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Title: Uncertain averaging operators: a new way to study the psychosocial organizational phenomena

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Abstract

The aim of this paper is to use uncertain averaging operators (Uncertain Average, Uncertain Weighted Average, Uncertain Probabilistic Aggregation, and Uncertain Probabilistic Weighted Average) in order to explore psychosocial processes. Traditionally, research in the field of work and organizational psychology has departed from positivism, based on simple deterministic laws that are unable to account for the complexity of organizational phenomena. Our purpose is to show how the Experton methodology contributes to the study of managers' subjectivity on their perception of Corporate Social Responsibility policies development. This is a very innovating perspective in the research of work and organizational psychology. We developed an interview guideline to analyze the level of development of policies for the workplace integration of persons with disabilities. Thirty-five interviews were obtained. Respondents were top managers, Chief Executive Officers, human resources and Corporate Social Responsibility managers. Ten academic and professional experts, with a minimum of 10 years' experience in the field of Corporate Social Responsibility, were asked to establish confidence intervals based on four anchors. The results achieved by the managers and by the experts group reached a similar assessment of the degree of deployment of those policies related to collaborate with the local community and associations, and the setting-up of strategic alliances. These techniques provide an assessment that optimizes the result, as it indicates the exact level of implementation of the policies for the workplace integration of persons with disabilities.

Keywords
Uncertain averaging operators; Experton methodology; Psychosocial perspective;
Corporate Social Responsibility

1 Introduction

In organizations, when dealing with management decision making processes, we can assume that all the information we have is clear and can be assessed with aggregation operators based on exact numbers. Therefore, there exists a wide range of aggregation operators, as weighted average (Beliakov et al. 2007), the probabilistic aggregation, the OWA operator (Emrouznejad and Amin 2010; Kacprzyk and Zadrozny 2009; Yager 1988, 1993; Yager and Kacprzyk 1997), the Choquet integral (Tan and Chen 2010), distance measures (Merigó and Casanovas 2011), norms (Yager 2010), logarithm aggregations (Zhou and Chen 2010), heavy aggregations (Merigó and Casanova 2010) or induced aggregator operators (Merigo and Gil-Lafuente 2009).

The most used aggregation operators based on exact numbers are weighted average and the probabilistic aggregation. The first operator aggregates the information by giving different levels of importance to each argument in the problem. On the other hand, the probabilistic aggregation uses probabilities to aggregate the data. Merigó (2009) proposed a combination of operators, the probabilistic weighted average (PWA) that considers the degree of importance of each concept in the analysis including the objective and the subjective information of the environment.

However, organizations are complex realities where information is not always so clear. In order to deal with this reality, Moore (1966) proposed interval numbers as a useful technique for representing uncertainty since it considers the minimum and the maximum results that may occur. When using interval numbers to aggregate the avalaible information, we form uncertain aggregation operators. The main operators based on interval numbers are the uncertain weighted average (UWA) and the uncertain probabilistic aggregation (UPA). Several studies use this kind of aggregation operators (Jin and Liu 2010, interval grey linguistic variables; Liu 2009, 2010, decision making under risk, interval vague set and TOPSIS method; Merigó and Casanovas 2011, induced and uncertain heavy OWA operators; Wei 2009, uncertain linguistic hybrid geometric mean operator).

2 The Uncertain Aggregation Operators

Following one of the main authors on this topic (Merigó 2009, 2010, 2011), in this section we develop the different uncertain aggregation operator, the UPA, the UWA and the UPWA.

The UPA can be defined as follows:

Ω is the set of interval numbers and an UPA operator of dimension n is a mapping UPA: $\Omega^n \to \Omega$ that has an associated weighting vector P, with $\tilde{p}_i \in [0,1]$ and $\sum_{i=1}^{n} \tilde{p}_i = 1$, such that:

$$UPA\,(\tilde{a}_1, \dots, \tilde{a}_n) = \sum_{i=1}^{n} \tilde{p}_i\, \tilde{a}_i.$$

Where $\tilde{a}_i$ is an interval number representing the i-th argument variable.

Meanwhile, UWA can be defined as:

Ω is the set of interval numbers and a WA operator of dimension n is a mapping WA: $\Omega^n \rightarrow \Omega$ that has an associated weighting vector W, with $\widetilde{w_i} \in [0,1]$ and $\sum_{i=1}^{n} w_i = 1$, such that:

$$UWA\ (\tilde{a}_1, \dots, \tilde{a}_n) = \sum_{i=1}^{n} \widetilde{w}_i\ \tilde{a}_{i.}$$

Where $\tilde{a}_i$ is an interval number representing the i-th argument variable.

Merigó (2011) proposed a new decision making approach based on a new operator that is the result of the union between the uncertain weighted average (UWA) and the uncertain probabilistic aggregation (UPA) operators. This result considers not only the subjective part of the assessment of the individual, but also the objective of the subject being treated, and it is called the uncertain probabilistic weighted averaging (UPWA) or the interval probabilistic weighted average (IPWA). The UPWA can be defined as:

Ω is the set of interval numbers and an UPWA operator of dimension n is a mapping UPWA: $\Omega^n \rightarrow \Omega$ such that:

$$UPWA\ (\tilde{a}_1, \dots, \tilde{a}_n) = \sum_{j=1}^{n} \tilde{v}_i\ \tilde{a}_{i.}$$

Where $\tilde{a}_i$ is an interval number representing the i-th argument variable. Each $\tilde{a}_i$ has an associated weight (WA) $\tilde{v}_i$ with $\sum_{j=1}^{n} \tilde{v}_i = 1$ and $\tilde{v}_i \in [0,1]$, and a probabilistic weight $\tilde{p}_j$ with $\sum_{j=1}^{n} \tilde{p}_i = 1$ and $\tilde{p}_i \in [0,1]$. $\hat{v}_i = \tilde{\beta}\tilde{p}_i + (1 - \tilde{\beta})\tilde{v}_i$ with $\tilde{\beta} \in [0,1]$ and it is also an interval number and $\hat{v}_i$ is the weight that unifies probabilities and WA in the same formulation. This formulation can be proposed as an alternative way to fit confidence intervals around the statistics values and to improve the estimation procedure. In fact, there are two special facilities in the use of UPWA: i) the possibility to apply this formulation to any numerical distribution without special assumptions and ii) a major precission in the interval estimation so the standard error is reduced in front of the classical statistical approach.

These operators have shown their suitability as an analysis tool in different fields as the quality assessment (Barreiro et al. 2007; Levrat et al. 1997), monitoring of stocks management (Reig and González 2002), marketing (Zalila et al. 2005) and business ethics (Gámez-González et al. 2010), but it is very innovative at work and organizational psychology research. In this sense, this methodology has been used in a few studies to analyse the effect of the subjectivity on management systems as selection and human resources assessment processes (Canós et al. 2011; Capaldo and Zollo 2001; Chen and Chen 2005).

Traditionally, research in the field of work and organizational psychology has departed from positivism, based on simple deterministic laws that are unable to account for the complexity of organizational phenomena (Navarro, 2006). From this point of view, the purpose of this study is to use uncertain averaging operators (UA, UWA, UPA, and UPWA) to explore psychosocial processes, specifically the effect of

managers' subjectivity on their perception of Corporate Social Responsibility (CSR) policies developement.

3 The case study

3.1 Participants

The study target group consisted of the companies included in the Iberian Balance Sheet Analysis System (SABI). This database listed a total of 1,300,000 companies. The inclusion criteria and indicators used to select the sample established that companies should have a total of more than 50 employees, should be operational and should have existed at least for seven years.

Respondents were top managers, Chief Executive Officers (CEOs), human resources (HR) and CSR managers. In order to improve the valid response rate, the interviewers explained the objectives of the study and the interview content. A total of 35 fully answered interviews were obtained. The characteristics of the participating companies are presented in Table 1.

3.2 Instrument

We developed an interview guideline to analyze policies for the workplace integration of persons with disabilities, understood as those guidelines, rules and procedures established with the aim of supporting the efforts to achieve the planned goals (Fred 2003).

Specifically, the instrument included, on the one hand, six items on the Likert scale with four anchors: *1 = No.; 2 = Under planning; 3 = Under development; 4 = Implemented* (Table 2) related to the level of internal analysis of disability and integration, regularization plans, social action, communication plans, partnerships and corporate commitment. The items take into account the internal (item 1 and item 3) and external facets (item 2 and item 4) of CSR policies, and their integration (item 5 and item 6). On the other hand, it includes a section presenting data on the segmentation and identification of the companies and interviewees.

3.3 Procedure

The instrument developed was subjected to a pilot study involving ten academics and professionals from the field of CSR to ensure that the items were clearly understandable, regardless of the sector and type of business. Subsequently, the wording of the questions in the interviews was adjusted in line with the observations made by the participants in the pilot study, and was administered to top managers, CEOs, HR and CSR managers above mentioned.

Finally, a group of ten academic and professional experts, with a minimum of 10 years' experience in the field of CSR, were asked to establish confidence intervals based on four anchors (Zalila et al. 2005).

3.4 Data analysis

In order to establish the confidence intervals the experts used a 11-point scale (11 values between 0, "*null*" and 1, "*totally*") and considered confidence levels as [0,1]. They allocated the "*Implemented*" response the value of 1 and the value of 0 to "*Not implemented*". Likewise, the responses "*Under planning*" and "*Under development*",

there being an uncertain level, were ascribed the values of [0.1, 0.5] and [0.5, 0.9] respectively. In this way, the imprecision in the validation corresponds to a specific situation that is semantically acceptable (Kaufmann et al. 1994).

When the company makes an evaluation indicating "*Under development*" or "*Under planning*", this has a factor of subjectivity, and the Experton method, as an aggregation procedure, combines the evaluations of the different experts in a single one (Gámez-González et al. 2010).

In general terms, each of the interviews (B) was assessed by N experts ($E_1,...,E_N$), with z questions ($C_1,...,C_z$). Each expert Ei, i $\in$[1,...,N] offers his evaluation as a fuzzy set B_i={$\mu_{Bi}(C_1)$, $\mu_{Bi}(C_2)$,...., $\mu_{Bi}(C_Z)$}, with reference $\Re$={ $C_1, C_2,...,C_z$),where:

$\forall k \in \{1,2,...,z\}$

$$\mu_{Bi}(C_k) = \left[\mu_{Bi}^{min}(C_k), \mu_{Bi}^{max}(C_k)\right] \in [0,1].$$

The aggregation has considered $\mu_{Bi}(C_k)$, as a case of generic variables $\mu_B(C_k)$, placing the values between [0,1], where the following is obtained by probability:

$\forall k \in \{1,2,...,z\}$

$$P\left(\mu_{Bi}^{min}(C_k) = \mu\right) = \frac{\mu_{Bi}^{min}}{N}.$$
$$P(\mu_{Bi}^{max}(C_k) = \mu) = \frac{\mu_{Bi}^{max}}{N}.$$

And where minimum and maximum n_B are the frequencies of μ for the two, lower and upper limits.

Through the laws of probability the equations are transformed into a complementary cumulative distribution function, *Experton*, calculating both limits of each item (Luis 2011).

$$F(\mu_B^{min}(C_k) = \mu) = \sum_{\Psi-\mu}^{1} P\left(\mu_B^{min}(Ck) = \Psi\right).$$
$$F(\mu_B^{max}(C_k) = \mu) = \sum_{\Psi-\mu}^{1} P\left(\mu_B^{max}(Ck) = \Psi\right).$$

Experton facilitates the analysis of the subjectivity of managers, using a confidence interval "[a_1, a_2]", with $0 \le a_1 \le a_2 \le 1$. It can be seen that a_1 and a_2 refer to the lower and the upper limits of the interval or a real number when $a_1 = a_2$.
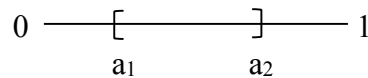
As an example, in our case study and using our semantic scale:

[0.0] = [*Not implemented*]
[0.1, 0.5] = [*Under planning*]
[0.5, 0.9] = [*Under development*]
[1.0] = [*Implemented*]

Based on that, if six experts give their opinions about one of the items, the results could be as follows:

Expert$_1$ = [0.2, 0.4] Expert$_2$ = [0.0, 0.3] Expert$_3$ = [0.5, 0.8].
Expert$_4$ = [0.2, 0.5] Expert$_5$ = [0.9, 1.0] Expert$_6$ = [0.4, 0.8].

Using Experton methodology the opinions are aggregated on the endecadarian scale, including the lower and the upper limits of the interval. Results are divided by the total number of answers. After that, the complementary aggregated law is applied (starting on $\alpha = 1$). Thus, we obtain a representation of the group opinion, called Experton (Table 3). The group opinion can be represented also graphically (Figure 1). In this exemple the graphical representation of the item shows a convex curve, which means that the experts consider that most policies aimed at the occupational insertion of persons with disabilities have been "*Implemented*". Nonetheless, it appears that there exists some disagreement among experts on their evaluation (separate curves).

To obtain UA, we calculate the average between the lower and upper limits of the intervals. The result thus obtained corresponds to the nearest semantic scale determined by the experts group.

Once we have the intervals for each item, in order to calculate the UA intervals for a set of them we proceed as follows:

Being different confidence intervals such as:

$A = [a_1, a_2] \subset R$, $B = [b_1, b_2] \subset R$, and $C = [c_1, c_2] \subset R$,

the addittion is $A(+)B(+)C = [a_1+b_1+c_1$, $a_2+b_2+c_2]$ and the mean is $= [A(+)B(+)C]/3$.

The mean provides an average value of all the experts' opinions. In some cases, knowledge or degree of influence of each expert can be different and this leads to having to use weighted averages. In this case, the general mean is used.

$$Mp\,(a,\lambda) = \left(\sum_{i=1}^{n} \lambda_i a_i^p \right)^{1/p}.$$

$$\text{with} \quad \lambda_i \in [0,1] \text{ and } \sum_{i=1}^{n} \lambda_i = 1.$$

Depending on the values of p and λ different averages can be obtained:

If p=1, weighted arithmetic average
If p=2, quadratic weighted average
If p=1 and λ =1/n, simple arithmetic average (SMA)
If λ =1/n, generalized simple average

In our study the SMA from the previously obtained UA was used as the basis for obtaining the UPA, UWA and the UPWA operators, because they allow analysing situations with subjective and objective information in the same formulation.

The different intervals for each item thus obtained are the basis to calculate UPA. An UPA operator of dimension n is a mapping UPA: $\Omega n \rightarrow \Omega$ (Ω be the set of interval number) that has an associated probabilistic vector P, with $\tilde{p}_i \in [0,1]$ and $\sum_{i=1}^{n} \tilde{p}_i = 1$, thus:

$$UPA(\tilde{a}_1, \tilde{a}_2, \dots, \tilde{a}_n) = \sum_{i=1}^{n} \tilde{p}_i\, \tilde{a}_i.$$

6

For the UPA weights, each expert gives his/her own opinions. These opinions are consensuated in order to form the collective weights to be used in the aggregation process. The UPA operator in our example uses de following vector P = (0.1, 0.3, 0.1, 0.25, 0.15, 0.1). It is important to note that the experts consensuated, on one hand, the higher coefficients for Item 3, related to adaptation of communication systems, and for Item 4, related to alliances with specialized associations. These items showed the higher levels of developement. On the other hand, they consensuated lower coefficients for Items 1, 3, 5 and 6, those with lower level of developement.

An UWA operator of dimension n is a mapping UPA: $\Omega^n \rightarrow \Omega$ (Ω be the set of interval number) that has an associated weighting vector W, with $\widetilde{w}_i \in [0, 1]$ and $\sum_{i=1}^n \widetilde{w}_i = 1$, thus:

$$UWA(\tilde{a}_1, \tilde{a}_2, \dots, \tilde{a}_n) = \sum_{i=1}^n \widetilde{w}_i\, \tilde{a}_i.$$

Furthermore, we determined for UWA the vector V = (0.15, 0.1, 0.15, 0.1, 0.25, 0.25). Note that we consensuated the higher coefficients to items 5 and 6, those considered as more strategic from the internal and external point of view. Items related to internal policies (item 1 and item 3) received intermediate coefficients and those related to external policies (item 2 and item 4) the lowest ones.

UPWA operator is an aggregation operator, which unifies the probability and the weighted average, joining the UPA and UWA, and combinating objective and subjective probabilities. The sum of the two operators must be equal to 1, and for this we use ß and (1-ß).

An UPWA operator of dimension n is a mapping UPWA: $\Omega^n \rightarrow \Omega$ (Ω be the set of interval number), it has an associated probabilistic vector P, with $\tilde{p}_i \in [0, 1]$ and $\sum_{i=1}^n \tilde{p}_i = 1$ and a weighting vector W, with $\widetilde{w}_i \in [0, 1]$ and $\sum_{i=1}^n \widetilde{w}_i = 1$, thus

$$UPWA(\tilde{a}_1, \tilde{a}_2, \dots, \tilde{a}_n) = ß \sum_{i=1}^n \tilde{p}_i\, \tilde{a}_i + (1 - ß) \sum_{i=1}^n \widetilde{w}_i\, \tilde{a}_i.$$

Following Merigó (2011), the UPWA operator uses UPA vector with a 40 % of importance and the UWA vector with a 60%.

4 Results

Among the top managers, CEOs, HR and CSR managers, 53.9% consider that their organizations have not implemented policies aimed at the integration of persons with disabilities in the workplace, while 40.1% claim they had policies under development or fully implemented and 6% are planning their implementation. In Table 4 the frequency distribution of each item is shown globally and segmented by sector and scale of operations.

In general terms, policies perceived as the most developed are those related to collaboration with the local community and associations (47.6 %) and the development of strategic alliances (43.9 %) (item 2 and item 4). Conversely, actions linked to the internal policies of the organization, i.e. the existence of strategic plans for regularization (Item 6), corporate policies (Item 5), communication plans (Item 3) and surveys on integration (Item 1), are those seen with a lower percentage of development. Respectively, 69%, 42.9%, 61.9% and 75% of top managers, CEOs, HR and CSR managers assure they have not implemented them.

The analysis of the results as segmented by scale of operations and sector shows that international companies and the service sector managers present above average percentages of implementation of external policies. At the same time, it should be noted that the service sector is below the average as regards the development of internal policies. Between 43.8 % and 87.5 % of service companies admit they have not developed these policies. Finally, national companies state in greater proportion that they have not developed strategic plans for regularization (75%), nor evaluated levels of integration by means of internal surveys (84.2 %). Both sectors concur in indicating that the strong point is "*collaboration with local community and associations for persons with disabilities to raise awareness in society and promote the incorporation and integration of persons with disabilities in the labor market*".

In order to analyse the effect of managers' subjectivity on perception of CSR policies, we performed an aggregation using the Experton methodology (Kaufmann and Gil-Aluja 1993) and uncertain averaging operators.

As regards the scale of operations (Table 5) the results show that firms operating internationally enjoy more highly developed employment policies for persons with disabilities than those restricted to the national sphere, regardless of the operator used. In this respect, the experts consider that national companies have a level of development of policies for occupational insertion between [0.50 , 0.64] by UA, [0.53 , 0.67] by UPA, [0.50 , 0.64] by UWA and [0.51 , 0.65] by UPWA, while they consider that this level is higher in the case of international companies, being between [0.57 , 0.70] by UA, [0.62 , 0.75] by UPA, [0.55 , 0.68] by UWA and [0.58 , 0.71] by UPWA. Nevertheless, when the responses on the 11-point scale are taken into consideration, the position of national and international companies, in relation to policies for occupational insertion, can be said to be "*Under development*".

Analyzing the items, "*collaboration with the local community and associations for persons with disabilities in order to raise awareness in society and promote the inclusion and integration of persons with disabilities in the labor market*" is valued by the experts as the most developed in both, national and internation companies. On the other hand, "*incorporation of questions on disability and integration in internal surveys*" is considered by the experts as the less developed policy in both groups of companies. This policy is considered to be "*Under planning*" in national companies, while in international companies is situaded between "*Under planning*" and "*Under development*".

Taking into account the sector, results show that construction and industry are the sectors that most favor the integration of persons with disabilities through their policies (Table 6). All operators indicate similar values ([0.56 , 0.61] by UA, [0.60 , 0.65] by UPA, [0.54 , 0.59] by UWA and [0.56 , 0.62] by UPWA) and they have a range between 5 and 6 points. Experts consider that policies in the construction/industry sector are "*Under development*".

Service sector companies have low levels of development, being the intervals [0.44 , 0.60] by UA, [0.51 , 0.65] by UPA, [0.42 , 0.57] by UWA and [0.45 , 0.60] by UPWA. In this case, the experts have a lower level of agreement. All the operators indicate that the policies in service sector companies are "*Under planning*" and "*Under development*", except for UPA, that indicates they are "*Under development*". With this operator the level of agreement between experts is higher.

As was the case with the results obtained in the scale of operations, experts believe that the most developed policy in both sectors is "*collaboration with the local community and associations for persons with disabilities in order to raise awareness in society and promote the inclusion and integration of persons with disabilities in the*

labor market". However, although the policy considered as less developed in construction/industry sectors is again "*incorporation of questions on disability and integration in internal surveys*", being the range of the interval between "*Under planning*" and "*Under development*", in the service sector "*Strategic plan to regularize disability in the business and work environmen*t" policy has levels "*Under planning*".

When the sector of activity is interrelated with the scale of operations, the international companies are seen to be those in both sectors that are more sympathetic to policies of occupational insertion (Table 7). International companies in both sectors obtain similar wide range intervals in all operators. Although the range of the intervals indicates low agreement among experts, all the operators are located under the label "*Under development*".

In the case of national companies in the industry/construction sectors, all operators vary between ratings "*Under planning*" and "*Under development*", being the range slightly higher than in the national companies of the services sector.

As regards specific policies, it exists a high variability between experts on their perception about the level of development of the policy "*incorporation of questions on disability and integration in internal surveys*" in the companies in the industry/construction sectors operating internationally. By contrast, this same policy in national organizations operating in the industry/construction sectors is valued by experts with a high level of consensus as "*Under planning*".

The strong point of companies in the service sector operating internationally is "*collaboration with the local community and associations for persons with disabilities in order to raise awareness in society and promote the inclusion and integration of persons with disabilities in the labor market*" and the "*development of partnerships with agencies specialized in integration*".

Finally, for companies operating nationally in the service sector there is a surprising lack of variability in the scores, these displaying an average of 0.41.

5 Contributions and conclusions

This study shows the Experton methodology suitability to explore psychosocial processes, specifically the effect of managers' subjectivity on perception of CSR policies. We decided to use different kinds of uncertain averaging operators (UA, UWA, UPA, and UPWA) given that they take into account the subjectivity of the interviewees' position by objectifying it (Gil-Lafuente and Luis-Bassa 2011). The results obtained by means of these techniques provide information about the dispersion in their assessments. Hence, this methodology provides an evaluation that optimizes the result, as it indicates the exact level of implementation of the policies for the workplace integration of persons with disabilities. This perspective is very innovative at work and organizational psychology research.

The results achieved by the CEOs, HR and CSR managers and by the experts group were the highest level of development of those policies related to collaboration with the local community and associations, and the creation of strategic alliances, while the actions linked to the development of internal policies were the least implemented. This same trend is also observed in the segmented analyses by sector and scale. In this regard, we note that the organizations that most favor the employment of people with disabilities were those that operate internationally (EUROSTAT 2001) and those in the service sector.

In this sense, it is important to point out how each of the groups reached a similar assessment of the degree of deployment of these policies in organizational contexts,

leading to a shared vision for the levels obtained by the semantic scale. Some authors (Dess and Picken 2000; Maani and Benton 1999) note the importance of having a shared vision among different organizational groups, since it facilitates organizational development. Specifically, the set of policies analyzed marks the strategic lines to be followed by organizations for effective integration of disabled persons. Hence, those organizations that present a greater deployment of their policies will be the most committed to the occupational insertion of persons with disabilities and show a willingness to go beyond mere compliance with the law, while at the same time organizational effectiveness is facilitated within the same company in terms of satisfaction (Aharon et al. 2011), engagement (Brammer et al. 2007), identification (Kim et al. 2010), and motivation (Skudiene and Auruskeviciene 2012).

Considering the data in detail, we observe that experts tend to value the policies for the workplace integration of persons with disabilities as more developed, in comparison with directors' ratings. The CEOs, HR and CSR managers show a low level of impact of motivational distortion, hence being more demanding when analyzing the degree of deployment of CSR policies.

Finally, the most importat contribution of this research is to present a new way to study psychosocial organizational phenomena, using an alternative way to fit confidence intervals around the statistics values and to improve the estimation procedure.

Given that this study was carried out in Spain its findings cannot be generalized. Future research should include other sectors and countries in order to provide further proof of the suitability of these methods using different sources and cultural contexts.

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Fig 1 Graph illustrating the opinion of the experts on the item example
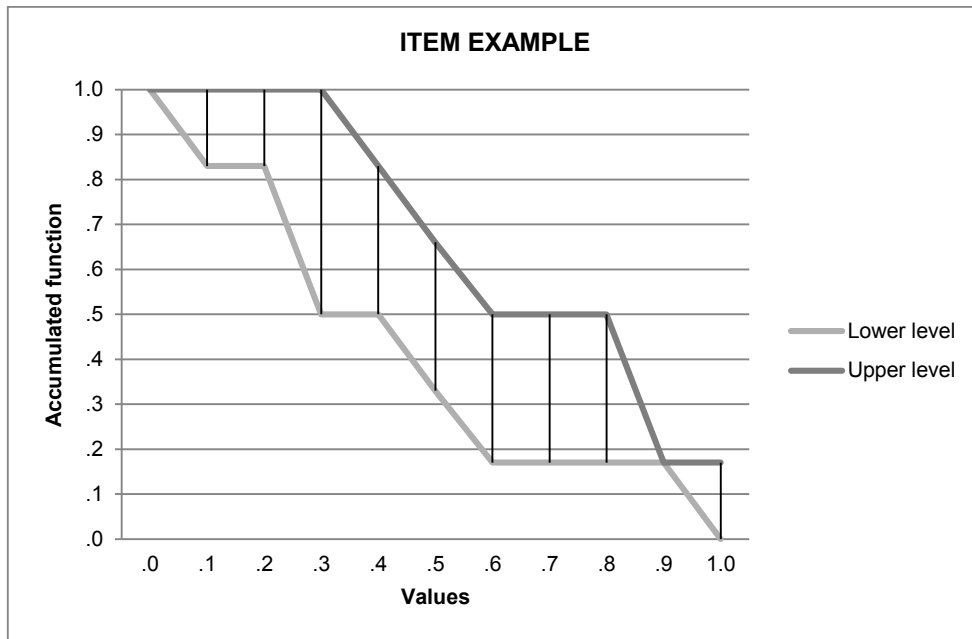
Table 1 Description of participating companies

SOCIO-DEMOGRAPHIC DATA ON THE PARTICIPATING COMPANIES		%
Gender distribution of company employees (average %)	Men	62.3
	Women	37.9
Scale of operations	International	50
	National	32.5
	Regional	5
	Local	12.5
Business sector	Manufacturing industry	56.4
	Construction	2.6
	Wholesale and retail trade, vehicle repairs	5.1
	Transport and storage	5.1
	Professional, scientific and technical activities,	10.3
	Administrative activities and auxiliary services	5.1
	Hotel and catering	10.3
	Other services	5.1
Companies that comply with the 2% quota of disabled workers[a]		79.8
Companies that comply with alternative measures	Donations and sponsorship	11.9
	Employment of staff through a job center for disabled persons	21.4
	No compliance	50
	NS/NC	7.1

[a]The Spanish Law on Social Integration of the Disabled (LISMI - Law 13/1982) stipulates the legal obligation of companies over 50 employees to cover a 2% staff quota with persons with disabilities or else comply with the law by means of alternative measures.

Table 2 Items from the interview guidelines concerning policies for the integration of persons with disabilities

ITEMS CORRESPONDING TO POLICIES		MEASURING SCALE
I1	Are questions about disability and integration included in the company's internal surveys?	
I2	Does the company collaborate with the local community and associations for persons with disabilities to raise awareness in society and promote the inclusion and integration of persons with disabilities in the labor market?	
I3	Is the communication plan tailored to employees' specific needs?	1=*No*
I4	Has the company developed partnerships with agencies specialized in integrating people with disabilities?	2=*Under planning* 3=*Under development* 4=*Implemented*
I5	Do corporate policies exist that define the company's commitment and objectives in the field of the integration in the workplace of persons with disabilities?	
I6	Does the company have a strategic plan addressed to its main stakeholders to regularize disability in the business and work environment	

Table 3
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Table 3 Example of applied experton methodology

0	1			0	1/6			0	6/6	6/6
0,1				0,1				0,1	5/6	6/6
0,2	2			0,2	2/6			0,2	5/6	6/6
0,3		1		0,3		1/6		0,3	3/6	6/6
0,4	1	1		0,4	1/6	1/6		0,4	3/6	5/6
0,5	1	1		0,5	1/6	1/6		0,5	2/6	4/6
0,6				0,6				0,6	1/6	3/6
0,7				0,7				0,7	1/6	3/6
0,8		2		0,8		2/6		0,8	1/6	3/6
0,9	1			0,9	1/6			0,9	1/6	1/6
1		1		1		1/6		1	0/6	1/6

Table 4
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Table 4 Distribution of frequencies of the items (%)

Item	Variable	Category	No	Under Planning	Under development	Implemented
I1	Scale	National	84.2	-	10.5	5.3
		International	73.7	5.3	5.3	15.8
	Sector	Industry/ construction	81	4.8	4.8	9.5
		Services	81.3	-	6.3	12.5
	Global		**75**	**5**	**7.5**	**12.5**
I2	Scale	National	50	-	10	40
		International	25	5	20	50
	Sector	Industry/ construction	39.1	4.3	21.7	34.8
		Services	37.5	-	-	62.5
	Global		**35.7**	**2.4**	**14.3**	**47.6**
I3	Scale	National	60	5	20	15
		International	70	5	15	10
	Sector	Industry/ construction	60.9	8.7	13	17.4
		Services	75	-	18.8	6.3
	Global		**61.9**	**4.8**	**19**	**14.3**
I4	Scale	National	52.6	5.3	10.5	31.6
		International	30	10	5	55
	Sector	Industry/ construction	39.1	13	4.3	43.5
		Services	46.7	-	6.7	46.7
	Global		**39**	**7.3**	**9.8**	**43.9**
I5	Scale	National	40	20	15	25
		International	50	10	10	30
	Sector	Industry/ construction	47.8	17.4	8.7	26.1
		Services	43.8	12.5	12.5	31.3
	Global		**42.9**	**14.3**	**14.3**	**28.6**
I6	Scale	National	75	5	10	10
		International	70	-	10	20
	Sector	Industry/ construction	65.2	-	13	21.7
		Services	87.5	-	6.3	6.3
	Global		**69**	**2.4**	**11.9**	**16.7**
Average percentage			**53.9**	**6**	**12.8**	**27.3**

1

Table 5 Experton mathematical expectations and their averages according to scale of operations

ITEM			National	International
I1	Are questions about disability and integration included in the company's internal surveys?		**[0,37 , 0,50]**	**[0,44 , 0,57]**
I2	Does the company collaborate with the local community and associations to raise awareness in society and promote integration?		**[0,60 , 0,74]**	**[0,72 , 0,86]**
I3	Is the communication plan tailored to employees' specific needs?		[0,50 , 0,65]	[0,46, 0,60]
I4	Have partnerships with agencies specialized in integration been developed?		[0,53 , 0,66]	[0,70 , 0,84]
I5	Have the company's commitment and objectives been defined in the field of integration?		[0,57 , 0,72]	[0,58 , 0,71]
I6	Has a strategic plan been developed to regularize disability in the business and work environment?		[0,44 , 0,57]	[0,50 , 0,63]
EXPERTON AVERAGE		UA	**[0,50 , 0,64]**	**[0,57 , 0,70]**
		UPA	**[0,53 , 0,67]**	**[0,62 , 0,75]**
		UWA	**[0,50 , 0,64]**	**[0,55 , 0,68]**
		UPWA	**[0,51 , 0,65]**	**[0,58 , 0,71]**

Table 6
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Table 6 Experton mathematical expectations and their averages according to sector.

ITEMS			Industry/Construction	Services
I1	Are questions about disability and integration included in the company's internal surveys?		**[0,40 , 0,53]**	[0,33 , 0,56]
I2	Does the company collaborate with the local community and associations to raise awareness in society and promote integration?		**[0,73 , 0,77]**	**[0,71 , 0,84]**
I3	Is the communication plan tailored to employees' specific needs?		[0,50 , 0,54]	[0,34, 0,48]
I4	Have partnerships with agencies specialized in integration been developed?		[0,63 , 0,67]	[0,50 , 0,63]
I5	Have the company's commitment and objectives been defined in the field of integration?		[0,56 , 0,60]	[0,49 , 0,63]
I6	Has a strategic plan been developed to regularize disability in the business and work environment?		[0,51 , 0,55]	**[0,29 , 0,43]**
EXPERTON AVERAGE		UA	**[0,56 , 0,61]**	**[0,44 , 0,60]**
		UPA	**[0,60 , 0,65]**	**[0,51 , 0,65]**
		UWA	**[0,54 , 0,59]**	**[0,42 , 0,57]**
		UPWA	**[0,56 , 0,62]**	**[0,45 , 0,60]**

Table 7 Experton mathematical expectations and their averages to sector and scale

ITEMS		National Industry/ Construction	National Services	International Industry/ Construction	International Services
I1	Are questions about disability and integration included in the company's internal surveys?	[0,30 , 0,44]	[0,41 , 0,56]	**[0,13 , 0,58]**	[0,43 , 0,58]
I2	Does the company collaborate with the local community and associations to raise awareness in society and promote integration?	[0,46 , 0,63]	[0,68 , 0,63]	[0,70 , 0,85]	**[0,78 , 0,93]**
I3	Is the communication plan tailored to employees' specific needs?	[0,51 , 0,69]	[0,48, 0,63]	[0,49 , 0,64]	[0,33 , 0,48]
I4	Have partnerships with agencies specialized in integration been developed?	[0,51 , 0,69]	[0,61 , 0,76]	[0,67 , 0,83]	**[0,78 , 0,93]**
I5	Have the company's commitment and objectives been defined in the field of integration?	[0,56 , 0,70]	[0,58 , 0,78]	[0,55 , 0,70]	[0,60 , 0,78]
I6	Has a strategic plan been developed to regularize disability in the business and work environment?	[0,46 , 0,63]	**[0,41 , 0,41]**	[0,53 , 0,68]	[0,33 , 0,58]
EXPERTON AVERAGE	UA	**[0,47 , 0,63]**	**[0,53 , 0,66]**	**[0,51 , 0,71]**	**[0,54 , 0,70]**
	UPA	**[0,48 , 0,64]**	**[0,57 , 0,72]**	**[0,58 , 0,76]**	**[0,63 , 0,78]**
	UWA	**[0,47 , 0,63]**	**[0,51 , 0,64]**	**[0,50 , 0,70]**	**[0,50 , 0,66]**
	UPWA	**[0,47 , 0,64]**	**[0,54 , 0,67]**	**[0,53 , 0,72]**	**[0,55 , 0,71]**