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Managerial Decision Making in Small and Medium Sized Enterprises: An Empirical Study in Valencia Region (Spain)

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ABSTRACT

In the present paper a study of decision making in Small and Medium Sized Enterprises (SMEs) from the Valencia region (Spain) is presented. The objectives of the study are the following:

- To analyse the actual decision making processes of SMEs in the region of Valencia (Spain)
- To discover the patterns in decision making and establish a common procedure for all of them
- To propose a strategy to introduce the use of Multicriteria Decision Analysis (MCDA) techniques in their usual decision making procedures

To achieve these objectives, the research is divided into two clearly defined stages. In the first one, an empirical analysis of the decision making models of SMEs in Valencia Region is carried out by means of a statistical study (reliability and correlation analysis) from the results of a questionnaire answered by 129 Valencian SMEs. This stage shows that these companies can be classified in *structured* and *ill-structured*, according to the decision making patterns they follow.

In the second stage, the utility, the capacity and the guidelines for adaptation of MCDA techniques to these decision patterns will be analysed working with Focus Group. The main aim of these techniques is to prioritize a group of proposed alternatives according to pre-selected criteria and their weights (or relative importance), taking into consideration the opinion of different experts.

Finally a MCDA methodology is proposed, which has the advantage of bringing more information to the decision process. That also means to add transparency, which is always recommended when dealing with managerial decisions and should be the first step to improve them.
Keywords: Decision Analysis, Decision models, Managerial decision making, Multicriteria, Small to Medium Sized Enterprises.

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1. Introduction

Decision making is an essential activity for the management of any company. The good performance of the company depends on many of these decisions. This is specially relevant in the case of Small and Medium Enterprises (SMEs) because 75% of them are characterized by being dependent or heavily dependent on their managers (Feltham et al., 2005), (Eisenmann, 2002).

The needs and often the decision making processes of SMEs differ significantly from larger companies (Shrader et al., 1989). Accordingly, it is important to understand the importance of decision making in the achievement of financial results and ultimately overall success. Moreover, SMEs performance and ultimately competitive advantage depends on these decision-making processes (O´Regan et al., 2005).

Improve the decision making processes of the management of Small and Medium Enterprises (SMEs) should be one of the main goals of Multicriteria Decision Analysis (MCDA). MCDA is a wide term that includes a collection of concepts, methods and techniques that aim to help individuals or groups to make decisions when conflicting points of view and multiple interests have to be considered (Belton and Stewart, 2002). Therefore, we are convinced that MCDA will help the decision makers to learn about the problem, about their own values and judgments and those of any others involved in the process.

Many examples of applying decision support methods to business decisions can be found in the Literature. However, Weistroffer and Narula (1997) warn that most of the proposals in the literature are not being applied to real decisions in the way that had been expected. This paper demonstrates the present reality of the lack of use of MCDA techniques by business enterprises and tries to answer some of the questions raised by this fact in the field of multi-criteria decision making, chiefly, *what steps can be taken to implant them?*

SMEs are usually family-run businesses which is a very frequent case in Valencia Region. Consequently, their decision making processes are usually unsystematic and informal due to the business culture of the owner-manager, who generally makes the decisions himself in response to specific opportunities and circumstances. This procedure seems to be chaotic and at the mercy of the personal and business priorities of the moment (Fernández de Lucio et al., 2000). This study also pointed out that the managers of smaller companies do not act according to formal strategies and rarely use structured and sequenced decision systems.

Dyer (1997) suggests that owner-managers rely more on intuition, whereas managers of subsidiary firms are likely to be subjected to a more structured and logical approach.

However, in the last years, many of these companies have been progressively incorporating technicians to support the work and decision made by the owners of the companies. These people need tools to justify and allow traceability to any decision they make as a way to

convince the owner or company management (Muhleman et al., 1995; Siskos and Spyridakos, 1999).

The aims of this paper are: (i) to analyse the actual decision making processes of SMEs in the region of Valencia, i.e. to discover the patterns in decision making and establish a common procedure for all of them. (ii) to propose a strategy to introduce the use of MCDA techniques in their usual Decision Making procedures.

2. Methodology of the study

The research is divided into two clearly defined stages. In the first one, an analysis of the decision making models of SMEs in Valencia is carried out. This model will be considered the reference pattern for the characterisation of the type of decisions made by the management of these business companies. In the second stage, the utility, the capacity and the guidelines for adaptation of MCDA techniques to these processes will be analysed. The main aim of these methods is to prioritize a group of proposed alternatives according to pre-selected criteria and their weights (or relative importance).

2.1.- Formulation of the hypothesis of the investigation

The following hypotheses have been stated:
Hypothesis 1. – The decisions made in the context of SMEs in Valencia Region are in type multi-criteria.
Hypothesis 2. – The decisions made in the context of SMEs in Valencia Region are in type multi-expert.
Hypothesis 3. – The decisions made in the context of SMEs in Valencia Region are in type discrete.
Hypothesis 4. – SMEs in Valencia Region do not use MCDA methods.
Hypothesis 5. – SMEs in Valencia Region can be categorized according to the Decision (Making) Pattern they follow.

2.2.- 1st phase of the investigation

In this phase, quantitative research methods have been used. A survey was carried out in order to verify H1, H2, H3, H4 and H5.

The target population was composed of a group of SMEs from the Valencia Region of Spain. This type of companies provides jobs to more than 80% of the Valencia labour force. The sample population consisted of 1006 of these companies obtained from a Data Base of the Valencia´s Government (IMPIVA, 2014). The manager of each of these companies was identified in order to address the questionnaires personally to them.

The sample design was performed by simple random sampling for finite populations. The sample, with a confidence interval of 95%, consisted of 129 business companies.

2.2.1.- Questionnaire design

They were addressed by means of a questionnaire composed of 12 questions (see annex 1), whose first five questions (Part I) were designed to determine the degree of structure of the decisions made and the others questions (Part II) were designed to find common patterns in the business decision processes.

For both parts of the questionnaire, an ordinal scale was devised in such a way that quantitative values could be assigned to each of the response categories in the following way:
Never = -2, Occasionally =.-1, Frequently = 1, Always = 2

Part I

Decision Theorists often characterize decision processes by their structure. In this way, some authors distinguish between processes (Hammond et al., 1999), approaches (Arvai et al., 2002), environmental (Gregory et al., 2001), or decision problems structure (Baker et al., 1998). They all follow the programmed/non programmed problem dichotomy proposed by Simon (1960): as structured (or well-structured) and un-structured (or ill-structured). To summarize this definition we assume these categories under the concept of Decision Models. Therefore, the contents of this part of the questionnaire (questions from DMP1 to DMP5) were based on the elements suggested by Gregory et al. (2001) and Baker et al. (1998) in their definition of structured and ill-structured decision models. These decision models are defined in the following way:

- A structured decision model (or well-structured decision model): the objectives are clear and the feasible alternative solutions are often obvious. A well-structured decision model is characterized by the following elements:
    - It defines the decision problem to be addressed.
    - It identifies key objectives to clarify what you want your decision to achieve.
    - It describes consequences in terms of how each alternative meets the objectives.
    - It identifies ”what matters” in the context of the impending decision in the form of the stakeholders objectives.
    - It examines how the outcome of this decision will influence future decisions . (Gregory et al., 2001)
- An ill-structured decision model: tends to be complex, non-routine and difficult to define. Potential alternative solutions, objective(s) associated with solving these problems, and the relevant decision makers and stakeholders, are often not obvious. An ill-structured decision model is characterized by the following elements:
    - Task objectives (problem solutions) and outcomes may be ambiguous and/or conflicting.
    - It is difficult to understand the effect of changes on decision outcomes and to predict (in advance) the effect of the actions.
    - Uncertainty exists concerning which actions affect the outcomes.
    - Human decision makers often use imperfect, subjective, and informal methods to process incomplete and imprecise knowledge. (Baker et al., 1998)

Part II

Questions from DMP6 to DMP12 was formulated with the aim to determine whether the decisions made were of the type multi-criteria and multi-expert, as well as to get to know the degree of usage of Decision Support Methods (DSMs).

2.2.2.- Data analysis and interpretation of results

Analysis I. Central tendencies

The descriptive statistical results, based on measuring central tendencies, obtained for each question, defined as decision-making process (DMP) variables, are given in Table I.

	DMP1	DMP2	DMP3	DMP4	DMP5	DMP6	DMP7	DMP8	DMP9	DMP10	DMP11	DMP12
N Valid	129	129	129	129	129	129	129	129	129	129	129	129
Lost	0	0	0	0	0	0	0	0	0	0	0	0
Median	1,00	1,00	2,00	1,00	1,00	-1,00	2,00	-1,00	1,00	1,00	1,00	-2,00
Mode	1	1	2	1	1	-1	2	-2	1	2	1	-2

Table I.- Descriptive Statistics of DMP variables.

The questions defined as variables DMP1, DMP2, DMP3, DMP4 and DMP5, grouped in the questionnaire under the heading *Approach to the Problem* (Part I), were intended to determine the degree of structure of the decision problem. With these results, the companies were classified as structured or ill-structured decision models users.

The questions defined as variables DMP6, DMP7, DMP8, DMP9, DMP10 and DMP11, under the heading *Characteristics of the Decision Process* (Part II), were formulated in such a way that negative answers to question DMP6 and positive answers to question DMP7 defined decisions as being of the type multi-criteria, negative answers to question DMP8 and positive answers to questions DMP9 and DMP10 defined decisions as being of the type multi-expert, and positive answers to question DMP11 defined decisions as being of the type discrete. The question defined as variable DMP12 tries to find out how frequently DSMs are used.

Analysis II. Frequency Distribution

The following table shows the results of the questionnaire regarding to the frequency distribution of all the variables that define the decision model (DMP1, DMP2, DMP3, DMP4 and DMP5) and also those of variables (from DMP6 to DMP12) which identify decisions as of the type multi-criteria multi-expert discrete, as well as the frequency of DSMs usage. They are defined by means of an ordinal scale, converted to a dichotomized nominal scale, grouping positive answers (always and frequently) as *generally yes* and negative answers (never and occasionally) *as generally no*.

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Question	*Generally Yes*	*Generally No*
Approach to the Problem,		
DMP1. Do you think you are given enough time to make decisions?	56.59 %	43.41%
DMP2. Do you specifically define the objective you wish to achieve with the decision process?	79.07%	20.93%
DMP3. Do you consider how your decision will affect your company as an organisation?	78.29%	21.71%
DMP4. Do you consider the effect your decision may have on stakeholders?	69.77%	30.23%
DMP5. Do you consider the consequences in terms of how each alternative meets the objectives?	58.14%	41.86%
Characteristics of the Decision		
DMP6. When making a decision only the economic criterion is considered?	16,28%	83,72%
DMP7. Is the decision analysed from different points of view or criteria?	93.02%	6.98%
DMP8. The decisions are always made by the person in charge individually?	13,95%	86,05%
DMP9. The decisions are always made by the person in charge with the support of experts?	74,34%	25,66%
DMP10. Are the decisions made within a group?	94,57%	5,43%
DMP11. When a decision has to be made a group of well defined	86,67%	13,33%

alternatives is stated?		
DMP12. During the decision making process, do you use any particular MCDA technique?	14,73%	85,27%

Table II.- Frequency distribution of the first part of the questionnaire.

The measurements of central tendency of the first 5 variables reflect a positive tendency in the answers towards a structured decision model. However, as can be seen in the Frequency Distribution Analysis, no single model clearly predominates (as shown in table II). In view of these results, it was decided to carry out a reliability analysis of this scale (composed of the first five questions).

Analysis III. Reliability Analysis

The reliability of the scale was addressed by means of Cronbach's Alpha Coefficient. The objectives of this analysis were: firstly, to discover whether the questionnaire was sufficiently consistent to provide a reliable measure of the model, and secondly, to discover whether the companies use a decision model that could be defined as structured or ill-structured. The results are shown below:

Cronbach's Alpha	Cronbach's Alpha based on typical elements	N of elements
,714	,713	5

Table III.- Reliability Statistics

The results show that the value of Cronbach's Alpha Coefficient is greater than 0.7 as recommended by Nunnaly and Bernstein (1994), which indicates that the proposed questions are reliable and internally consistent. The reliability offered by the questionnaire also indicates that this measurement would give the same results in successive tests.

There were also analysed the relevant results of the items of the questionnaire in order to identify problematic elements to be reconsidered or excluded. The following table shows the results of the inter-element correlation matrix (items or variables) and a summary of the statistics that compare each element with a scale composed of all the other elements.

	DMP1	DMP2	DMP3	DMP4	DMP5
DMP 1	1.000	.051	-.076	-.031	.081
DMP 2	.051	1.000	.712	.648	.336
DMP 3	-.076	.712	1.000	.766	.433
DMP 4	-.031	.648	.766	1.000	.396
DMP 5	.081	.336	.433	.396	1.000

Table IV.- Inter-element correlation matrix

	Mean of the scale with element eliminated	Variance of the scale with element eliminated	Corrected total-element correlation	Squared múltiple correlation	Cronbach's Alpha with element eliminated
DMP 1	2.92	22.791	.011	.043	.819
DMP 2	2.15	15.986	.650	.542	.599
DMP 3	2.10	15.107	.699	.687	.573
DMP 4	2.48	14.877	.666	.613	.582
DMP 5	2.81	16.074	.439	.210	.685

Table V.- Total-element statistics

It can be seen from these results that high inter-element correlations exist except in the case of DMP1 with the others. An analysis of the statistical results of the rest of the scale, if each of the elements was eliminated, concludes that the correlation between DMP1 and the scale composed of the other elements is very low and also that the Cronbach's Alpha Coefficient

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without this item is much higher (0.819). This means that the scale would be more reliable and consistent without it. It can also be observed that significant correlations exist among variables DMP2, DMP3, DMP4 and DMP5. They all have a positive relationship with each other, which indicates that the association existing among these elements tends to be in the same direction (structured or ill-structured model) .

2.2.3.- Discussion of the 1st part of the study.

Hypothesis 1 was verified by the results obtained for DMP6 and DMP7 since most of the people answered that they use different criteria when making a decision and not only the economic criterion as could be assumed. Hypothesis 2 was verified by the results obtained for DMP8, DMP9 and DMP10 which show that most of the managers do not make decisions by themselves but with the support of their staff or experts. Hypothesis 3 was verified by the results obtained for DMP11 since most of the answers show that the type of decision problems faced by the managers has concrete alternatives (discrete) and is not multi-objective decision type which is more related to technical problems. Hypothesis 4 was therefore verified by the results obtained for DMP12, since most of the people declare that they do not use MCDA techniques.
All in all, we can conclude that SMEs in the Valencia Region follow a multi-criteria multi-expert discrete type decision process, but without the help of any MCDA method.
Regarding the questions about the approach to the problem we want to stand out that one of the results that has surprised us is that more than 50% of the managers declared to devote enough time to make decisions, although the general feeling is to never have enough time to make decisions. Moreover, most of the people considered that when making decisions the objectives are clearly stated, and the consequences related to the organizations and stakeholders involved are taken into account.
On the other hand, according to the reliability analysis results, many of the companies in the sample deal with important decision problems in a structured way. However, a fairly high percentage of them approach decision problems with an ill-structured model. Hypothesis 5 was therefore verified: SMEs in Valencia Region can be categorized according to the decision model they follow.

2.3.- 2nd phase of the investigation

In this second phase, a qualitative research method has been used, i.e. Focus Groups. The results of the survey carried out in the first part of the investigation have been used as the base for the strategic selection of the cases subjected to a qualitative analysis in this second part. The procedure for theoretical sampling proposed by Glaser and Strauss (1967) has been used for the strategic selection of cases. This involved creating a typological matrix and crossing two criteria in order to identify cases within each of the typologies obtained. Cases were chosen by means of a conceptual approach. The sampled cases are therefore identified in two analytical categories: size of the company and the decision-making model used.

Within the category of company size two groups can be distinguished according to the classification of the European SME Observatory (Comisión Europea, 2000):

- Small companies with from 10 to 99 employees, and
- Medium companies with from 100 to 499 employees.

Within the category of decision model two groups have been identified according to the results obtained (1st phase) regarding the degree of structure of the decision making processes:

- Structured
- Ill-structured

2.3.1.- Focus groups

In the second phase of the investigation the usefulness of the DSMs based on MCDA for the companies under study was investigated by means of the Focus Groups technique. The objective was to analyse the expectations of the different groups of companies with regard to Decision Support Methods and to gather information for the design of a methodology.

Of the 129 companies of which information was obtained in order to classified them in the categories defined above, the selection of strategic cases were established; 38 were chosen for the focus groups phase. These cases were chosen from all the cells of the typological matrix, that way the following four focus groups were arranged:

	Structured Model	Ill-structured model
Medium companies	M-S (8 companies)	M-IS (5 companies)
Small companies	S-S (17 companies)	S-IS (8 companies)

Table VI.- Typological matrix. Strategic cases selection for Focus Groups.

These 38 companies (composed of 20% of the total amount of the companies from each group) were chosen according to diversity criteria (industrial sector, geographical area, type of managerial organization…).

2.3.2.- Results obtained

The table shown below summarizes the main ideas that arose from the activities of the focus groups about their ideal way in decision making procedures. The ideas that arose during these sessions are grouped in the table, in columns 2 and 4, according to the main elements (parameters in column 1) of the Multicriteria Decision Analysis: alternatives (courses of action which have to be prioritised), criteria (aspects which have to be taken into account in order to evaluate alternatives) and criteria weights (relative importance of the criteria).

After having analysed these ideas, they were transformed into guidelines for the proposed Decision Support Methodology, columns 3 and 5. In most cases, the structured and ill-structured companies arrived at different conclusions, however, different opinions between the small and medium companies were only found in the cases indicated below.

Characteristics	**Ill-structured decision model**		**Structured decision model**	
MCDA parameters(1)	*Group opinion (2)*	*Methodology (3)*	*Group opinion (4)*	*Methodology (5)*
Analysis of alternatives	Alternatives are defined before criteria	Methodological sequence: first *definition and analysis of alternatives*, second *selection of criteria*	Occasionally (according to experience and type of decision) criteria are selected first. That way, the definition of alternatives becomes clearer.	Two possibilities: Sequence 1: first *definition and analysis of alternatives*, second *selection of criteria*. Sequence 2: first *establish criteria* and then *choose alternatives to fit criteria* (usual decisions).
Definition of criteria	Criteria are implicit and not standardized	Help in formulation of criteria (creativity techniques)	Criteria explicit and standardized	Help in selecting criteria: revision and addition/reduction
Weighting of criteria	Weights are not given	Criteria weighted by pair wise comparison	Weights based on experience. It is necessary to solve difficulties in weighting intangible criteria.	Weights directly assigned/ weighting calculated by pair wise comparison (intangible criteria).
Evaluating alternatives	It is necessary to solve difficulties in evaluating intangible criteria.	Evaluation of alternatives according to criteria by direct assignation or by pair wise comparison (for intangible criteria).	It is necessary to solve difficulties in evaluating intangible criteria. Scale could be assigned according to criteria.	Evaluation of alternatives according to criteria by direct assignation or by pair wise comparison (for intangible criteria). Establish *ad hoc* scales for known criteria.
Selecting group	***Small and***	***Small and medium***	***Small and***	***Small and medium***

of decision makers	***medium companies:*** Some members of the team are no specialists. More weight should be given to certain judgements. ***Medium companies:*** aim for consensus. Opinions of affected departments should be considered.	***companies:*** Help in selecting experts. Judgements have to be combined.	***medium companies:*** Expert decision makers. Greater weight given to certain judgements. ***Medium companies:*** aim for consensus. Opinions of affected departments should be considered.	***companies:*** judgements have to be combined.
Initial information	It should always be available	Information has to be compiled.	It is always available	
Desirable characteristics in decision process	Simplicity of results. Flexibility under changing situations. Traceability.	Result: ordering of alternatives. Sensitivity analysis according to possible scenarios. Results file: record of scenarios.	Simplicity of results. Flexibility under changing situations. Traceability.	Result: ordering of alternatives. Sensitivity analysis according to possible scenarios. Results file: record of scenarios.

Table VII.- Focus groups results

The general conclusion obtained from the Focus Groups sessions was that all companies, regardless of decision model and size, considered discrete multi-criteria decision support techniques adequate and applicable to their decision processes.
Conclusions in columns 3 and 5 allowed us to establish the necessary standards to adapt a decision support methodology to these companies.

On the other hand, at the end of each session, a questionnaire was handed to all the Focus Groups members. The answers of this questionnaire, based on a nominal scale, were subjected to a frequency distribution analysis with the aim of an in-depth study of criteria and experts selection. These questions also provided detailed information about the guidelines needed for the decision support methodology. The results are shown below:

How are criteria arrived at?

a. They are imposed from above 12%
b. They are known beforehand 60%
c. They are selected ad hoc 28%

How do you select your decision makers?

a. From members of your own staff 60%
b. It depends on the case 36%
c. Contract outside consultants 4%

What characteristics do you look for in experts?

a. They are appointed by management 4%
b. They are selected for their technical knowledge 49%
c. They are selected for their experience 43%
d. Others …… 4%

In what situations would you use a decision support method/technique?

a. It has been used by other companies in the sector 25%
b. It is used by a trusted consultant 16%
c. It is scientifically or academically recognized 33%
d. Others …….…… 26%

3. Proposed methodology

According to the summary of results presented in table VII (in columns 3 and 5), that could be considered the patterns of Decision Making in these companies, a general process for introducing DSMs in the companies is proposed. The aim of that being to answer the question stated at the beginning of this paper: *what steps can be taken to implant these techniques in companies*?

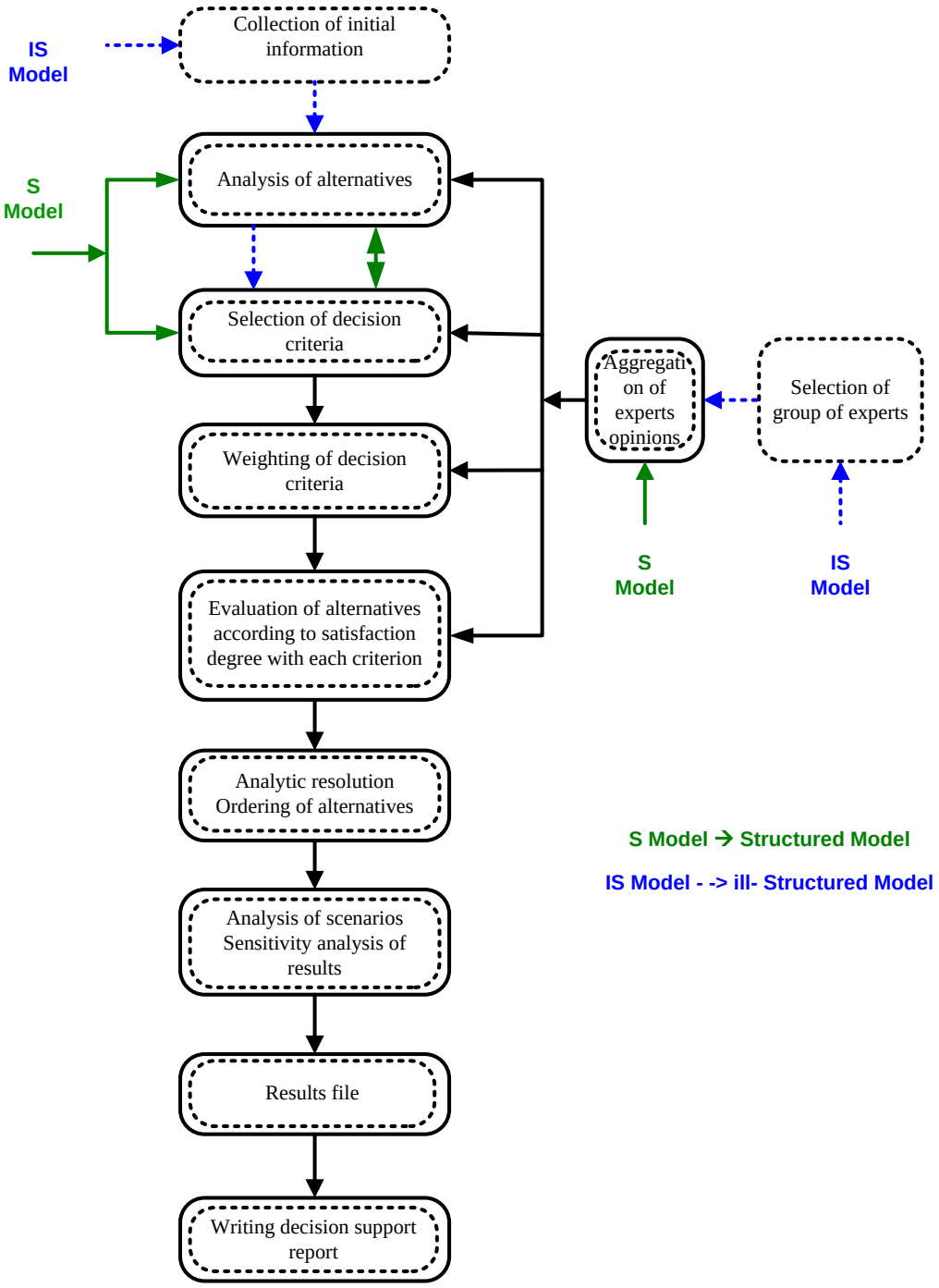

Figure 1.- Decision making methodology

As has already been mentioned in Section 4, the proposed methodology is based on the use of MCDA techniques. Specifically, the use of Analytic Hierarchy Process (Saaty, 1980) is proposed with multiple experts and with the assistance of the software Expert Choice 2000©.

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The Analytic Hierarchy Process (AHP) proposed by Saaty is a measurement theory of intangible criteria (Saaty, 2001). AHP is based on the fact that the inherent complexity of a multiple criteria decision making problem can be solved through the construction of hierarchic structures consisting of a goal, criteria and alternatives.
In each hierarchical level paired comparisons are made with judgments using numerical values taken from the AHP absolute fundamental scale of 1-9. These comparisons lead to dominance matrices from which ratio scales are derived in the form of principal eigenvectors. These matrices are positive and reciprocal (aij = 1/ aji). The synthesis of AHP combines multidimensional scales of measurement into a single one-dimensional scale of priorities. For mathematical details see, Saaty (1994, 1996).
The method has the additional advantage of being easy to explain to the experts that have to assess the different criteria or alternatives in a simple and systematic way. The support software, Expert Choice 2000©, also enables the calculations and presentation of the results to be done easily and quickly.
The main steps in this process are described in the following:

1. Selection of groups of experts
It is recommended that experts be department heads or middle management from different areas of the company. They should be selected for their knowledge and experience related to the decision analysed (García-Melón et al., 2008). To create the group, it is suggested that 4 or 6 experts be appointed to carry out the entire evaluation process.

2. Analysis of alternatives
The alternatives to be compared should be different, excluding and exhaustive (Barba-Romero and Pomerol, 1997). It is essential to ensure that each of the experts taking part in the process is familiar with the characteristics of the different alternatives in order to be able to make adequate judgements.

3. Selection of the criteria
Following the AHP model, the decision criteria are established by hierarchical decomposition. The discussion of which criteria or aspects determine the quality of the alternatives should be carried out by the group of experts.
In the case of companies with a structured decision model, it is suggested that selection criteria should be selected first and in the light of these the alternatives should be subsequently examined. For these companies, this is advisable for decisions made with standard procedures and pre-defined criteria. These standard decision processes take usually place in scenarios in which there is little change.

4. Weighting of decision criteria
When the hierarchy of the criteria has been established, the AHP method allows a scale of priorities to be established among criteria at the same hierarchical level by means of pair wise comparisons. Each expert gives his judgements according to the determined scale and has only to indicate which of the two criteria is more important and by how much, according to the

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Saaty´s scale. The weights are then calculated with the help of the Expert Choice software. This program calculates the weights both collectively, aggregating the judgements of all the experts, and individually.
For the companies which follow a structured decision model, it is suggested that criteria should be weighted by direct assignation in the case of standard decision processes.

5. Evaluation of alternatives according to satisfaction degree with each criterion
In this stage there are two evaluation possibilities: by means of pair wise comparison of alternatives according to the AHP method (in this case an individual scale for each criterion is not necessary) or by ad hoc scale for each criterion (direct assignation for quantitative criteria or the Saaty´s *ratings* method for known criteria, recommended in the case of companies with a structured decision model).
To simplify matters, it is advisable to define the criteria evaluation scale during the criteria defining process. In this way, the experts, when defining a criterion, can decide how they are going to evaluate the alternatives. If the scale was defined later, it could mean that when the alternatives are evaluated some criteria may have to be re-considered.
It is recommended that each of the experts gives an individual judgement. That way, the decision maker can have access to individual judgements as well as to the overall collective judgement.

6. Analytic resolution and ordering of alternatives
Once the alternatives have been evaluated by the experts, the results are processed in Expert Choice. The AHP method applies a weighted sum with all these data. The decision maker can thus establish the priority among the set of alternatives according to the value obtained by each alternative set by the group of experts.

7. Sensitivity analysis and analysis of scenarios
Finally, the decision maker must know the degree of reliability of the results in order to be able to make the final decision. Therefore, a sensitivity analysis is recommended once the global order of alternatives has been obtained. This consists of re-calculating the rank order of the alternatives, but with a slight modification (+/-10%) in the weight of an individual criterion, keeping the remaining weights fixed. This procedure should be carried out for each criterion. This will allow the decision maker to obtain several rankings for the alternatives, which will help him to analyse how results can be affected by small deviations in judgements.

4. Conclusions

In this paper a study of the decision making process in small and medium enterprises is presented.
In the first stage of the study, the results allow us to conclude that SMEs in the Valencia Region follow a multi-criteria multi-expert discrete type decision process, therefore the most suitable techniques to use in the decision making processes of SMEs in Valencia are those that belong to MCDA techniques, however these results demonstrate the lack of use of MCDA techniques by

these companies. It is also shown that two different company groups can be identified, according to the structure level of their decision-making processes: structured and ill-structured. The existence of these two groups has suggested us to develop another study, to obtain more detailed information about the decision making procedures of each of the two company categories.

The results of the second stage of the study, based on Focus Groups, have provided us with the necessary guidelines to design a methodology adapted to both types of companies. Finally, following the guidelines obtained, a Decision Support Methodology, e.g. the steps that should be taken to implant MCDA techniques in these companies, is proposed.

The proposed methodology has the advantage of bringing more information to the decision process. That also means to add transparency, which is always recommended when dealing with managerial decisions and should be the first step to improve them. That way, the decision makers can justify the result according to the rigorous and systematic procedure followed.

Beyond the scope of this work is the aim to expand this empirical study to the rest of Spain in order to confirm the hypothesis stated in a wider range.

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ANNEX 1. Questionnaire

	Never	Occasionally	Frequently	Always
Part I. Approach to the problem				
DMP1. Do you think you are given enough time to make decisions?				
DMP2. Do you specifically define the objective you wish to achieve with the decision process?				
DMP3. Do you consider how your decision will affect your company				

as an organisation?				
DMP4. Do you consider the effect your decision may have on stakeholders?				
DMP5. Do you consider the effect your decision may have on Senior Managers?				
Part II. Characteristics of the decision process				
DMP6. When making a decision only the economic criterion is considered?				
DMP7. Is the decision analysed from different points of view or criteria?				
DMP8. The decisions are always made by the person in charge individually?				
DMP9. The decisions are always made by the person in charge with the support of experts?				
DMP10. Are the decisions made within a group?				
DMP11. When a decision has to be made a group of well defined alternatives is stated?				
DMP12. During the decision making process, do you use any particular Decision Support Method?				