situation fundamentally changed as the environment of "health care providers" became more demanding: FPHs, like most of their foreign counterparts, have now to engage in a strategic process. Indeed, the traditional bureaucratic model, based on an autarchic conception of organisations, does not allow

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hospitals to face their stakeholders' requirements anymore (Contandriopoulos and Souteyrand, 1996). In this context, the development of managerial culture and techniques – among them strategy-oriented practices – would enable hospitals to focus on performance achievement and to deal with change (de Pouvourville, 1995; Valette, 1996; Minvielle and Contandriopoulos, 2004). For a few years, the emergence of alliances among health care providers – notably public hospitals – has constituted one of the more striking phenomena in the French health care system that testifies to the development of strategic practices in these organisations.

In this article, we aim at characterizing FPHs according to their strategic behaviour. We focus on the content of strategies of public organisations (see Stone *et al.* (1999) for a classification of the different types of researches on strategic management in nonprofit organisations), and compare our results with standard findings obtained in the Strategic Management literature, notably the strategic behaviour typologies established by Miles and Snow (1978) and Zaleznik and Kets de Vries (1975). Our study relates to the existing literature in three ways. First, this article pertains to the literature on strategic management in public service organisations. This research area, mainly investigated through the issues of "change", "reform", "turnaround", or "modernization" of public services providers (e.g. Guyomarch, 1999; Kirkpatrick and Ackroyd, 2003; Walshe *et al.*, 2004), and most often in the US and UK contexts, still needs to develop (Boyne, 2004). In particular, the strategy content of these organisations is largely ignored in the existing literature that mainly focuses on the decision process issue. Second, our research belongs to the body of literature that investigates how theoretical frameworks established when studying private firms (e.g. organisational effectiveness evaluation models (Boyne, 2003), performance evaluation models (Jas and Skelcher, 2005), failure analyses and turnaround models (Boyne, 2004; Walshe *et al.* (2004), or change models (Ackroyd, 1996; Kirkpatrick and Ackroyd, 2003)) can help the researcher understand the strategy content of public sector organisations. Hence, our purpose is different from research that examines the transfer of management methods (e.g. short-term contracting (Lane, 2001), customer-focused relationships (Alford, 2002), strategic planning and quality management (Lozeau *et al.*, 2002), or governing boards (Farrell, 2005)). Third, this paper relates to research that focuses on the content of strategy rather than on the elaboration process of strategy. Existing literature on strategy in the public sector mostly aims at specifying the way strategic decisions are made. These studies, often grounded on the seminal work of Mintzberg (1979) on professional bureaucracies, either characterize the change process, and notably identify radical versus incremental processes and estimate their rational and irrational components (e.g. Leavy, 1998; Jordan *et al.*, 2003), specify leadership and management styles (e.g. Noordegraaf and Stewart, 2000), sometimes in the case of hospitals (e.g. Denis *et al.*, 2001), or clarify the goals assigned to strategy when it emerges (e.g. Llewellyn and Tappin, 2003). Our research includes variables pertaining to the strategy formulation process, but aims at characterizing more comprehensively the strategic behaviour of FPHs, which implies to study the strategy content.

Our research relies on the evaluation of environment-related, organisational, and strategic FPHs' characteristics. More precisely, we estimate how the FPHs' decision-makers perceive recent mutations in their environment and the competition intensity they face. FPHs' structural dimensions are also evaluated in order to characterize their organisational design. Finally, we investigate the strategic ambition

of FPHs, their focus on strategic resources, and their resorting to strategic alliances. We follow a three-stage empirical approach, mixing qualitative and quantitative methods and providing three main data sources. First, an exploratory stage, relying on interviews and on a participant-observation, leads to generate questionnaire items. The second stage, based on a questionnaire survey, allows us to form classes among FPHs' decision makers according to the environmental, organisational, and strategic features they describe. Finally, the third stage of the empirical approach, grounded on group interviews, aims at providing an interpretation of the classes.

The results we obtain are globally consistent with the typologies used as a benchmark; this is noteworthy since the latter were obtained in a different context – e.g. private organisations, other countries – and with different methodological approaches – e.g. case studies. Hence, this article tackles the issue of the universality of the strategic process, and of the existence of generic strategies (e.g. Porter, 1980; Karnani, 1984; McGee and Thomas, 1986; Herbert and Deresky, 1987; Wright, 1987; Mintzberg, 1988; Murray, 1988; Zajac and Shortell, 1989). However, we show that FPHs can be separated according to the alliances criterion. It differentiates our results from the standard strategic behaviour classifications.

The article is organised as follows. The first section depicts the context of the study. The second section describes its theoretical framework. The third section presents the empirical approach we adopt. The strategic behaviour typology of FPHs is presented and commented on in the fourth section.

## Context of the study

The environment of FPHs, like other public organisations (defined by Bozeman (1993, p. 5)), is distinctively characterized by complexity and turbulence (Boyne, 2002).

Complexity first results from the intricate nexus of national and regional authorities in charge of the French health system. A broad picture is that the Ministry of Health defines national orientations concerning public health, while the regional financing authorities annually allocate a budget to each hospital. Complexity also arises from the variety of stakeholders FPHs must satisfy or just deal with, like any other professional bureaucracy (Mintzberg, 1979): local politicians that have a say in the strategic orientation of hospitals, other health care providers (that may be public or private, and develop similar or complementary activities), potential patients, and public and private insurances.

Turbulence results from the ever more sophisticated technology, tougher professional relations, and more demanding customers FPHs face, like other hospitals in most Western countries (Ginter *et al.*, 2002)[1], but with some specific constraints. First, the French "territorial equality" principle guarantees the same quality of health care everywhere in France. This principle is questioned by the demographic recession of rural areas which makes it difficult for hospitals located there to maintain a level of activity higher than the "critical threshold" defined by regulating authorities in order to promote quality (French Ministry of Health, 2003a). Consequently, many of these hospitals have had to close some of their departments, notably maternity departments (French Ministry of Health, 1999). Second, the French public system is based on the principle that patients must receive health care whatever the cost it implies. A consequence is that, in 2002, French hospitalization expenses rose to about 75 billion Euros and represented approximately one half of total health care

expenses (French Ministry of Health, 2003b). Attempts were made to limit these expenses but failed (Fénina and Geffroy, 2004) since life expectancy increases, more and more sophisticated and expensive medical techniques are used, and new pathologies emerge. However, these attempts have stopped the exponential growth of the French hospitalization capacities (e.g. number of beds available); recently resulted in actual, although moderate, cuts in some hospitals' budgets, and induced the FPHs of the same geographic area to undertake more complementary activities (French Ministry of Health, 2003c). Third, every patient must receive health care, even if he or she could not afford to contribute financially to the system, thanks to an enlarged social protection mechanism (*Couverture Maladie Universelle*). Since the number of distressed people who should benefit from this mechanism rockets, it imposes an additional constraint on the system.

A renewed legal framework is intended to allow French health care organisations to adapt to this evolving context. In 1983, the allocation of a global budget to hospitals replaced a financing system where the annual amount allocated to each hospital was directly proportional to the number of its patients during the year. The implementation of a cost and activity control system followed during the 1980s and the 1990s. This system, based on the calculation of costs of homogeneous groups of patients, determines an indicator of productivity for each hospital. Contractual mechanisms linking the budget allocation to the achievement of specific objectives (level and nature of activity, quality) have been progressively set up since the 1990s (*Journal Officiel de la République Française*, 1996; French Ministry of Health, 2002). Besides, hospitals, like several public organisations, have been urged to engage in a modernization process (Journal Officiel de la République Française, 1989) in order to improve their customers' satisfaction. In this context, an independent national agency ("Agence Nationale d'Accréditation et d'Evaluation en Santé"), in charge of evaluating and certifying the FPHs activity, was created in 1996 (*Journal Officiel de la République Française*, 1996). These attempts to face environmental changes are to be related to the introduction, in some Western countries, of market-based mechanisms pertaining to the "New Public Management model" (Ferlie *et al.*, 1996), e.g. privatisations, development of managerial autonomy, increase in competition, development of audit and performance control procedures.

## Theoretical framework

In this section, we first justify our adopting a conception of strategy that focuses on the acquisition of resources. Moreover, consistent with Mintzberg (1987) and Miles and Snow (1994), we retain a broad approach of the content of FPHs' strategies.

### *A resource-focused approach of strategy*

Nonprofit organisations need to establish and maintain relationships with different external stakeholders such as financiers, customers, and lobbies in order to acquire and protect resources that are crucial for them (e.g. Greenberg, 1982; Oster, 1995). In the case of FPHs, potential patients and physicians, other health care providers and institutional actors control the following resources: funds, equipment, competences and patients (Valette, 1994). We argue that these resources can be considered as strategic – as defined by Wernerfelt (1984), Peteraf (1993) and Black and Boal (1994) – for FPHs in the sense that it is possible to identify a synergy process between them (i.e. owning one

of these resources enhances the ability to acquire the others). This synergy process can translate into "enhancing" or "destructing" relationships, according to Amit and Schoemaker's (1993) terminology. For example, the ability to attract patients is reinforced by the ownership of technical equipment and medical competence, which signals the quality of the hospital to potential patients. Similarly, a hospital can attract well-trained physicians all the more easily as it owns sophisticated medical equipment and as it enjoys an important clientele. Indeed, physicians who have benefited from a high-level training within university hospital complexes are eager to practice in a hospital with an important activity and high-tech medical equipment. Reciprocally, the administrative license that is mandatory to acquire expensive medical equipment is all the more easily granted to a hospital as it can demonstrate its competence to use it and a sufficient level of activity. Furthermore, equipment acquisition and competences acquisition (creation of medical or nursing positions) require the hospital to possess enough financial resources. Finally, benefiting from equipment, competences and patients favours the access to financial resources. Indeed, when negotiating its budget, the hospital must be able to give evidence of a sufficient level of activity. It is noticeable that the financing system, the implementation of which began in January 2004 (in order to replace the current global annual allocation), is precisely based on a direct link between budget and activity. Equipment and competence can also help justify the allocation of an increased budget. The above synergy process resembles the one suggested by Adler *et al.* (2003) in the case of the US hospitals.

The mutations described in the first section lead to an increased competition between FPHs for the access to strategic resources. First, there exists a rising competition for the access to financial resources as regulating authorities try to limit the increase in health care expenses. They also control hospital activities by evaluating costs and quality, and set up contractual mechanisms linking financing to the realization of specific objectives. Next, there exists a cut-throat competition for the access to competences, for the number of students allowed to study medicine has gradually decreased. Hospitals with a low level activity and/or located in geographic areas considered as less attractive particularly suffer from this increased relative scarcity. Finally, attracting patients is also subject to reinforced competition, most notably because patients and their relatives become more demanding towards health services.

In this context, FPHs have to engage into specific actions in order to obtain strategic resources. According to the framework elaborated by Bigelow *et al.* (1996) in the case of non-profit organisations, these actions can aim at directly acquiring resources (e.g. development of relationships with influent actors of their environment) or at indirectly favouring the resource acquisition process (e.g. reinforcement of the hospital's legitimacy). Hence, the reference to strategic resources we use to depict the strategy content of FPHs pertains less to an introverted conception of the strategy elaboration process ("inside-out approach") than to an environment-oriented reflection ("outside-in approach").

*An organisational conception of strategy*

A number of studies in the strategic management literature (e.g. Mintzberg, 1987; Miles and Snow, 1978, 1994) are based on a broad approach of the content of strategies, in which organisational features are considered as evidences of the adopted strategic

orientations. According to this approach, studying strategic orientations implies to evaluate organisational characteristics simultaneously. Some of these studies identify major strategic behaviours allowing organisations to succeed.

Our work is closely related to the typology of Miles and Snow (1978) for two reasons. First, Miles and Snow focus on the content of the strategic orientations. Their typology shows how organisations choose specific strategies that allow them to realize an adequate fit with their environment (see Table I). Miles and Snow's model includes organisational and strategic variables that describe the alternative ways used by various organisations in order to adapt to their environment. Secondly, Miles and Snow's study is part of a stream of research that classifies the strategic responses given by organisations to changes in their environment. We discuss in detail in the fourth section the test by Shortell and Zajac (1990) of Miles and Snow's model in the hospital sector (for other tests, see for example Hambrick (1983), or James and Hatten (1995) for the banking industry).

Leadership style has recently been identified as having an impact on the change process in public hospitals (e.g. Denis *et al.*, 1991). Thus, we use Zaleznik and Kets de Vries's (1975) typology which is based on a psychological analysis of leadership styles. Zaleznik and Kets de Vries (1975) depict organisational strategies according to the firm's behaviour towards change (see Table II). This behaviour can be made of anticipation or of reaction to change, and reveals the degree of aversion to disruptive features. One of the specificities of Zaleznik and Kets de Vries' typology is to study organisational strategies and leadership styles simultaneously. Indeed, the three organisational strategies they identify correspond to leadership strategies because the leader's personality is supposed to favour one organisational strategy. The right match between individual orientations and organisational strategies leads the firm to the highest performance level.

**Table I.**
Miles and Snow's typology

| Category | Characteristics |
|---|---|
| Defenders | Exhibit poor strategic ambition, eager to evolve in a stable market environment |
| Prospectors | Continuously seek new opportunities in their environment, able to anticipate their environment's evolution |
| Analysers | Study their environment very carefully in order to adapt their strategy to the characteristics of each interesting sub-environment |
| Reactors | Do not formulate a consistent response to their environment notably because of a lack of anticipating ability |

**Table II.**
Zaleznik and Kets de Vries' typology

| Category | Characteristics |
|---|---|
| Homeostatic | Highly reluctant to change that must be avoided by all means |
| Mediative | Changes occur but are a mere reaction to environmental pressure |
| Proactive | Do not avoid changes and consider them as intentional and thus positive features |
| | Creatively use their own resources in order to modify their environment in a suitable way and to produce major innovations |

Overall, Miles and Snow (1978) and Zaleznik and Kets de Vries (1975) offer complementary perspectives on organisations' strategic behaviour towards change, and represent two relevant benchmarks for the purpose of our study.

## Methodological design

The empirical approach is based on the combination of three main data sources, summarized in Figure 1.

### *Exploratory stage*

The exploratory stage relies both on interviews with hospitals' managers and regional experts belonging to the regional financing authorities and on a

| Data collection stage | Period | Method | Data collection basis | Aims/subjects of the data collection |
|---|---|---|---|---|
| Exploratory stage | 1995-1997 | targeted-interviews | 3 experts belonging to the regional financing authorities | Perception of the main evolutions in the FPHs' environment<br>Perception of the relationships between FPHs and the regional financing authorities |
| | 1995 | insightful-interviews | 5 managers of university hospital complexes | Perception of the of the main evolutions in the FPHs' environment |
| | 1996-1997 | participant-observation | the emergency medical department in a hospital | Perception of the of the main evolutions in the FPHs' environment<br>Impact of these changes on the organisational design |
| | 1997 | insightful-interviews | 3 Directors of hospitals | Perception of environmental changes<br>Description of the hospital's organisational features<br>Description of the hospital's main strategic orientations |
| | | | Generation of items | |
| Measurement stage | 1999 (1st semester) | questionnaire survey | FPHs exhibiting a significant activity in Medicine, Surgery, or Obstetrics | Identification of the strategic responses formulated and implemented by FPHs towards change |
| | | | Typology of strategic responses | |
| Interpretation stage | 1999 (2nd semester) | group interviews | 29 managers belonging to 5 different hospitals | Interpretation of the strategic responses formulated and implemented by FPHs towards change |

**Figure 1.**
Data sources

participant-observation in a hospital's medical department. The data collected during this stage aims at identifying how hospitals' managers and regional experts describe the environment, the organisational design and the strategy of FPHs. Concerning these three issues, key subjects (hereafter labelled "constructs") and associated themes are detected in the actors' discourses (see Table III). The actors depict the environment of the FPHs with respect to its recent mutations – either as a source of reinforced constraints or of new opportunities – and to the competition intensity. The hospitals' organisational design is mainly described by the way the structural dimensions enable the organisation to face changes. Finally, strategic orientations are depicted according to several standard dimensions of the strategy concept: the decision process, the

| Issue | Key subjects | Associated themes |
|---|---|---|
| 1. FPHs' environment | 1.1 Opportunities in the mutations of the hospital's environment | Most significant evolutions in the local and global hospital's environment |
| | | Impact of the environmental mutations (notably legal ones) on the constraints to deal with and opportunities to exploit |
| | 1.2 Competitive intensity | Reaction towards the competition thematic in the public health sector |
| | | Identification of the competitors in the hospital's geographic location |
| | | Identification of the hospital's activities facing competition |
| | | Recent changes in the competition faced by the hospital |
| 2. FPHs' organisational design | 2.1 Openness to change of the organisational structure | Impact of the environmental changes on the behaviour of various categories of staff (notably the medical staff): consciousness, reluctance vs openness to change |
| | | Impact of the environmental changes on the role played by the Medical Committee |
| | | Impact of the environmental changes on the role played by the executive team |
| | | Impact of the environmental changes on the implementation of managerial methods, especially: promotion of transversal relationships (e.g. on quality, formation, information system) and of responsibility |
| 3. FPHs' strategy | 3.1 Strategic decision process | Impact of the environmental changes on the role played by the executive team (in contrast with the role of the regional financing authorities) |
| | | Analysis of the decision process concerning strategic alliances |
| | 3.2 Strategy content | Description of the strategic choices according to the underlying ambition level (e.g. number of activities to be created/suppressed) |
| | | Identification of the resources or competences to acquire or maintain in order to achieve the hospital's goals |
| | 3.3 Implementation of the strategy | Impact of the environmental changes on the participation in strategic alliances |

**Table III.**
Interviews' thematic coding grid

content, and the implementation (Learned *et al.*, 1965). In particular, investigated actors describe the ambition displayed in the hospitals' strategic objectives (reduction in the number of activities versus development of new ones), their focus on resources in the strategy formulation, and their resorting to strategic alliances with other health care providers (considered as a way to implement strategic decisions).

Moreover, the actors' discourses are also scrutinized in order to identify idioms and language specificities that will help formulate questionnaire items in the most appropriate way[2].

*Measurement stage*

In a second stage, we questioned the main decision-makers – the Director and the President of the Medical Committee (a physician elected by the medical staff who has a major role in the defining of the hospital's strategic orientations) – of each hospital exhibiting a significant activity in medicine, surgery, or obstetrics (MSO). This represents 452 hospitals (French Ministry of Health, 1998). The mail survey, conducted with the professional union (Fédération Hospitalière de France) representing FPHs, allowed us to gather the answers of 276 decision-makers working with 229 hospitals, that is, 51 per cent of the target population.

*Sample design.* We use two criteria to assess the statistical quality of the sample: the size of the hospital and its geographic location[3]. The statistical tests (see Appendix 1) show that the sample is representative of the target population according to both criteria.

*Variable measurement.* The questionnaire is based on the constructs identified in the exploratory stage. Table IV shows the structure of the different constructs resulting from a principal component analysis (Cueille, 2000). We focus on perceptual features, which implies to evaluate the FPHs decision-makers' perception of environmental and organisational data. Indeed, since the pioneering studies of Weick (1979), many researches have pointed out that the perceptions of actors in the organisation – and notably the decision-makers' ones – constitute the actual basis of strategic decisions:

- *FPHs' environment.* On the one hand, the questionnaire estimates the extent to which respondents perceive "opportunities in the mutations of their hospital's environment". The ability to take advantage of these opportunities, to benefit from new or renewed relations with actors in the environment, and to reconvert the activity are some examples of factors that illustrate this first construct. On the other hand, "the competitive intensity" perceived by the respondents is estimated through factors including competition for the access to strategic resources, competition between health care providers in the city where the hospital is located, and competition in the attracting area of potential patients.
- *FPHs' organisational design.* "The openness to change of the organisational structure" illustrates the organisational design of the FPHs. This construct is estimated by the following factors: the transversal configuration of the structure, the responsibilities granted to the administrative and nursing staffs, the attitude of the physicians and of the executive team towards change.
- *FPHs' strategic behaviour.* Finally, the questionnaire takes into account several facets of the strategy of the FPHs. These facets are related to the "strategic

| Issues | Constructs | Factors |
|---|---|---|
| FPHs' environment | Opportunities in the mutations of the hospital's environment (9 items) | ADVREL: ability to take advantage of new relations with actors of the hospital's environment |
| | | ADVOPP: ability to take advantage of new opportunities |
| | | ACCFIRES: access to financial resources |
| | | RECONV: ability to reconvert the activity |
| | Competitive intensity (6 items) | COMPCITY: competition in the city of the hospital |
| | | COMPAREA: competition in the geographic area of the hospital |
| | | COMPRES: competition for strategic resources |
| FPHs' organisational design | Openness to change of the organisational structure (8 items) | TRANSVER: transversal configuration of the organisational structure |
| | | RESPADNUR: degree of responsibility taken by the administrative and nursing staffs |
| | | PHYSBEHAV: physicians' behaviour towards change |
| | | EXECBEHAV: executive team's behaviour towards change |
| FPHs' strategy | Strategic decision process (4 items) | ALLAUTO: autonomy in the decision to enter into strategic alliances |
| | | STRATAUTO: autonomy in strategic decisions |
| | Strategy content (2 items) | STRATAMB: strategic ambition |
| | | FOCRES: focus on strategic resources |
| | Implementation of the strategy (4 items) | ALLIANCES: participation in strategic alliances |
| Control variables | Level of activity of the hospital (4 items) | ACTLEVEL: level of activity of the hospital compared to national and regional benchmarks |
| | | DEMOG: demographic importance of the geographic area of the hospital |
| | Nature of the activity of the hospital (4 items) | TECHNACT: degree of technicality of the activity of the hospital |
| | | SPECIACT: degree of specialization of the activity of the hospital |

**Table IV.**
Structure of the constructs studied in the questionnaire

**Note:** Factors are obtained by aggregating some items of the questionnaire through a principal component analysis

decision process", the "strategy content", and the "implementation of the strategy". Factors such as autonomy in strategic decisions, strategic ambition, focus on resources in the strategy formulation, and participation in strategic alliances constitute some of the indicators of these constructs.

- *Control variables.* Control variables, relative to the hospitals' size and activity, are added. They are estimated by means of specific items in the questionnaire and of information delivered by the French Ministry of Health (1998). The first control variable is "the level of activity of the hospital". It is estimated by comparing the hospital's activity to national and regional benchmarks, and by estimating the demographic weight of the geographic area. The second control variable is "the nature of the activity of the hospital". It is evaluated by the degree of specialization of the activity and by the technical equipment of the hospital.

*Statistical method.* The typology of hospitals is elaborated through a cluster analysis[4] which allows us to form five classes of respondents that contain respectively 29, 71, 46, 53, and 77 respondents.

A total of 11 factors, combined in four discriminant functions[5], explain best the five classes. Three of them are related to the environment of the hospital: COMPRES (competition for strategic resources), COMPAREA (competition in the geographic area of the hospital) and COMPCITY (competition in the city of the hospital). Three other factors concern the hospital's organisational design: PHYSBEHAV (physicians' behaviour towards change), EXECBEHAV (executive team's behaviour towards change), and TRANSVER (transversal configuration of the organisational structure). Finally, five factors are related to the strategy of the hospital: STRATAUTO (autonomy in strategic decisions), ALLAUTO (autonomy in the decision to enter into strategic alliances), STRATAMB (strategic ambition), FOCRES (focus on strategic resources) and ALLIANCES (conclusion of strategic alliances).

*Interpretation stage*

In the last stage, the classes of respondents resulting from the cluster analysis are presented to various hospitals' managers during group interviews. The reactions of directors, of presidents of the Medical Committee, of physicians managing a medical department, and of nurses supervising the nursing staff of medical departments were collected. This stage allowed us to illustrate by concrete situations the environmental, organisational and strategic features corresponding to each class.

## Results and analysis

*Description of the classes*

The groups of respondents resulting from the cluster analysis can first be interpreted by examining the structure matrix (correlations between factors and discriminant functions) on the one hand, and the values taken by the discriminant functions at groups centroids on the other hand (see Appendix 3). A synthesis of the characteristics of the hospitals described by the various classes of respondents, in terms of activity, environment, organisational design, and strategic behaviour is shown in Table V. A short description of each class follows. The group interviews conducted during the last stage of the empirical study facilitate their interpretation.

*Description of Class 1.* The respondents of Class 1 describe small hospitals, located in a geographic area with a low demographic density, facing a weak competition for the access to strategic resources. Overall, the ability to take advantage of changes in the environment is not mentioned by the respondents. The environment is not considered as a resources provider; moreover, the attention paid to strategic resources is low. Regarding organisational design, few managerial actions are noticeable. In addition, the behaviour of the medical staff is described as rather adverse to change. Strategic behaviour is characterized by a weak autonomy regarding the decision to enter into strategic alliances and a poor strategic ambition, combined with few attempts to reconvert the activity. These respondents describe hospitals that do not feel really concerned with the evolutions of their environment and remain passive towards change.

*Description of Class 2.* The hospitals described by the respondents of Class 2 have a rather large size and are located in a relatively densely populated area. These

**Table V.**
Synthesis of the statistical analysis of the classes' characteristics

| Class characteristics | Class 1 (29 resp.) | Class 2 (71 resp.) | Class 3 (46 resp.) | Class 4 (53 resp.) | Class 5 (77 resp.) |
|---|---|---|---|---|---|
| Level of activity[a] | *Rather low* | High | Weakly discriminant | *High* | Rather low |
| Specialization of the activity | Low | *Low* | High | n.d. | High |
| Technicality of the activity | High | *High* | Low | n.d. | Low |
| Competition intensity[b] | COMPRES: weak | *COMPRES: high* | COMPRES: high | *COMPRES: low* | COMPRES: n.d. |
| | COMPAREA: weak | *COMPAREA: low* | COMPAREA: high | COMPAREA: n.d. | COMPAREA: high |
| Capacity of access to financial resources | High | *High* | Low | n.d. | Low |
| Capacity to take advantage of the changes in the environment[c] | *ADVOPP: low* | ADVOPP: high | ADVOPP: n.d. | *ADVOPP: high* | ADVOPP: low |
| | ADVREL: low | ADVREL: high | *ADVREL: low* | ADVREL: low | *ADVREL: high* |
| Transversal configuration of the structure | *Low* | High | n.d. | *High* | Low |
| Behaviour of actors towards change (d) | EXECBEHAV: favourable | EXECBEHAV: unfavourable | *EXECBEHAV: favourable* | EXECBEHAV: favourable | *EXECBEHAV: unfavourable* |
| | PHYSBEHAV: unfavourable | PHYSBEHAV: favourable | *PHYSBEHAV: unfavourable* | PHYSBEHAV: unfavourable | *PHYSBEHAV: favourable* |
| | RESPADNUR: low | RESPADNUR: high | *RESPADNUR: low* | RESPADNUR: low | *RESPADNUR: high* |
| Ability to reconvert the activity | Low | High | *Low* | Low | *High* |
| Independence in the strategic decision[e] | *ALLAUTO: low* | ALLAUTO: high | ALLAUTO: n.d. | *ALLAUTO: high* | ALLAUTO: low |
| | STRATAUTO: high | *STRATAUTO: low* | STRATAUTO: low | *STRATAUTO: high* | STRATAUTO: n.d. |
| Focus on strategic resources | Low | *Low* | High | n.d. | High |
| Strategic ambition | Low | High | *Low* | Low | *High* |
| Participation in strategic alliances | High | *Low* | Low | *High* | n.d. |

**Notes:** [a] Criterion regrouping the size of the hospital, the demographic weight of the geographic area, and the number of competitors on the city; [b] Competition for the access to strategic resources (COMPRES) or number of competitors on the attracting area of potential patients (COMPAREA); [c] Capacity to take benefit from opportunities resulting from mutations in the environment (ADVOPP) or from new relations with the actors of the environment (ADVREL); [d] Perceived behaviour of the executive team (EXECBEHAV) or of the medical staff towards change (PHYSBEHAV), or degree of responsibility granted to the administrative and nursing staffs (RESPADNUR); [e] Perceived autonomy in decisions relative to strategic alliances (ALLAUTO) or in other strategic decisions (STRATAUTO); n.d. = not discriminant. For every class, indications relative to the variables the discriminant power of which is the most important are italicised

respondents perceive the environment of their hospital as rather favourable – although the competition for the access to strategic resources is considered as severe – and prove able to take benefit from the changes that occur. Concerning organisational design, the transversal configuration of the structure is considered as relatively important. The strategic behaviour is characterized by poor resorting to strategic alliances and a weak attention devoted to strategic resources. Furthermore, the respondents perceive a weak autonomy regarding strategic decisions that do not concern alliances.

*Description of Class 3.* The respondents of Class 3 consider the environment of their hospital as hostile, notably because of the competition for the access to strategic resources. In addition, the ability to take advantage of changes is said to be weak. The organisational design reflects this perception of the environment: the medical staff is perceived as unfavourable towards change, and the degree of responsibility granted to the administrative and nursing staffs seems weak. The strategic behaviour of these hospitals is depicted by a weak strategic ambition, a poor autonomy regarding strategic decisions, and a weak participation in strategic alliances. The respondents describe their hospitals as having trouble reacting correctly to the evolutions of their environment: they are depicted as inhibited towards change.

*Description of Class 4.* The hospitals described by the respondents of Class 4 have a large size and are implanted in a densely inhabited area. Their environment is depicted as rather favourable: weak competition for access to resources, high ability to take advantage of opportunities resulting from environmental mutations. However, the respondents feel a tough competition in the city where the hospitals are located. According to them, the organisational structure of these hospitals is mainly characterized by strong transversal relations among their various actors. Finally, they are said to feel independent in their strategic decision making, notably regarding the conclusion of strategic alliances which are considered as a frequently used way of implementing strategy.

*Description of Class 5.* The respondents of Class 5 consider the environment of their hospital as unfavourable: cut-throat competition in the attracting area of potential patients, relatively difficult access to financial resources. However, these hospitals are said to try to take benefit from changes in their environment, in particular from new relations with the actors in the environment. Regarding organisational design, the behaviour of the medical staff is considered as favourable towards changes while the degree of responsibility granted to the administrative and nursing staffs is perceived as important. The strategic ambition of these hospitals is depicted as strong and a lot of attention is dedicated to strategic resources. Steps to reconvert the activity have often been taken. Overall, these hospitals are described as trying to cope with the mutations of their environment aggressively.

## Discussion

The FPHs' strategic behaviours identified above are compared with the two standard typologies commented on and selected in the second section. This analysis is synthesised in Figure 2.

| | Class 1 | Class 2 | Class 3 | Class 4 | Class 5 |
|---|---|---|---|---|---|
| **Main characteristics** | - Low pressure resulting from the environment<br>- No need of action towards environment<br>- Almost no resort to managerial practices<br>- Weak strategic ambition | - Relatively favourable perceived environment<br>- Independent strategy (no implication in alliances)<br>- Low attention dedicated to strategic resources<br>- Low autonomy in strategic decisions | - Hostile perceived environment<br>- Almost no resort to managerial practices<br>- Weak strategic ambition<br>- Poor autonomy in strategic decisions<br>- Weak participation in alliances | - Rather favourable perceived environment<br>- Lot of efforts dedicated to exploit the environment's opportunities<br>- Resort to managerial practices, transversal organisation<br>- Autonomy in strategic decisions<br>- High implication in alliances | - Unfavourable perceived environment but high effort to benefit from changes<br>- Resort to managerial practices<br>- High strategic ambition<br>- High focus on strategic resources<br>- Steps to reconvert the activity |
| **Corresponding class in Zaleznik and Kets de Vries' typology** | Organisation reluctant to engage into a change process<br>⇩<br>HOMEOSTATIC<br>i.e. 'Highly reluctant to change that must be avoided by all means.' | Organisation reluctant to engage into a change process<br>⇩<br>HOMEOSTATIC<br>i.e. 'Highly reluctant to change that must be avoided by all means.' | Inability to formulate a global strategic response to environmental change<br>⇩<br>MEDIATIVE<br>i.e. 'Changes occur but are a mere reaction to environmental pressure.' | Offensive and consistent response to environmental changes<br>⇩<br>PROACTIVE<br>i.e. 'Do not avoid changes and consider them as intentional and thus positive features. Creatively use their own resources in order to modify their environment in a suitable way and produce innovations.' | Offensive and consistent response to environmental changes<br>⇩<br>PROACTIVE<br>i.e. 'Do not avoid changes and consider them as intentional and thus positive features. Creatively use their own resources in order to modify their environment in a suitable way and produce innovations.' |
| **Corresponding class in Miles and Snow's typology** | - Comfortable with a stable environment<br>- Poor strategic ambition<br>⇩<br>DEFENDER<br>i.e. 'Exhibit poor strategic ambition, eager to evolve in a stable market environment.' | - Comfortable with a stable environment<br>- No real strategic analysis<br>⇩<br>DEFENDER<br>i.e. 'Exhibit poor strategic ambition, eager to evolve in a stable market environment.' | Inability to formulate an adequate strategy towards change<br>⇩<br>REACTOR<br>i.e. 'Do not formulate a consistent response to their environment notably because of a lack of anticipating ability.' | Seek for opportunities<br>Innovative policies<br>(e.g., managerial actions, alliances)<br>⇩<br>PROSPECTOR<br>i.e. 'Continuously seek new opportunities in their environment, able to anticipate their environment's evolution.' | Seek for new ideas to face environmental pressure<br>(e.g., efforts to reconvert, two types of activities)<br>⇩<br>ANALYSER<br>i.e. 'Study their environment very carefully in order to adapt their strategy to the characteristics of each interesting sub-environment.' |

**Figure 2.**
Correspondences between the FPHs' classes and the standard typologies

*FPHs' classes versus standard typologies*

*Comparison with Zaleznik and Kets de Vries's typology.* Hospitals described by the respondents of Classes 1 and 2 are similar to organisations which have a "Homeostatic" behaviour towards their environment. What mostly explains this relative passivity in the context of our study is the absence of perception of severe constraints resulting from environmental change.

Hospitals corresponding to Class 3 resemble the "Mediative" organisations identified by Zaleznik and Kets de Vries (1975): far from designing a global strategic response which could enable them to handle their turbulent environment, they adopt a defensive behaviour towards change.

Finally, hospitals described by respondents of Classes 4 and 5 seem to be "Proactive" organisations. Indeed, they try to formulate an offensive and consistent response to the evolutions of their environment. They strive to take advantage of opportunities, to focus on strategic resources, to reconvert former activities, or to enter into strategic alliances. This leads these hospitals to formulate a strong strategic ambition.

*Comparison with Miles and Snow's typology.* Hospitals corresponding to Class 1 are similar to the "Defenders" described by Miles and Snow (1978). Indeed, the environmental mutations are not perceived as central; the organisation does not feel any pressure to adapt itself. This implies that these hospitals are not in search of new opportunities to be exploited. Hospitals depicted by respondents of Class 2 also bear some resemblance with "Defenders". As they benefit from a relatively favourable environment, they do not feel the necessity to formulate a strategy to adapt themselves to their evolving environment. These hospitals pursue an independent strategy, and remain relatively isolated from their environment.

Hospitals described by respondents of Class 3 are comparable to "Reactors". Indeed, even though they pay attention to the changes that occur in their environment, they are unable to formulate adequate strategic responses. The lack of internal consistency, notably between decision-makers and the administrative staff, leads to a deadlock situation. No adaptation process is initiated, except when it is imposed by the regulating authorities. Consequently, the autonomy in the strategic decision process is perceived as weak.

Hospitals corresponding to the respondents of Class 4 are close to "Prospectors". These hospitals dedicate a lot of time to look for opportunities emerging from changes in their environment, and try to benefit as much as possible from them. Furthermore, they seem to be particularly interested by innovative policies, pay attention to their organisational design (transversal configuration of the structure), as well as to the relationships they enjoy with their environment (high involvement in strategic alliances).

Finally, hospitals described by the respondents of Class 5 are close to "Analysers". In search of new ideas to better cope with the evolutions of their environment, they often undertake actions to reconvert their previous activities. In order to satisfy their potential patients' requirements, they often undertake another activity on top of the standard Medicine, Surgery, and Obstetrics (MSO) care characterized by a short-time hospitalization. They pay special attention to track their competitors, to identify strategic resources that are necessary for their development, and to formulate an ambitious strategy.

## Contributions of the study

Finally, we derive some theoretical and practical contributions from our results.

### *Theoretical contributions*

Concerning theoretical contributions, we first demonstrate the relevance of the two standard typologies used as a benchmark to depict FPHs' strategic behaviour. Next, the specificities of the FPHs' classes are highlighted. Finally, the value of the generic transfer of these typologies in the public sector is questioned.

*The relevance of standard typologies.* Overall, our results are consistent with standard strategic behaviour typologies, although these typologies were obtained in a different context – e.g. private organisations, other countries – and with different methodological approaches – e.g. case studies. This is in itself striking.

Zaleznik and Kets de Vries' contribution is mainly based on research studies conducted on large private firms or industrial groups in the 1960s and 1970s: Sears, General Motors, Krupp, the Carnegie Steel Company, Ford, IBM . . . Their approach of organisational strategy through leadership styles may seem especially relevant in such famous firms managed by charismatic leaders. However, the typology of organisations that resulted from their study is globally well suited to depict the FPHs' strategic behaviour – that is to say of not-for-profit and non-industrial organisations, managed by a rather administrative-oriented staff facing strong medical and political influences – at the beginning of the 2000s.

The similarity between Miles and Snow's typology and our classification is slightly less surprising notably because of the nature of the firms studied by these authors. Indeed, their theoretical analysis of the organisational adaptation process is followed by in-depth case studies on extremely various American industries in the 1970s: publishing industry, electronics and food processing, and also hospitals. In each of these industries, Miles and Snow were able to identify firms with very different strategic behaviours and belonging to the various classes resulting from their theoretical framework. Furthermore, our method bears some similarities with Miles and Snow's, for it implies variable measurement. Indeed, their case studies are based on questionnaires or diagnostic checklists aiming at evaluating how managers perceive environment uncertainty, organisational adaptivness, and other organisational features (e.g. questionnaire items measuring perceived environmental uncertainty in the case of food and electronics processing firms, Miles and Snow (1978, p. 200); measurement of hospital adjustment behaviour, Miles and Snow (1978, pp. 238-9). The measurement validity of Miles and Snow's strategic types in the hospital industry is precisely a key result of Shortell and Zajac (1990). These authors were able to empirically identify a continuum of strategic behaviours among the US hospitals, from "Defenders" to "Prospectors" ("Analysers" corresponding to a middle position), according to their focus on developing new services and on tackling new markets, and to their propensity to accept risk. However, their study largely ignored "Reactors" strategy for its inconsistency makes it difficult to measure with their methodological approach.

*The FPHs' classes specificities.* The typology elaborated in our study identifies the resorting to strategic alliances as a major criterion that separates several categories of FPHs. This criterion does not appear in the standard typologies used as a benchmark.

"Homeostatic" organisations described by Zaleznik and Kets de Vries end up into two categories in our study: hospitals described by the respondents of Class 2 are characterized by an isolated implementation of their strategy, whereas hospitals depicted by the respondents of Class 1 cannot be discriminated by their level of participation in strategic alliances. Similarly, we separate "Proactive" organisations into two categories: hospitals described by respondents of Class 4 which enter massively into strategic alliances, and hospitals depicted by the respondents of Class 5 which cannot be discriminated according to this criterion.

We also refine Miles and Snow's typology by identifying two distinct categories among "Defenders". Hospitals depicted by the respondents of Class 2 follow isolated strategies, whereas hospitals described by the respondents of Class 1 cannot be discriminated according to this specific criterion. Finally, hospitals described by the respondents of Class 4 – and that are very close to "Prospectors" – are also characterized by a massive involvement in strategic alliances, criterion that does not appear in Miles and Snow's study.

The FPHs' resorting to alliances is consistent with a Miles and Snow's more recent study (Miles and Snow, 1994), in which the transition from a complex to a turbulent environment is argued to imply the development of networks, depicted as an organisational adjustment allowing firms to deal with reinforced environmental constraints. This result is also consistent with institutional isomorphism theory (Di Maggio, 1983), used by Meyer *et al.* (1990) in the case of American hospitals to demonstrate that alliances constitute a way to reduce increasing environmental uncertainty.

*Questioning on the value of the generic transfer of strategic typologies into the public sector.* Our results suggest a high validity of the standard typologies in the French health care sector; thus, their universality is reinforced. The value of the generic transfer of these typologies into the public sector lies in the interpretation of FPHs' strategic behaviour it allows us to put. First, describing simultaneously environmental, organisational, and strategic features leads to a deep understanding of FPHs' strategic behaviour, for it situates their strategic orientations in a global context. The strategic typologies used as a benchmark enable us to give a synthesized interpretation of the environmental-organisational-strategic combinations. Next, the focus on decision-makers' perceptions allows us to identify consistency in these combinations, for coherence stems from the way environment and organisation are interpreted by managers in charge of formulating strategic orientations. Finally, the comparison of the described FPHs' strategic behaviours with established strategic types allows us to highlight some key features in these behaviours and to condense them into few striking terms.

*Practical implications*

This study has practical implications both for policy makers and hospitals' managers.

*Implications for policy makers.* First, it was clear from the interviews we conducted during the first empirical stage of the study that policy makers have abandoned the long lasting view of FPHs as organisations merely executing the orders given by regulating authorities. However, policy makers were willing to have a neater picture of which strategies existed, and whether these strategies were idiosyncratic or corresponded to general principles. By identifying some correspondences between

the perception of environmental and organisational features, and FPHs' strategic orientations, policy makers can understand how their action – as major environmental actors – influences the strategy formulation. This should enable them to favour the emergence of the strategy they think is best suited for a particular hospital.

Second, this study can help French regional regulating authorities – which have been commissioned by national authorities to promote the conclusion of alliances between health care providers in order to limit expenses and maintain (or increase) the quality of health care services delivered to patients – convince hospitals that strategic alliances can benefit them (see hospitals described by the respondents of Class 4). It should be easier than simply imposing alliances on hospitals.

Third, the result that FPHs' managers actually try to develop and implement strategies urges policy makers to change administrative principles which currently rule the career of the FPHs' managers: in particular, the obligation to regularly switch from one hospital to another conflicts with the long-term perspective (and thus the long-term position) they need to have.

Implications for hospitals' managers. First, analysing our results through the structural contingency approach (Lawrence and Lorsch, 1967) enables us to point that some hospitals do not achieve fit between their organisational design and their perceived environment, which may be useful to managers since misfit leads to underperformance. Hospitals depicted by the respondents of Class 3 seem unable to face their unfavourable perceived environment. The reason is that their organisational design is not integrated enough. On the contrary, hospitals described by the respondents of Class 4 exhibit a very high level of integration compared to their environmental perceived characteristics. However, this can prove necessary to face the organisational requirements resulting from the implementation of strategic alliances. In contrast, the level of integration of hospitals described by the respondents of Classes 1 and 5 proves perfectly adequate to deal with the environment's perceived requirements. Figure 3 summarizes this analysis.

Second, this study suggests that the ability of hospitals' managers to identify opportunities in their environment may have a positive impact on fit when constraints in the environment are perceived. Indeed, identifying constraints in the environment (notably competition) without identifying opportunities corresponds to a misfit situation (see Class 3). In contrast, fit is possible when hospitals' managers are able to detect opportunities that may balance environmental constraints (see Class 5). This point would require future investigation.

| **Perceived environment**<br>**Organisational design** | Favourable | Rather favourable | Unfavourable |
|---|---|---|---|
| Not open to change<br>(Low integration level) | Class 1 | | Class 3 |
| Open to change<br>(High integration level) | | Class 4 | Class 5 |

Right fit | Lack of integration | High level of integration

**Note:** [a]Hospitals described by the respondents of Class 2 are not positioned in this table because their organisational characteristics are not discriminant

**Figure 3.**
Level of fit between perceived environment and organisational design

## Conclusion

This study focuses on how FPHs' decision makers analyse their ever more demanding environment, perceive their organisational design, and describe their strategic orientations. We establish a strategic behaviour typology of FPHs which proves consistent with two standard classifications of the strategic management literature established by Miles and Snow (1978) and Zaleznik and Kets de Vries (1975). This result contributes to reinforce the universality of these studies. However, alliances with other health care providers appear as a major criterion that separates FPHs' current strategic behaviour. This dimension is not identified in the standard strategic typologies we use as a benchmark.

In addition, the FPHs' typology allows us to identify some extremely different ways used by these organisations in order to deal with new environmental features: identification of opportunities resulting from change, activity reconversion, development of transversal relations between different categories of staffs, responsibilization of administrative and nursing staffs, attention devoted to strategic resources, formulation of an ambitious strategy, resorting to strategic alliances ...

Finally, the combinations of environmental-organisational-strategic features identified in this study are shown to correspond to a more or less satisfying alignment between FPHs' organisational and strategic characteristics and their perceived environment. Thus, this study highlights the role played by FPHs' decision makers in interpreting their environment, conceiving organisational design, and crafting strategic orientations.

## Notes

1. These features are extensively depicted in the literature on national health public systems (see for example Ferlie (1992), Ferlie *et al.* (1996), Carr-Hill *et al.* (1997), and Exworthy *et al.* (1999) for an analysis of the evolution of the British National Health Service; McHugh (1996), Gilles and Lelièvre (2003), and Kautto and Uusitalo (2003) for an analysis of Scandinavian reforms; Dufour and Lamothe (2000), and Lozeau *et al.* (2002) for the case of Quebec; and Gruca and Nath (1994), Shortell *et al.* (1995), Ginter *et al.* (2002), and Adler (2003) for the case of the US hospitals).
2. The questionnaire is available upon request from the author.
3. The size is estimated on the basis of the classification proposed by the French Ministry of Health; the criterion used to indicate the geographic location is the French administrative "*Région*".
4. An agglomerative hierarchical procedure, based on the Ward's method and thus generating classes of rather similar size (Aldenderfer and Blashfield, 1984), is conducted.
5. In order to verify the ability of the functions to discriminate the classes properly, canonical correlations are calculated. The Wilks' Lambda test is used to assess the significance of the canonical correlations. The characteristics of the four satisfactory discriminant functions we obtain are presented in Appendix 2.

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## Appendix 1. Statistical analysis of the sample quality

See Table AI and AII.

| Category of size of the hospital | Observed events (O) | Theoretical events (T) | $(T - O)^2/T$ |
|---|---|---|---|
| 1 less than 5500 ASE[a] | 48 | 46.607 | 0.042 |
| 2 from 5501 to 10000 ASE | 48 | 47.620 | 0.003 |
| 3 from 10001 to 16000 ASE | 42 | 41.541 | 0.005 |
| 4 more than 16000 ASE | 53 | 49.647 | 0.226 |
| 5 University Hospital Complexes | 38 | 43.568 | 0.711 |
| Total | 229 | 229 | $\chi^2 = 0.988$ |

**Notes:** The Chi-square distribution table (df = 4) shows that it is not possible to reject the null hypothesis at the usual level of significance of 5 per cent ($0.988 < < 9.49$). Thus, the distribution by size observed in the sample cannot be considered as statistically different from the distribution existing in the population (df = degrees of freedom); The values of the last two columns are presented with six figures at most, after rounding the third decimal. Possible visible inaccuracies result only from the rounding made for the presentation; [a] The number of Anonymous Summaries of Exit (ASE) approximately corresponds to the number of patients having benefited from a medical service in the hospital for a whole year

**Table AI.**
Sample characteristics on the criterion of the size of the hospital

| Geographic location (French administrative "*Région*") | Observed events (O) | Theoretical events (T) | $(T - O)^2/T$ |
|---|---|---|---|
| Alsace | 4 | 5.066 | 0.224 |
| Aquitaine | 13 | 10.132 | 0.812 |
| Auvergne | 8 | 5.573 | 1.057 |
| Basse – Normandie | 9 | 8.612 | 0.017 |
| Bourgogne | 4 | 7.599 | 1.705 |
| Bretagne | 12 | 11.652 | 0.010 |
| Centre | 11 | 9.625 | 0.196 |
| Champagne – Ardenne | 5 | 5.573 | 0.059 |
| Corse | 1 | 1.013 | 0.000 |
| Franche – Comté | 9 | 5.573 | 2.108 |
| Haute – Normandie | 9 | 6.079 | 1.403 |
| Ile-de – France | 33 | 40.528 | 1.398 |
| Languedoc – Roussillon | 5 | 5.573 | 0.059 |
| Limousin | 4 | 4.053 | 0.001 |
| Lorraine | 6 | 8.612 | 0.792 |
| Midi – Pyrénées | 13 | 10.639 | 0.524 |
| Nord-Pas-de-Calais | 9 | 10.639 | 0.252 |
| Provence – Alpes – Côte d'Azur | 19 | 17.731 | 0.091 |
| Pays-de-la-Loire | 13 | 12.158 | 0.058 |
| Picardie | 10 | 10.132 | 0.002 |
| Poitou – Charentes | 9 | 8.612 | 0.017 |
| Rhône – Alpes | 22 | 22.290 | 0.004 |
| Territoires d'Outre – Mer | 1 | 1.520 | 0.178 |
| Total | 229 | 229 | $\chi^2 = 10.969$ |

**Table AII.**
Sample characteristics on the criterion of the geographic location of the hospital

**Notes:** Similarly, the Chi − square distribution table (df = 22) indicates that one can not reject the null hypothesis at the usual level of significance of 5 per cent ($10.969 < < 33.9$). Thus, the distribution by geographic area observed in the sample cannot be considered as statistically different from the distribution existing in the population (df = degrees of freedom); [a] The values of the last two columns are presented with six figures at most, after rounding the third decimal. Possible visible inaccuracies result only from the rounding made for the presentation

## Appendix 2. Quality of the discrimininant functions

See Table AIII.

| Function | Eigenvalue | % of variance | Cumulative % | Canonical correlation | Wilks' Lambda | Significance level |
|---|---|---|---|---|---|---|
| 1 | 1.630 | 44.7 | 44.7 | 0.787 | 0.084 | 0.000 |
| 2 | 0.948 | 26.0 | 70.6 | 0.698 | 0.220 | 0.000 |
| 3 | 0.700 | 19.2 | 89.8 | 0.642 | 0.429 | 0.000 |
| 4 | 0.371 | 10.2 | 100.0 | 0.520 | 0.729 | 0.000 |

**Table AIII.**

## Appendix 3. Interpretation of the results of the cluster analysis

See Tables AIV and AV.

| Factors | Functions 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| STRATAMB | 0.419[a] | 0.004 | 0.149 | −0.238 |
| PHYSBEHAV | 0.341[a] | 0.111 | 0.143 | −0.247 |
| EXECBEHAV | −0.169[a] | 0.084 | 0.089 | −0.163 |
| RECONV[b] | 0.152[a] | 0.046 | 0.073 | −0.118 |
| ADVOPP[b] | 0.101[a] | −0.021 | 0.049 | 0.009 |
| RESPADNUR[b] | 0.099[a] | −0.080 | 0.015 | 0.085 |
| ALLAUTO | 0.028 | 0.853[a] | −0.148 | 0.275 |
| TRANSVER | 0.048 | 0.287[a] | 0.069 | −0.166 |
| COMPCITY | 0.193 | 0.229[a] | −0.134 | −0.133 |
| ACTLEVEL[b] | 0.115 | 0.150[a] | 0.043 | −0.141 |
| DEMOG[b] | −0.172 | 0.092[a] | −0.018 | 0.029 |
| ADVOPP[b] | 0.005 | 0.044[a] | 0.011 | −0.015 |
| COMPRES | 0.358 | −0.199 | −0.626[a] | 0.204 |
| STRATAUTO | 0.283 | 0.095 | 0.295[a] | −0.203 |
| ALLIANCES | 0.152 | −0.007 | 0.288[a] | 0.153 |
| COMPAREA | 0.099 | 0.043 | 0.404 | 0.614[a] |
| FOCRES | 0.215 | −0.201 | −0.048 | 0.417[a] |
| TECHNACT[b] | 0.148 | 0.132 | 0.000 | −0.176[a] |
| ACCFIRES[b] | 0.051 | 0.091 | −0.010 | −0.160[a] |
| SPECIACT[b] | 0.029 | −0.011 | −0.057 | 0.080[a] |

**Notes:** [a] Highest correlation in absolute value between the variable and a discriminant function; [b] Variables not included in the analysis

**Table AIV.** Structure matrix (correlations between factors and discriminant functions)

| Class | Function 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | −0.583 | −2.301 | 0.602 | −0.593 |
| 2 | 0.266 | 0.587 | −0.912 | −0.829 |
| 3 | −2.060 | −0.039 | −0.765 | 0.723 |
| 4 | −0.569 | 1.027 | 1.339 | −0.099 |
| 5 | 1.618 | −0.192 | −0.034 | 0.524 |

**Table AV.** Values of discriminant functions at groups centroids

**About the author**

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