CORPORATE SOCIAL RESPONSIBILITY AND ORGANISATION BEHAVIOUR

A. Manzoni, Sardar M. N. Islam***

Abstract

This study shows how the non-parametic optimisation model of Data Envelopment Analysis can be applied to Corporate Social Responsibility in a company-wide analysis of the capacity of people, processes, and other resources to meet the expected social obligations to all stakeholders under the organisation's promulgated corporate citizenship. Data used in the analysis are the scores of empirical results from an Australian bank study. The DEA model identified 11 decision making units, from a cohort of 231, that were leading exponents of the behavioural characteristics required to be rated as the most efficient in meeting the corporate social responsibility criteria set by the firm. These findings can be used to investigate why some units succeeded so well while others wallowed. The analysis can provide valuable information for developing an efficient organizational structure for the company for achieving good corporate governance.

Keywords: Corporate Social Responsibility, Optimisation, Data Envelopment Analysis

** Lecturer, Faculty of Higher Education, William Angliss Institute, Australia*
*** Professor, Centre for Strategic Economic Studies, Victoria University, Australia*

1 Introduction

Corporate governance (CG) is a topical subject about organisational stewardship that is vigorously debated in current academic, business and government forums (Thomsen 2004) Its wide jurisdiction covering the institutions, laws, rules, policies and procedures governing the operations and running of the company, allows it to be analysed and discussed from numerous vantages. It is multi-faceted thus allowing it to be studied at different strata and with restricted foci. CG is much touted to underpin organisational competitiveness (Young 2003, Williamson 1988) and success, yet its dialogues are legal, financial, economic or social, and discussions are usually limited to these singular perspectives. And, while these dimensions are all contributors to corporate performance, not one of them alone is influential enough to be a significant gauge of corporate effectiveness, yet each has often been studied and promoted as if it were. It is intuitively attractive to regard each of these as indicators of particular aspects of a multi-factorial CG matrix where each factor is weighted according to its contribution to overall efficiency. To the authors' knowledge this has not been done before. The potential for a mathematical model to achieve this is promoted in this study with the application of the optimization tool of data envelopment analysis for one dimension of CG, that of corporate social responsibility (CSR). That is, this study investigates the efficiency of CG from the vantage of its CSR efficacy using DEA as the diagnostic tool. CSR, and its corollary corporate citizenship, is taken as the extent to which the enterprise defines its ethical, legal, economic and stakeholder responsibilities, and how well it performs against these standards. The CSR model chosen for this purpose proposes that there are measurable 'antecedents' of CSR, displayed through identifiable 'indicators', which result in outputs displayed through 'consequences' of CSR. DEA is applied to a database of 231 decision making units (DMUs) across 39 variables in six business divisions of the firm.

Corporate social responsibility describes the way in which an organisation engages with stakeholders and the environment in which the firm operates. According to Robert Davies (2004) at the World Economic Forum it has migrated from the philanthropy arena to mainstream and strategic corporate practice for the most successful companies in the financial marketplace, and is often personified in the label of corporate citizenship. Maignan and Ferrell (2001) define corporate citizenship as "the extent to which businesses assume the economic, legal, ethical, and discretionary responsibilities imposed on them by their stakeholders" (p 38). Basically, the economic responsibilities are those obligations the organisation has to be productive and meet the expectations of shareholders and investors. The legal responsibilities are those which allow it to meet its economic mission within the legal framework that governs it. The ethical responsibility is society's expectation that it performs against established moral standards. Discretionary responsibilities are those that extend beyond the ones mentioned above and are for the general betterment of society (Donaldson 2005). These can be seen as a continuum from reactive to proactive citizenship. The proactive corporate citizen for example, is dedicated to fair treatment of employees (O'Sullivan 2003) in economic, ethical,

legal and discretionary matters. Economically it may offer secure employment and competitive rates of pay as well as procedures that ensure it meets and exceeds contractual obligations (legal citizenship). It may have work-life-balance programs which encourage family centric initiatives and offer discretionary benefits such as employee share privileges and other benefits packages. It goes beyond the minimum expected by all stakeholders (Dean and Clarke 2004).

The reactive corporate citizen on the other hand, is one that would espouse the same values as above but only on the basis that they 'make a business case' and link directly to the bottom line. It sees citizenship as benevolence equated to profitability plus compliance plus philanthropy and possibly a piecemeal response to stakeholder demands. It may give lip service to ethos of multiple social contracts; between the corporation and society, and government, and stakeholder groups (Quazi 2003).

The socially responsible corporation is one that displays high levels of social responsiveness to the demands of its stakeholders and an understanding of them. It experiences positive consequences as a result.

Lasting relationships with primary stakeholders has been shown to be a major source of competitive advantage in today's highly competitive environment (Oketch 2004). In studies of over 160 organisations with high social responsiveness capabilities, Black (2004) found improvements in business performance, increases in employee commitment with a greater alignment between employer and employee values, and an improved perception of the employer by its employees. There was a reduced intent for employees to resign and a general reduction in conflict with stakeholders. In her particular study, managers identified benefits as tangible and intangible. They believed the company benefited tangibly by a greater financial literacy (for shareholders), improved shareholder value, increased involvement in company decision making, products developed to customer specifications, reduced conflict, and increased trust, as well as a likelihood of decreased government regulation and a general reduction in business risk. The intangible benefits were better organisational identity and reputation, with employee pride, and an employer of choice status, as well as attractiveness to customers, and a learning organisation. She proposed a cultural mindset reflecting the behavioural antecedents that predispose employees to corporate social responsiveness, resulting in positive consequences. Figure 1 shows the behavioural antecedants of; open communication, a supportive and humanistic style of management, and ethics integrated with fairness and perceived justice. These antecedants were demonstrated behaviourally by a number of indicators; identification by the employee with the firm, social accountability and reporting, common values with a commitment to an ethical ethos. Generally the open-door humanistic style of management which encouraged an engaged dialogue resulted in culture conducive to corporate social responsibility.

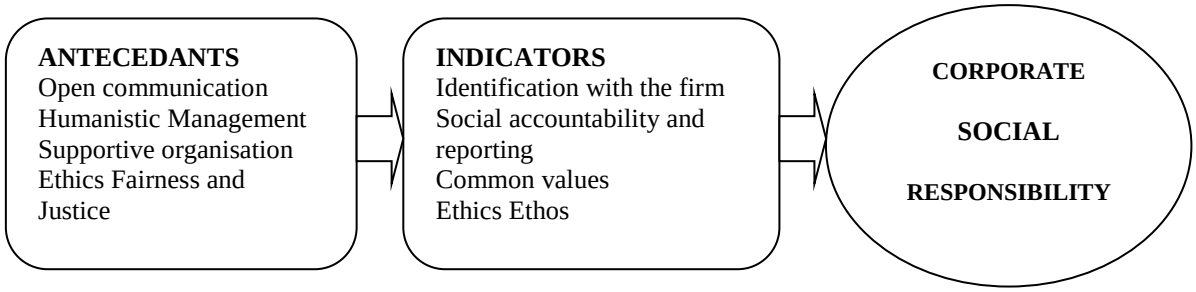

Figure 1. Antecedants and indicators of corporate social responsibility

Employees view of the organization was humanistic and supportive with open communication and a commitment to fairness and ethics displayed by the integration of ethics in business practices and procedures. They were supported by the organization and this was reflected in its culture. The benefits of this culture included low staff turnover, employee identification with a trustworthy organisation which had a good public image, was willing to invest in employees and to communicate with them openly. Consequently, this particular bank was publicly applauded for its citizenship by being a serial gold award winner of the Australian national Corporate Responsibility Index.

In the present study the individual decision making units (DMUs, managerial units) across the organization were surveyed through the internal email system. The response rate was 32%. The 231 decision making units (DMUs) crossed 6 business divisions. These were tested for corporate social responsibility as the outcome on the basis of the cultural mindset represented by the indicators mentioned earlier; identification with the firm, social accounting and responsibility, common values and an ethics ethos. These allowed the firm to understand the needs of its employees as stakeholders and incorporate these into the firm's business decisions, recognising that both their futures are linked. The firm needs to understand the contribution or employees in making decisions and how to empowered them in this process. The ethics of business has two components; ethics compliance and ambience or atmosphere. Compliance is the conformance to formal systems of reward and punishment used to reinforce ethical behavior, often prescribed in some corporate compliance handbook such as a code of conduct. Ethics atmosphere is the

degree to which people sincerely care about the well-being of others, regardless of what the rules say. It is possible that these two are de-coupled. A code for business ethics may be prescribed but observable behaviours reveal that interests are self-centred. Such a code of ethics without a supporting culture is generally ineffective. There are also two elements to social accountability, the reporting of social impacts by the company and the sense of social accountability towards stakeholders held by management. Social reporting is how the firm substantively accounts for its performances truthfully even when the evidence is not good. Social accountability is the degree to which managers feel accountable to stakeholders for the firm's social impacts. Values describes the ability of staff at the forefront to tune-in to public affairs to detect and transmit value-pertinent information from stakeholders to organisational decision-makers. Well developed environmental scanning and issues management skills can help senior managers recognise stakeholder aspirations and attune these to a congruence of corporate and stakeholder values. For example, a firm may symbolically and substantively authorise the entry of certain values into organisational decision-making by establishing a CSR committee that reports directly to the Board. Dialogue is how a respectful attitude for stakeholders as equal partners is dealt with in communications about issues of mutual concern. It is the relationship between stakeholders and the firm's staff at the operational business level.

The original model of Black (2004) was supported by traditional hypothesis testing methodology with correlations for the behavioural indicators all significant at the 0.01 level (2 tailed tests). There was strong support for the model of corporate social responsibility with significant ANOVA results for eight sub-dimensions as related to the employee stakeholder group. Qualitative results through comprehensive interviews further attested to the significance of the construct while conventional hypothesis testing validated the hypotheses that:

- humanistic culture will be positively related to CSR,
- management commitment to ethics will relate positively to CSR,
- integrated ethical practices will relate positively to CSR, and
- perceived distributive justice, organizational support, and communication accuracy will relate positively to CSR.

2 Methodology

The operations research method of linear programming (LP) is an optimization technique which maximizes or minimizes a linear function of decision variables. Specifically, the linear programming problem can be described as finding the values of n decision variables, x_1, x_2,.....x_n such that they maximize (or minimize) the objective function z where:

$$z = c_1x_1 + c_2x_2 + \ldots + c_nx_n \quad (1)$$

subject to the following constraints:

$$\begin{aligned} &a_{11}x_1 + a_{12}x_2 + \ldots + a_{1n}x_n \leq b_1 \\ &a_{21}x_1 + a_{22}x_2 + \ldots + a_{2n}x_n \leq b_2 \\ &a_{m1}x_1 + a_{m2}x_2 + \ldots + a_{mn} \leq b_m \end{aligned} \quad (2)$$

and usually

$$x_1 \geq 0, \quad x_2 \geq 0, \ldots\ldots x_n \geq 0 \quad (3)$$

where c_j, a_{ij}, and b_i are given constants representing the objective function coefficients, constraint coefficients and right-hand side coefficients respectively.

$$\text{Let x} = \begin{pmatrix} x_1 \\ \vdots \\ \vdots \\ x_n \end{pmatrix}, \text{ c} = \begin{pmatrix} c_1 \\ \vdots \\ \vdots \\ c_n \end{pmatrix}, \text{ and } b = \begin{pmatrix} b_1 \\ \vdots \\ \vdots \\ b_n \end{pmatrix} \quad (4)$$

be column vectors of sizes n, and m, respectively,

$$\mathbf{A} = \begin{pmatrix} a_{11} \cdots a_{1n} \\ \vdots \ldots\ldots \vdots \\ \vdots \ldots\ldots \vdots \\ \vdots \ldots\ldots \vdots \\ a_{m1} \cdots a_{1n} \end{pmatrix} \quad (5)$$

be the m x n constraint matrix.

The above linear program can be written in matrix-vector form, with superscript T representing the transpose of vector or matrix and 0 the column vector.

$$\begin{aligned} &\text{Maximize} && \text{Iz} = c^T\text{x} \\ &\text{subject to} && \text{Ax} <= \text{b} \\ & && \text{x} \geq 0 \end{aligned} \quad (6)$$

The values of the decision variables x_1, x_2, ...x_n that satisfy all the constraints of (2) and (3) simultaneously are said to form the feasible solution to the linear programming problem while the set of all values of the decision variables characterized by the constraints (2) and (3) form the feasible region bounded by the piecewise linear frontier.

Data envelopment analysis is a development of linear programming first reported by Charnes, Cooper and Rhodes (1978), and based on Farrell's (1957) work 'The Measurement of Productive Efficiency". They chose it because it allowed them to be unencumbered of restrictive parametric techniques yet still measure the relative efficiency of 'decision making units' (DMUs). Their model "generalized the single-output/input ratio measure of efficiency for a single DMU in terms of a fractional linear-programming formulation transforming the multiple output/input characterization of each DMU to that of a single "virtual" output and virtual input Charnes et al. 1994 p6). The researcher assigns the DMU entities and DEA computes the performances of these relative to one another with the most efficient being ascribed the benchmark value of unity.

Suppose there are j=1……n DMUs and for each there are m inputs and s outputs, where the input data

for DMU$_j$, (x_{1j}, x_{2j}, ……x_{mj}), are represented by the **X** matrix and the output data, (y_{1j}, y_{2j}, ……y_{sj}), are represented by the **Y** matrix as follows:

$$\mathbf{X} = \begin{pmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & \cdots & \vdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{pmatrix} \quad (7)$$

$$\mathbf{Y} = \begin{pmatrix} y_{11} & y_{12} & \cdots & y_{1n} \\ y_{21} & y_{22} & \cdots & y_{2n} \\ \vdots & \vdots & \cdots & \vdots \\ y_{s1} & y_{s2} & \cdots & y_{sn} \end{pmatrix} \quad (8)$$

The efficiency of each DMU is measured as the "virtual output" divided by the "virtual input" once, so there needs to be *n* optimizations for the whole DMU set. The following fractional programming problem is solved to obtain values for the input "weights" $(v_i) \quad (i = 1,...,m)$ and the output "weights" $(u_r) \quad (r = 1,...,s)$ as variables.

$$(F.P_O) \quad \max \quad \theta = \frac{u_1 y_{1o} + u_2 y_{2o} + \ldots + u_s y_{so}}{v_1 x_{1o} + v_2 x_{2o} + \ldots + v_m x_{mo}} \quad (9)$$

$$\text{subject to } \frac{u_1 y_{1j} + u_2 y_{2j} + \ldots + u_s y_{sj}}{v_1 x_{1j} + v_2 x_{2j} + \ldots + v_m x_{mj}} \le 1 \left(j = 1,\ldots,n \right) \quad (10)$$

$$v_1, v_2, \ldots, v_m \ge 0 \quad (11)$$

$$u_1, u_2, \ldots, u_s \ge 0 \quad (12)$$

The above fractional program (FP_o) can now be replaced by a linear program (LP_o) as follows:

$$(L.P_O) \quad \max_{\mu, v} \quad \theta = \mu_1 y_{1o} + \ldots + \mu_s y_{so} \quad (13)$$

$$\text{Subject to } v_1 x_{1o} + \ldots + v_m x_{mo} = 1 \quad (14)$$

$$\mu_1 y_{1j} + \ldots + \mu_s y_{sj} \le v_1 x_{1j} + \ldots + v_m x_{mj} \quad (j = 1,\ldots,n) \quad (15)$$

$$v_1, v_2, \ldots, v_m \ge 0 \quad (16)$$

$$\mu_1, \mu_2, \ldots, \mu_s \ge 0 \quad (17)$$

The Charnes et al (1978) development of the linear program can be expressed as:

$$Efficiency\ of\ unit\ i = \frac{\sum_{j=1}^{n_O} O_{ij} w_j}{\sum_{j=1}^{n_I} I_{ij} v_j} \quad (18)$$

$$Where: \quad Efficiency\ of\ unit\ i = \frac{Weighted\ sum\ of\ unit\ i's\ outputs}{Weighted\ sum\ of\ unit\ i's\ inputs}$$

And: O_{ij} represents the value of unit i on output j, I_{ij} represents the value of unit i on input j, w_j is the non-negative weight assigned to output j, v_j is the non-negative weight assigned to input j, n_I is the number of input variables, n_O is the number of output variables

The weighted sum of the units' outputs must be less than or equal to the weighted sum of the units' inputs.

$$\sum_{j=1}^{n_O} O_{kj} w_j \le \sum_{j=1}^{n_I} I_{kj} v_j \text{ for k=1 to n units} \quad (19)$$

Also, to prevent unbounded solutions we need the sum of the weighted inputs for each unit to equal one.

$$\sum_{j=1}^{n_I} I_{ij} v_j = 1 \quad (20)$$

There may be as few as 15 or 20 DMUs, or as many as 10 000 (Beasley 1990) but the sample size is pertinent because it can affect DEA's ability to discriminate between DMUs. While there are no rules that answer this question, there are heuristics that can give guidance (Cooper Seiford and Tone 2006, Avkiran 2006, Ramanathan 2003). However, it is the uniqueness of DEA that it has a reported usefulness in cases where other tools have failed because of the complexity and often unknown nature of the relationship between multiple input and output variables.

This study used DEA within the firm because of its attraction as a multi-criteria decision analysis technique. It followed the Golany and Roll (1989) procedure and used the Greenberg and Nunamaker (1987) transformation to generalize Likert scale scores into surrogate quantifiable values for the behavioural indicators.

The output-input relationship that subsumes the DEA algorithm is grounded in the mathematical ratio form that presents a production frontier for economic units of production, but one that can be generalized into a broader multiple criteria control model using the. Here the output-input factors themselves can be expressions of a ratio form as surrogates for the (difficult to obtain) exact measures of quantified tangible inputs and outputs. In this study the scores from the e-mail attitudinal survey used the popular

Likert scale as the instrument and converted those scores into individual or aggregated.

3 Results

The test results with six behavioural inputs and the CSR output showed that there were eleven efficient DMUs identified from the cohort of 231 (in Table 1).

Table 1. Behavioural inputs and CSR output

	Total n = 231	Across all business units
Input Variables	6	Behavioural Indicators
Output	1	Aggregated CSR score
Result:	11 DMUs identified as 100% efficient	

These were identified as efficient against peers across the whole cohort in the first instance and then labelled according to their location within the business unit structure of the organization (Table 2).

Table 2. Efficiencies from Individual DMUs in 6 Business Units

Business Unit	DMUs in Unit	Inputs	Output	Efficient DMUs
Unit A	6	6	CSR	
Unit B	46	6	CSR	
Unit C	63	6	CSR	5
Unit D	57	6	CSR	4
Unit E	41	6	CSR	2
Unit F	18	6	CSR	
TOTALS	231	6	CSR	11

4 Discussion

This study has demonstrated the utility of DEA as an optimization model that can be applied to research areas where qualitative dialogue suggests quantification of the observations is difficult. The non-parametric DEA has idiosyncratic features which lends itself to be used where conventional tools are wanting because they often require specificity in the relationship between the input and output variables. In this study DEA was able to identify 11 decision making units, from a cohort of 231, that were leading exponents of the behavioural characteristics required to be rated 100% on corporate social responsibility criteria. The firm could use such findings to investigate why these units succeeded so well when others floundered. This could be the vehicle for organizational improvement. More importantly, this study may motivate researchers to test the suitability of DEA in other fields of study where comparative analysis of relative ratings may be parsimoniously suitable instead of seeking absolute scores.

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