Advising on the CSR strategy using DEMATEL: A case study of a MNC in the IT consulting industry

Fadwa Chaker, Mohammed Abdou Janati Idrissi, Abdellah El Manouar

Abstract— Decision support models have proved useful in helping managers build and implement business strategies. In this paper, we propose to use a revised version of Decision Making Trial and Evaluation Laboratory (DEMATEL) technique to help advise on the Corporate Social Responsibility (CSR) strategy of an organization. More particularly, we explore the case of a Multi-National Corporation (MNC) operating in the IT consulting industry where we apply the proposed method to appraise the cause-effect relations of 24 indicators in 4 areas of management. In addition, we propose a more intuitive and informative graphical representation of DEMATEL outcomes to categorize sustainability performance indicators by importance and by strength of impact produced or received. Results show that boosting professional gender equality and work ethics is a top priority. We also find that financial performance is influenced subsequently to an HR-centered CSR policy. Based on our findings, we suggest guidelines for the CSR strategy to be adopted.

Index Terms— Decision making, sustainability decision making, DEMATEL, MNC CSR strategy.

1 INTRODUCTION

THE growing concern about environmental and social issues has fuelled the debate around the role that sustainable enterprise can play in the global economy. As opposed to the shareholders theory [1] which restricted the goal of a business to maximizing profit for investors, a different and today more widely accepted view puts greater emphasis on businesses' contribution to sustainable development. Defined by the World Commission on Environment and Development in its Brundtland Report as the "economic development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" [2], sustainable development (or sustainability) continues to attract the interest of researchers and practitioners alike. More precisely, the concept of Corporate Social Responsibility (CSR), or the societal aspect of sustainability, has gone under increased scrutiny over the past decade. Some studies examined the controversial, but overall positive, interrelation between CSR and corporate financial performance [3-8] while others showed the importance of CSR in coping with the global economic crisis [9] or dealing with corporate governance [10]. CSR raised marketing researchers' and behavioral scientists' interest as well. Research shows how CSR initiatives can significantly impact upon consumer fidelity and purchasing behavior. For example, some studies investigated the importance of the thoughtful selection of CSR programs and the instance in which such programs could create positive impact on consumer perception and loyalty [11, 12].

In the globalized economy, companies are under increased pressure to define and integrate CSR initiatives into their business operations. Multi-National Corporations (MNCs) are more particularly concerned with executing and leveraging their CSR policies in subsidiaries across borders [13, 14]. Institutional considerations in host markets remain in fact central to the debate on MNCs' CSR choice and implementation [15-17]. The literature on MNC's CSR remains limited compared with the importance and relevance of CSR strategies in a globalized economy, with that respect, even less research has been conducted on MNCs operating in the consulting industry.

As CSR initiatives got more incorporated into business strategy, the need for more structured decision making frameworks gained momentum. Such frameworks helped, among other aspects, to solve selection problems, to address prioritization questions, or to build sustainability performance management systems. With that respect, several studies used or combined Multi-Criteria Decision Making (MCDM) techniques, Mathematical Programming, or Artificial Intelligence methods to support sustainability management decision making [18-23] or to select appropriate CSR indicators and programs [24-27]. Some studies presented methods for the design and implementation of corporate sustainability performance measurement systems as in [28-30] while others explored the various approaches of designing a sustainability Balanced Scorecard [31, 32].

In this paper, we use the Decision Making Trial and Evaluation Laboratory (DEMATEL) method to determine the cause-effect relationships among the variables of a system. We present the results in a new layout which allows to further assess the importance of impact produced and received by

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factors, and which helps, consequently, to draw the guiding lines of business strategy.

We explore the case of a MNC operating in the consulting industry. We apply revised DEMATEL [33] and use the proposed layout to appraise the corporate indicators most likely to influence the CSR strategy of the firm.

This paper is organized as follows: in **Section 2**, the DEMATEL method and its revised version [33] are briefly introduced. **Section 3** presents the proposed analysis layout and the rationale behind it. In **Section 4**, an empirical case study is presented along with the results obtained. A conclusion and some research perspectives are presented in **Section 5**.

2 DEMATEL

DEMATEL method is a MCDM technique initiated in the mid-seventies by the Battelle Memorial Institute of Geneva as a technique to structure complex cause and effect relationships among the elements of a system. This method has been widely used and applied in various fields over the past years [20, 21, 25, 26, 31, 34-37]. In its original version, the DEMATEL method can be summarized as follows [37]:

First, the pair wise impact matrices of n indicators are collected from a group of p experts. Let $X(k)=[x_{ij}(k)]_{nxn}$ denote the $n \times n$ answer matrix of expert k. The $n \times n$ average matrix A $(A=[a_{ij}]_{nxn})$ is then calculated by averaging out the experts' scores as in Eq1:

$$a_{ij} = \frac{\sum_{k=1}^{p} xij(k)}{p} \quad (1)$$

Second, the normalized initial direct matrix D is obtained by multiplying the elements of average matrix A by the number λ as explained in Eq. (2) and (3). The resulting matrix is the normalized initial direct matrix D.

$$D=\lambda * A \quad (2)$$

$$\lambda = Min\left[\frac{1}{Max\ 1\le i\le n \sum_{j=1}^{n}|aij|}, \frac{1}{Max\ 1\le j\le n \sum_{i=1}^{n}|aij|} \right] \quad (3)$$

Third, the total direct/indirect influence matrix is obtained by raising matrix D to an infinite power, which guarantees the continuous decrease of indirect effects along the powers of D and the convergence of the total direct/indirect matrix $T=[t_{ij}]_{nxn}$ to the inverse matrix $T=D(I-D)^{-1}$ as $\lim_{m\to\infty} D^m = [0]_{nxn}$ (Eq. 4).

$$T=D+D^2+D^3+...+D^m \quad (4)$$
$$=D(I+D+ D^2+...+D^{m-1})(I-D)(I-D)^{-1}$$
$$=D(I-D)^{-1}$$ where I denotes the identity matrix.

However, this method has been contested in the study conducted by Lee, Tzeng, et al. [33] who argued that the normalized initial direct-indirect matrix D does not necessarily converge to the null matrix, meaning that $lim_{m\to\infty} D^m = [0]_{nxn}$ might or might not be true. In fact, the study has proven that the convergence is only possible under the sufficient condition that the column sum of each column of the initial direct-indirect matrix D is less than one. To correct for this condition, a modification is made to normalizing factor λ such that (Eq.5):

$$\lambda' = \frac{1}{Max\left(Max\ 1\le i\le n \sum_{j=1}^{n}|aij|,\ \varepsilon + Max\ 1\le j\le n \sum_{i=1}^{n}|aij| \right)} \quad (5)$$

In this research, we use normalizing factor λ' from Eq.5 where ε is a very small positive number. With this modification, we correct for the original DEMATEL while making sure that the total influence matrix T converges to the inverse matrix in Eq.4. In addition, vectors R and C are defined such that:

$$R = [r_i]_{n\times 1} = [\sum_{j=1}^{n} t_{ij}]_{n\times 1}$$
$$C = [c_j]_{1\times n} = [\sum_{i=1}^{n} t_{ij}]_{1\times n} \quad (6)$$

The sum r_i of the i^{th} row of matrix T denotes the total direct and indirect influence that indicator i exerts on all other indicators, while the sum of the j^{th} column of matrix T, c_i, shows the direct and indirect influence that indicator j has received from all other indicators of the system. In addition, when $i=j$, (r_i+c_i) indicates the central role that factor i plays in the system while (r_i-c_i) reveals whether factor i is a net dispatcher, when (r_i-c_i) is positive, or a net receiver, when (r_i-c_i) is negative.

Finally, a graphical representation of the causal relationships is made through the Impact Relation Maps (IRMs) which translate values of the total influence matrix T into directed graphs or di-graphs. In order to reduce the complexity of the resulting IRM, a threshold value α is set for matrix T, keeping only values greater than α, those deemed most important for the analysis.

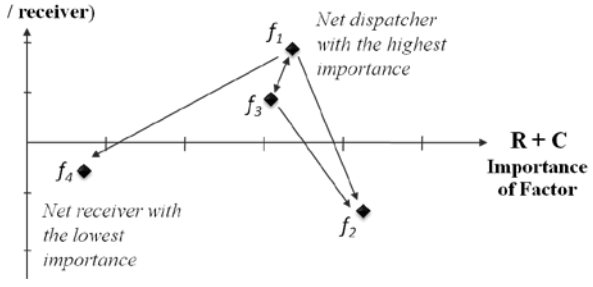

Fig. 1. Illustration of DEMATEL Impact Relation Map (IRM)

3 A Proposed Layout to Analyze DEMATEL Outcomes

While the standard DEMATEL's IRM graphical representation is useful in plotting factors in terms of importance and function (dispatching vs. receiving), it does

not readily inform of the factors which represent the highest intensity of impact, and which deserve, consequently, the closest attention from managers and decision makers. For instance, in **Fig. 1**, while the standard IRM shows that factor f_1 is a net dispatcher with the greatest *R-C* value, it does not necessarily imply that this factor produces the greatest intensity of impact on the system as a whole. In fact, it could be that factor f_3 is the one which produces the highest impact on the system even though it displays a lower *R-C* value. Similarly, net receivers f_2 and f_4 could vary in terms of the intensity of impact received regardless of their *R-C* values.

Therefore, a framework exhibiting factors with respect to not only their importance but also the intensity of impact they either produce or receive could be highly informative. In this section, we propose such an outline along with the corresponding interpretation method.

In this layout, we propose to use a three-dimensional representation of the factors on the plan (*R+C* , *R* , *C*) **(Fig. 2)**. Net dispatchers are represented on the (*R+C* , *R*) plan while net receivers are represented on the (*R+C* , *C*) plan. In addition, factors are subdivided into three categories as follows:

• **First Impact Indicators (FII):** are the factors which rank in the top 10% of overall importance in the system –that is the top 10% *R+C* values– and in the top 10% of the total impact produced or received by factors.

• **Second Impact Indicators (SII):** are the factors which rank in the range [60% - 90%] of the overall importance in the system –that is the factors whose *R+C* values fall in the range [60% - 90%]– or the factors with top 10% importance but which are not FII.

• **Third Impact Indicators (TII):** are the factors which rank in the least 60% of the overall importance in the system.

With this layout, it is possible to reposition the system's factors based on their importance and the amount of consideration they should get from the decision maker. Indeed, FIIs are the most sensitive factors of the system, they are responsible for the greatest overall amount of impact produced or received. They deserve, consequently, the closest attention from the decision maker. In second place come the SIIs, these are factors which directly impact upon the receiving FIIs or which are themselves moderately impacted by the system's indicators. Finally, TIIs represent the set of indicators with the lowest impact produced or received. Thus, this proposed layout presents a straightforward basis for setting management priorities and making recommendations on the strategy formulation.

The proposed layout brings two main advantages. Firstly, it helps to categorize corporate indicators in a straightforward framework. Each category suggests the appropriate level of importance and priority that indicators within should get from managers and decision makers. Secondly, this layout helps to put indicators in perspective by displaying them in a more intuitive and more informative graphical representation. While the standard *(R+C, R-C)* representation used in DEMATEL's Impact Relation Maps (IRMs) is useful in plotting indicators by importance and role (dispatching vs. receiving), it does not inform of the indicators responsible for the greatest amount of influence exerted on the system. Our proposed framework helps to correct for this limitation by suggesting to use the three-dimensional plan *(R+C, R, C)*.

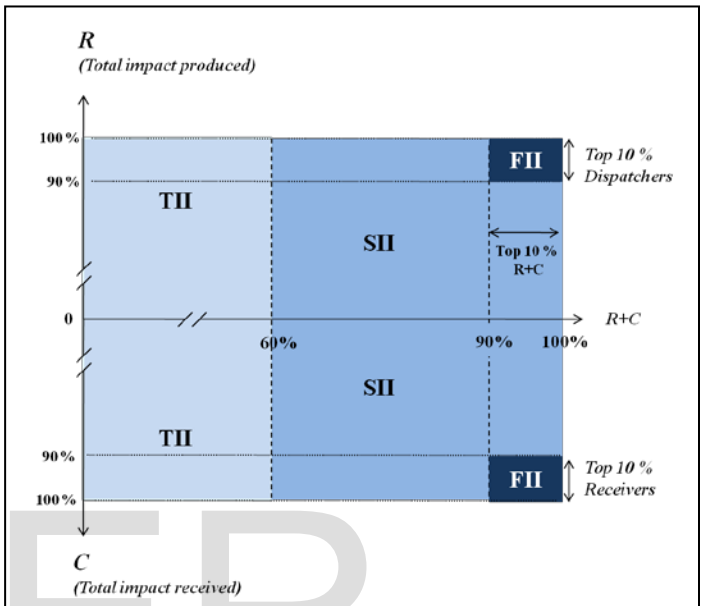

Fig. 2. The proposed DEMATEL layout

4 Empirical Case Study on a Multi-National Corporation in the IT Consulting Industry

The case company is a multinational Information Technology consulting group with 48 years of existence and 1500 consultants and experts in 11 countries across the globe. The case company is a subsidiary of a MNC in the telecom industry. As part of its sustainability global strategy, the parent company is empowering its subsidiaries worldwide to reinforce its societal an ethical standards through well-thought CSR strategies. In this context, this study has been conducted in close collaboration with the case company's CSR global Director with the aim to advise on the appropriate CSR strategy for the Group employing scientifically proven decision making methods.

For this purpose, revised DEMATEL technique is used to determine the cause-effect relationships between the CSR indicators of the firm. Then, the layout proposed in **Section 3** is used to plot the various indicators and help draw some useful conclusions.

4.1 Defining the Domains of Study and Corresponding Indicators

For this study, four domains related to the firm's CSR activity have been identified by a team of internal managers based on their

experience and deep understanding of the business. These domains represent the main areas that are scrutinized by the parent company in its CSR policy. They are: 1. Human resources and internal policy (HR) , 2. Production (P), 3. Ethics (E), 4. Community service (CS). For every domain, a set of indicators has been defined by the same team of experts based on two main inputs: firstly, the annual CSR Report of the parent company from which the team picked only CSR indicators deemed relevant to the case company's industry, and secondly, additional indicators which were developed by the experts to respond to the specific needs and context of the case company. **Table 1** exhibits the chosen domains and their respective indicators. We note that two indicators, *Firm Reputation* and *Win Ratio* are present in the four domains alike. These overlapping indicators have been chosen based on their importance for the company in all four domains.

TABLE 1
DOMAINS OF STUDY AND CORRESPONDING INDICATORS

Indicators	Definition
Domain A. Human Resources and Internal Policy (HR)	
A_1. Integration of the disabled	Recruitment and integration of disabled employees
A_2. Diversity index	Accounts for recruitment and integration policies without regard for gender, ethnicity, race, religion...etc.
A_3. Percent of female management positions	Percent of management positions held by women
A_4. Gender professional equality index	Accounts for various forms of gender professional equality (recruitment, promotion, salary, training)
A_5. Ratio of female employees	Percent of female employees in the company
A_6. Female training ratio	Percent of females in the total trained employees
A_7. Firm reputation	Reputation and image of the company as seen by the various stakeholders
A_8. Win ratio	Number of deals won reported to the total number of deals addressed
Domain B. Production (P)	
B_1. Percent of staff trained	Number of trained employees reported to the total number of employees
B_2. Motivation	Motivation of employees
B_3. Productivity	Productivity of employees in terms of effectiveness and efficiency
B_4. Number of service quality incidents	Service quality incidents related to project delivery (deadlines, quality, customer relationship, deliverables...etc)
B_5. Number of work incidents	Number of incidents related to employees' work and safety (illness, sickness caused by working conditions...etc)
B_6. Training effectiveness	Effectiveness of training as assessed by employees via surveys
B_7. Win Ratio	Number of deals won reported to the total number of deals addressed
B_8. Number of Enterprise Business Awards	Number of awards for employees with the best projects
B_9. Number of Enterprise Individual Awards	Number of awards for employees with the most outstanding personal achievements
B_{10}. Staff involved in social activities	Percent of employees taking part to internal social activities and gatherings
B_{11}. Competition	Impact of main competitors
B_{12}. Firm reputation	Reputation and image of the company as seen by the various stakeholders
Domain C. Ethics (E)	
C_1. Number of ethics training sessions	Number of training sessions on ethics per month
C_2. Total number of participants in ethics training sessions	Number of participants in ethics training sessions per month
C_3. Participants to intranet ethics training module	Number of employees subscribed to and actively following the ethics training module on the company's intranet
C_4. Number of ethical incidents	Number of incidents related to employees' or the company's ethical conduct
C_5. Firm Reputation	Reputation and image of the company as seen by the various stakeholders
C_6. Win Ratio	Number of deals won reported to the total number of deals addressed
Domain D. Community Service (CS)	
D_1. Number of partnerships with schools	Number of partnership agreements signed with engineering schools and universities
D_2. Number of partnerships with professional institutions	Number of partnership agreements signed with professional institutions
D_3. Number of community service events	Number of philanthropic events held and/or sponsored by the company
D_4. Population impacted by community services	Size of population impacted by community service events
D_5. Firm Reputation	Reputation and image of the company as seen by the various stakeholders
D_6. Win Ratio	Number of deals won reported to the total number of deals addressed

4.2 Data Collection

A group of ten experts were invited to provide their respective evaluations of the pair wise influence of factors on one another with respect to the four topical domains (HR, P, E, CS). Four of the ten experts are senior executives with more than ten years of experience in the IT consulting and/or telecom sector, four are middle managers with a minimum of five years of experience in the IT consulting industry, and two of the respondents are IT expert consultants. The group was composed of four women and six men. Respondents were given a form comprised of four matrices with the corresponding indicators and explanations. They referred to the scale shown in **Table 2** to fill in the matrices, which took between 40 to 60 minutes to complete. Influence network relation maps are obtained from the four total relation matrices. Threshold values for the respective four domains were set by a top decision maker in the firm.

TABLE 2
COMPARISON SCALE OF THE DEMATEL TECHNIQUE

Numerical Value	Meaning
0	No influence
1	Low influence
2	Medium influence
3	High influence
4	Very high influence

4.3 Results

In this sub-section, revised DEMATEL technique introduced in **Section 2** is applied to obtain the total relation matrices for each of the four domains **(Tables 3 - 6)**. In our case, the small positive number ε was set to $\varepsilon = 10^{-2}$. Next, IRMs are obtained using vectors R and C from **Section 2**, **Eq.(6)**. For each domain, our proposed graphical layout is presented and contrasted to the standards IRMs' findings **(Fig. 3-10)**.

4.3.1 Human Resources and Internal Policy (HR)

In the *Human Resources and Internal Policy (HR)* domain, it is found that *Gender professional equality index (A_4)*, is the factor with the greatest vector sum *R+C* with a value of *4.379*. In addition to being a net dispatcher –since the difference *R-C* between the total impact produced and the total impact received is positive with the value *0.729*, this factor produces the highest amount of impact on the *HR* domain *($R=R_{max}=2.554$)*. Therefore, factor A_4 is the most central in the *HR* area.

Other dispatching factors in this domain are A_5, A_3, A_2, and A_1 which correspond respectively to the *Ratio of Female Employees*, *Percent of Female Management Positions*, *Diversity Index*, and *Integration of the disabled* with respective *R-C* values of *0.457*, *0.149*, *0.070* and *0.375*. The *HR* IRM in **Fig. 3** shows that the main factors influenced by the dispatchers are A_7, A_8, and A_6 which correspond respectively to *Firm Reputation*, *Win Ratio* and *Female Training Ratio* ordered by increasing values of *R-C*.

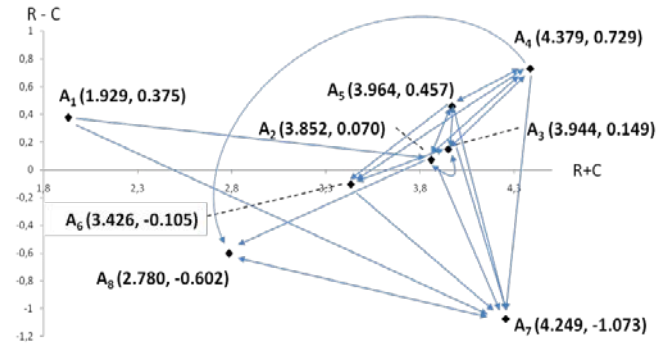

Fig. 3. Impact Relation Map for the HR domain

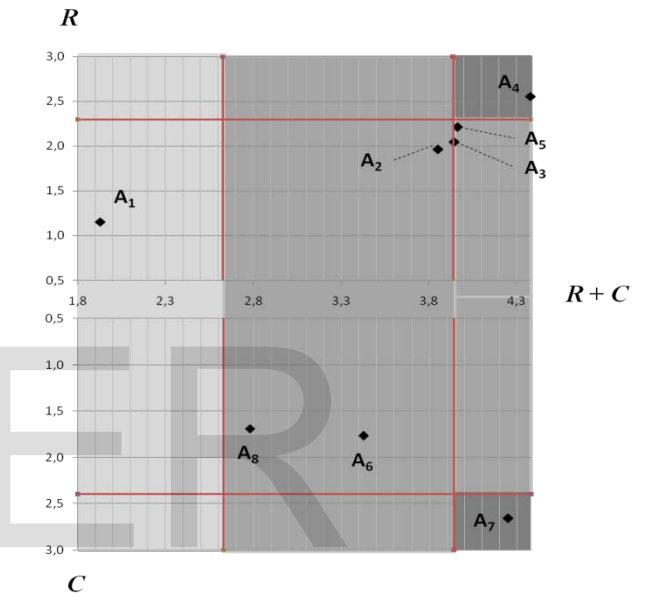

Fig. 4. Proposed layout for the HR domain

In this domain, our graphical layout **(Fig. 4)** pinpoints two factors as high-priority indicators, or FIIs; *Gender professional equality index (A_4)* and *Firm Reputation (A_7)*. The first one *(A_4)* is responsible for the greatest amount of influence exerted on the system, the second is the most significantly impacted factor in this domain. In addition, while the standard IRM **(Fig. 3)** shows a visible gap in the *R-C* values of factors A_6 and A_8, our layout displays both factors at nearly equal priority levels thanks to their close-by values of total impact received.

4.3.2 Production

In the *Production (P)* domain, results show that *Motivation (B_2)* is the most important factor with the greatest *R+C* value, followed immediately in importance by *Productivity (B_3)* and the *Win Ratio (B_7)*. These three factors display *R+C* values of *5.904*, *5.635*, and *5.515* respectively **(Table 4)**. Moreover, they are impacted by the rest of indicators as shown through their negative *R-C* values of *-0.117*, *-0.729*, and *-0.409* correspondingly **(Table 4)**. The net influencers in this domain are B_6, B_1, B_4 and B_5 ordered by strength of impact, or values of vector *R*. They represent respectively *Training effectiveness*, *Percent of staff trained*,

Number of service quality incidents, and Number of work incidents. The remaining indicators display various degrees of importance and are net receivers of impact.

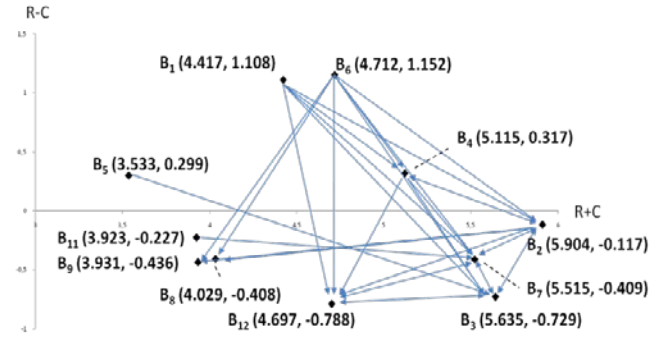

Fig. 5. Impact Relation Map for the Production domain

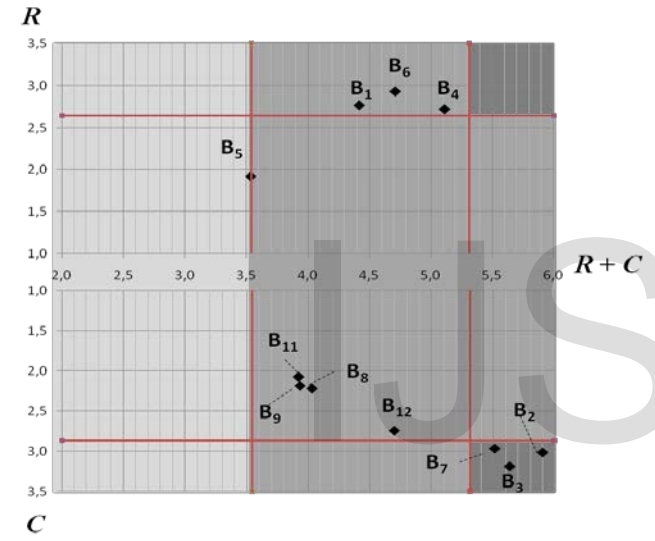

Fig. 6. Proposed layout for the Production domain

In this domain, it is found that our proposed layout **(Fig. 6)** helps to better appraise the degrees of impact produced and received via a more intuitive graphical representation. In fact, while the IRM **(Fig. 5)** displays *Firm Reputation* (B_{12}) as the factor with the lowest *R-C* value, the corresponding total influence matrix T_P indicates that it is not the factor with the greatest amount of impact received, and neither is *Motivation* (B_2) which is here the factor with the greatest *R+C* value. In fact, *Productivity* (B_3) retains the greatest amount of impact in the *Production* domain. We also note that factor B_{10} is not represented in the IRM of this domain **(Fig. 5)**.This is explained by the fact that the total effects received and produced by this factor are below threshold value α_B.

4.3.3 Ethics

Ethics wise, it is found that factor C_4, which represents the *Number of ethical incidents*, is a net dispatcher with the highest importance *(R+C=7.382)* and the greatest degree of impact produced ($R=R_{max}=4.001$). The net receivers in this domain are C_5 and C_6 which correspond to *Firm Reputation* and *Win Ratio* with respective *R-C* values of *-1.265* and *-1.369* **(Table 5)**. Similarly to B_{10} in the *Production* domain, factor C_3 is not represented in the IRM **(Fig. 7)** since all the effects it produces and receives are below threshold value α_C.

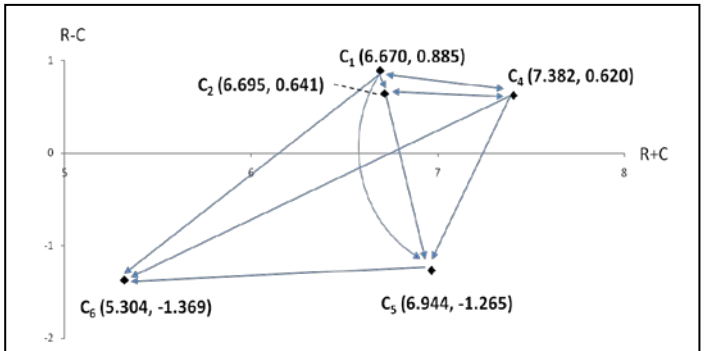

Fig. 7. Impact Relation Map for the Ethics domain

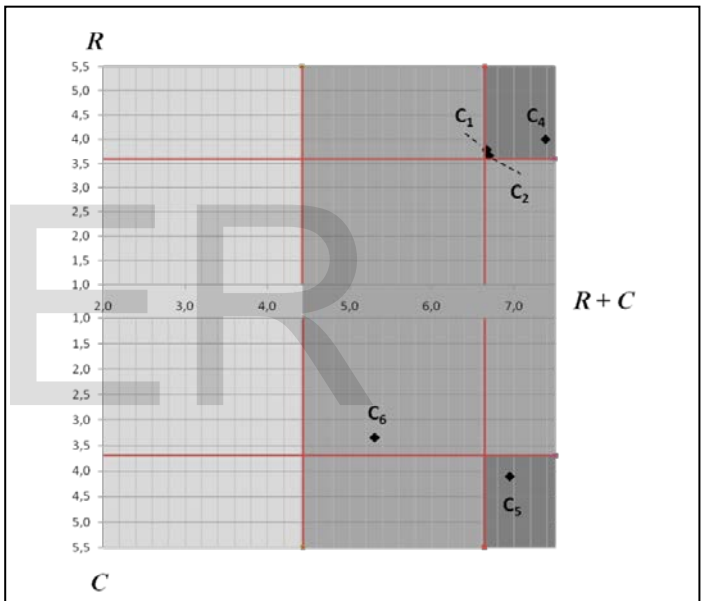

Fig. 8. Proposed layout for the Ethics domain

Both the standard IRM **(Fig. 7)** and our proposed layout **(Fig. 8)** exhibit *(C_1), (C_2)* and *(C_4)* as top priority indicators. However, while the *Win Ratio* (C_6) appears to have the lowest *R-C* value, our graphical layout indicates that it is just a SII, surpassed in priority by *Firm Reputation* (C_5).

4.3.4 Community Service (CS)

With respect to *Community Service (CS)*, results show that D_5, or *Firm Reputation*, is the most central element with the highest importance *(R+C=5.589)* and the greatest amount of impact received *($D=D_{max}=2.927$)*. This factor is a net receiver alongside D_3 and D_4 respectively corresponding to the *Number of community service events* and the *Population impacted by community services*. The net dispatchers of impact in this domain are the *Win Ratio* (D_6), the *Number of partnerships with schools* (D_1), and the *Number of partnerships with professional institutions* (D_2), ordered by decreasing strength of impact produced. Although D_5 is a net effect

factor, the IRM in **Fig. 9** shows that it can also be a cause factor influencing factors D_3 and D_4.

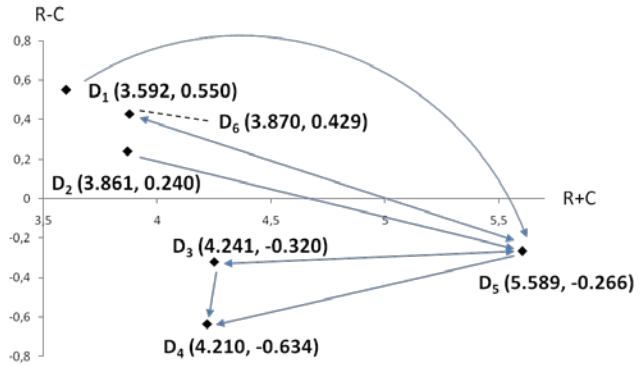

Fig. 9. Impact Relation Map for the Community Service domain

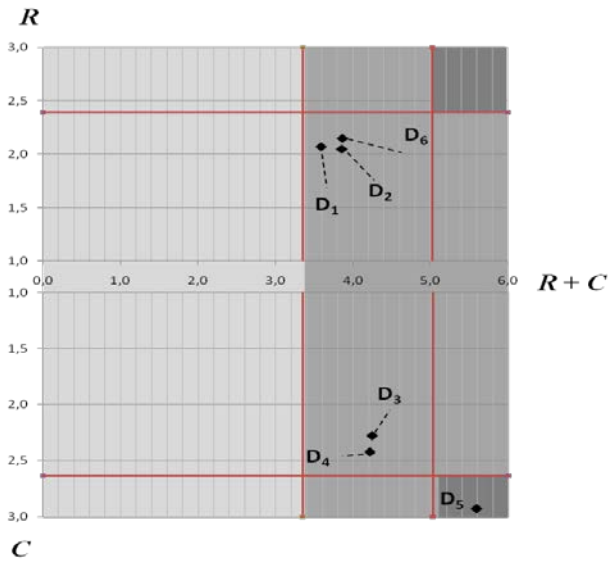

Fig. 10. Proposed layout for the Community Service domain

According to our layout in **Fig. 10**, *Firm Reputation* (D_5) is the only FII while all other indicators are SIIs. Note, however, that D_6 is the factor which diffuses the largest amount of total impact in this domain **(Fig. 10)** even though D_1 has the highest *R-C* value.

TABLE 3
TOTAL RELATION MATRIX T_{HR} FOR THE HUMAN RESOURCE AND INTERNAL POLICY (HR) DOMAIN

	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	**R**	**C**	**R+C**	**R-C**
A_1	0.053	0.240	0.120	0.115	0.113	0.104	0.266	0.143	1.152	0.777	1.929	0.375
A_2	0.167	0.176	0.258	0.264	0.263	0.215	0.377	0.241	1.961	1.891	3.852	0.070
A_3	0.090	0.274	0.195	0.322	0.293	0.275	0.379	0.219	2.047	1.898	3.944	0.149
A_4	0.116	0.345	0.389	0.233	0.381	0.368	0.445	0.276	**2.554**	1.825	**4.379**	0.729
A_5	0.097	0.319	0.338	0.322	0.194	0.323	0.387	0.230	2.210	1.753	3.964	0.457
A_6	0.070	0.196	0.281	0.251	0.205	0.146	0.316	0.196	1.660	1.766	3.426	-0.105
A_7	0.120	0.200	0.195	0.194	0.189	0.200	0.202	0.288	1.588	2.661	4.249	-1.073
A_8	0.063	0.142	0.122	0.124	0.116	0.135	0.289	0.098	1.089	1.691	2.780	-0.602

Threshold value α_A=0.239

TABLE 4
TOTAL RELATION MATRIX T_P FOR THE PRODUCTION DOMAIN

	B_1	B_2	B_3	B_4	B_5	B_6	B_7	B_8	B_9	B_{10}	B_{11}	B_{12}	**R**	**C**	**R+C**	**R-C**
B_1	0.121	0.317	0.335	0.274	0.176	0.180	0.310	0.240	0.226	0.123	0.190	0.271	2.763	1.655	4.417	1.108
B_2	0.160	0.229	0.355	0.280	0.191	0.208	0.318	0.260	0.258	0.135	0.212	0.288	2.893	3.010	**5.904**	-0.117
B_3	0.147	0.255	0.204	0.222	0.160	0.166	0.295	0.220	0.216	0.106	0.203	0.259	2.453	**3.182**	5.635	-0.729
B_4	0.185	0.299	0.317	0.173	0.161	0.191	0.312	0.232	0.229	0.112	0.215	0.290	2.716	2.399	5.115	0.317
B_5	0.122	0.225	0.247	0.161	0.083	0.136	0.205	0.156	0.154	0.091	0.139	0.196	1.916	1.617	3.533	0.299
B_6	0.204	0.325	0.347	0.286	0.179	0.140	0.324	0.256	0.250	0.110	0.229	0.283	2.932	1.780	4.712	1.152
B_7	0.174	0.296	0.292	0.219	0.156	0.168	0.203	0.208	0.206	0.113	0.237	0.280	2.553	2.962	5.515	-0.409
B_8	0.108	0.226	0.212	0.163	0.107	0.125	0.184	0.108	0.172	0.082	0.130	0.195	1.810	2.219	4.029	-0.408
B_9	0.105	0.221	0.212	0.160	0.092	0.116	0.174	0.164	0.103	0.083	0.126	0.193	1.748	2.183	3.931	-0.436
B_{10}	0.073	0.177	0.185	0.120	0.102	0.092	0.136	0.109	0.107	0.043	0.097	0.145	1.386	1.149	2.535	0.237
B_{11}	0.137	0.210	0.231	0.164	0.098	0.127	0.254	0.128	0.126	0.070	0.107	0.197	1.848	2.075	3.923	-0.227
B_{12}	0.120	0.231	0.245	0.176	0.111	0.132	0.247	0.139	0.137	0.082	0.190	0.144	1.954	2.742	4.697	-0.788

Threshold value α_B=0.245

TABLE 5
TOTAL RELATION MATRIX T_E FOR THE ETHICS DOMAIN

	C_1	C_2	C_3	C_4	C_5	C_6	R	C	R+C	R-C
C_1	0.459	0.663	0.514	0.713	0.805	0.623	3.777	2.892	6.670	0.885
C_2	0.610	0.466	0.509	0.714	0.768	0.602	3.668	3.027	6.695	0.641
C_3	0.457	0.510	0.303	0.586	0.605	0.476	2.936	2.448	5.384	0.488
C_4	0.640	0.645	0.527	0.553	0.907	0.731	**4.001**	3.381	**7.382**	0.620
C_5	0.435	0.449	0.364	0.488	0.487	0.616	2.839	4.105	6.944	-1.265
C_6	0.293	0.296	0.232	0.327	0.533	0.288	1.968	3.337	5.304	-1.369

Threshold value α_C=0.615

TABLE 6
TOTAL RELATION MATRIX T_{CS} FOR THE COMMUNITY SERVICE (CS) DOMAIN

	D_1	D_2	D_3	D_4	D_5	D_6	R	C	R+C	R-C
D_1	0.179	0.283	0.417	0.429	0.496	0.268	2.071	1.521	3.592	0.550
D_2	0.242	0.215	0.383	0.411	0.511	0.289	2.050	1.810	3.861	0.240
D_3	0.232	0.279	0.257	0.463	0.482	0.247	1.961	2.280	4.241	-0.320
D_4	0.212	0.262	0.390	0.250	0.439	0.236	1.788	2.422	4.210	-0.634
D_5	0.365	0.437	0.469	0.489	0.443	0.458	2.661	**2.927**	**5.589**	-0.266
D_6	0.291	0.334	0.365	0.381	0.557	0.222	2.150	1.720	3.870	0.429

Threshold value α_D=0.456

4.4 Synthesis: Advising on the CSR Strategy Based on Results

Our proposed layout suggests that each indicator has a role to play in the system according to its position on the graph. In order to present a better view of results, we summarize our findings as in **Table 7**.

TABLE 7
INDICATORS CLASSIFIED USING THE PROPOSED LAYOUT AND RANKED BY DECREASING INTENSITY OF IMPACT PER DOMAIN OF STUDY

	Net Dispatchers	**R**	**Net Receivers**	**C**
First Impact Indicators (FIIs)	A_4. Gender professional equality index	2.554	**A_7. Firm reputation** [1]	2.661
			B_3. Productivity	3.182
			B_2. Motivation	3.010
			B_7. Win Ratio [2]	2.962
	C_4. Number of ethical incidents	4.001		
	C_1. Number of ethics training sessions	3.777	**C_5. Firm reputation**	4.105
	C_2. Total number of participants in ethics training sessions	3.668		
			D_5. Firm reputation	2.927
Second Impact Indicators (SIIs)	A_5. Ratio of female employees	2.210		
	A_3. Percent of female management positions	2.047	A_6. Female training ratio	1.766
	A_2. Diversity index	1.961	**A_8. Win ratio**	1.691
			B_{12}. Firm reputation	2.742
	B_6. Training effectiveness	2.932	B_8. Number of Enterprise Business Awards	2.219
	B_1. Percent of staff trained	2.763	B_9. Number of Enterprise Individual Awards	2.183
	B_4. Number of service quality incidents	2.716	B_{11}. Competition	2.075
			C_6. Win ratio	3.337

[1] *Firm Reputation* is found to be a net receiver in all domains. In addition, except for the *Production (P)* domain where it is a SII, this indicator is a FII in the remaining three domains.
[2] The *Win Ratio* is found to be a net receiver in all domains except for the *Community Service (CS)* domain where it is a net dispatcher of impact. Moreover, it is found to be a SII in all domains but the *Production (P)* domain where it plays the role of a FII.

	D_6. Win Ratio	2.150	D_4. Population impacted by community services	2.422
	D_1. Number of partnerships with schools	2.071		
	D_2. Number of partnerships with professional institutions	2.050	D_3. Number of community service events	2.280
Third Impact Indicators (TIIs)	A_1. Integration of the disabled	1.152		
	B_5. Number of work incidents	1.916		

First Impact Indicators (FII) are the ones which are most central as compared with others. When they are net dispatchers, they produce the most significant intensity of impact on the rest of the system. With respect to the proposed graphical representation, we suggest that the firm gives the highest priority to the dispatching FIIs followed by the dispatching SIIs impacting the receiving FIIs. Then, the company should look at the remaining SIIs and TIIs responsible for impacting the rest of indicators.

In our case, the dispatching FIIs derive from the *HR* and *Ethics* domains. In the *HR* domain, it is found that *Gender professional equality index (A_4)* plays the most central role, which speaks for the priority to instill gender equality at work not only from a recruitment perspective –by acting on the *Ratio of female employees (A_5)*, but also from a job promotion perspective –by addressing the *Percent of female management positions (A_3)*. Ethics wise, increasing awareness about professional ethics remains central. Results show that the highest priority should be given to working on reducing the *Number of ethical incidents (C_4)*. This could be achieved by tackling directly the other two FIIs in this domain which are directly responsible for C_4, namely the *Number of ethics training sessions (C_1)*, and the *Total number of participants in ethics training sessions (C_2)*. Therefore, we find that the highest priority should be given to strengthening professional gender equality via increased diversity and gender-aware recruitment and promotion policies. Ethics wise, results show that firms need to genuinely raise awareness about work ethics through frequently held ethics training sessions to diminish ethical incidents susceptible of harming reputation. These results echo research findings from previous studies which have shown the central role of ethics and the human factor in the development of CSR and sustainability policies [38-40].

The receiving FIIs necessitate particular attention as well. They are the most significantly impacted elements of the system and are represented in our case by *Firm Reputation (A_7, C_5, D_5)*, *Productivity (B_3)* and *Motivation (B_2)*. It is therefore essential to scrutinize the cause indicators impacting them, namely the dispatching FIIs and SIIs.

The dispatching SIIs play the second most important role in the system. They are a direct cause of impact on the receiving FIIs and SIIs, thus, it would make sense to address them right after the FIIs. With this respect, the case company should look into factors A_5, A_3, and A_2 to boost gender equality and diversity at work. Regular and inclusive training is found to be paramount in this process as well. Increasing *Training effectiveness (B_6)* and the *Percent of staff trained (B_1)* helps to reduce potential *Service Quality Incidents (B_4)* and to bolster *Productivity (B_3) and Motivation(B_2)*, leading to stronger *Win Ratio (B_7)* and *Firm Reputation (B_{12})* in the longer run. In the same line, top management should continue to work on building partnerships both with universities and professional institutions as a means to reinforce its social impact. Results show indeed that the higher the number of partnerships *(D_1,D_2)*, the stronger the *Firm Reputation (D_5).*

Looking at TIIs reveals that as much as integrating the disabled and watching out for work incidents are an important aspect of diversity and safety at work, their impact on the system remains minimal. Therefore, in the case company, top management should put these indicators *(A_1,B_5)* as third priority after the FIIs and the SIIs.

Finally, it is important to analyze the case of the two overlapping variables used in this study, namely *Firm Reputation* and the *Win Ratio*, and which are present in different priority levels with different roles. More precisely, *Firm Reputation* is found to be a net receiver of impact in all four domains and a FII in three domains *(HR, E, CS)*. This finding speaks for the particular importance of this factor, suggesting that top management should pay attention to all variables susceptible of impacting positively or negatively the company's reputation from all areas.

As for the *Win Ratio*, results show that this indicator is found to be a SII in three domains –it is a FII only in the *Production (P)* area where it is regarded as a key performance objective. The *Win Ratio* is also three times a net receiver of impact and only once a net dispatcher – in the *(CS)* domain. These findings are particularly interesting in that they elucidate the essence of CSR and how it should be deployed in a corporation. In fact, these results suggest that when creating its CSR strategy, a firm should not place financial performance as the first and foremost priority. Instead, by putting stronger emphasis on the human factor via a sound and sustainable HR policy, along with a genuine reinforcement of professional ethics, the firm is able to act upon the factors directly responsible for creating the right working environment which boosts motivation, productivity, and hence the win ratio. Our results show that in crafting the CSR strategy, financial objectives should come at second-level consideration, paradoxically, Corporate Financial Performance (CFP) gets readily impacted and improved from the moment it is not pointed as the main goal. This finding is supported by existing research which demonstrates that the positive CSR-CFP link is stronger when firms focus their initial CSR engagement on activities in relation with such internal dimensions as human resources, internal development, and governance [41].

5. Conclusion and Perspectives

This paper aims to advise on the Corporate Social Responsibility (CSR) strategy creation based on Decision Making Trial and Evaluation Laboratory (DEMATEL) technique. In particular, we propose an enhanced graphical layout of DEMATEL outcomes to offer a more intuitive and informative representation of results. Our proposed layout not only categorizes corporate indicators in a straightforward framework, but it also puts them into perspective by using an intuitive three-dimensional plan.

As an application of the proposed layout, we explore the case of a Multi-National Corporation (MNC) in the IT consulting industry. Our framework allowed to prioritize CSR indicators and highlight the ones which deserve particular monitoring from decision makers. For instance, in the case explored, our findings indicate that the highest priority should be given to building a sound and sustainable human resource policy along with the reinforcement of work ethics.

Most importantly, in addition to providing an enhanced analysis tool for DEMATEL's cause-effect outcomes, our proposed framework adds value to existing research by providing a procedural explanation of the CSR-CFP link established by empirical evidence from previous studies. The categorization involved in our methodology helps to explain how the positive CSR-CFP interrelation actually operates.

Our results show that the proposed graphical layout is successfully applicable to the CSR strategy creation process. For further research, it would be useful to investigate the extent to which it applies to other management fields and to industries other than consulting.

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