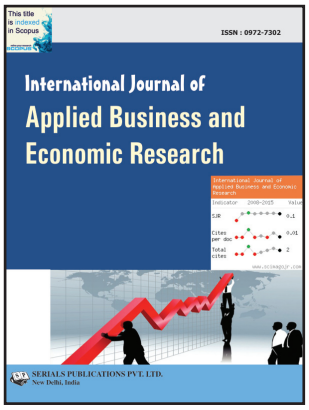

International Journal of Applied Business and Economic Research

ISSN : 0972-7302

available at http: www.serialsjournal.com

Volume 15 • Number 4 • 2017

Integrating Customer Involvement and Social Investment-Financial Performance Relationship in Islamic Banks

A New Framework for Corporate Social Responsibility Decision Making using AHP, DEMATEL and System Dynamics

Mohamed Wail Aaminou[1], Fadwa Chaker[2], Rajae Aboulaich[3] and Abdellah El Manouar[4]

[1]*Corresponding author: Islamic Financial Engineering Laboratory (IFE LAB), LERMA, Mohammadia School of Engineering, Mohammed V University (Rabat, Morocco). Email: mohamed.wail@gmail.com*

[2]*Technologies de l'Information et. Management des Entreprises (TIME), Ecole Nationale Supérieure d'Informatique et. d'Analyse des Systèmes, Mohammed V University (Rabat, Morocco). Email: fadwa.chaker@gmail.com*

[3]*Islamic Financial Engineering Laboratory (IFE LAB), LERMA, Mohammadia School of Engineering, Mohammed V University (Rabat, Morocco). Email: aboulaich@gmail.com*

[4]*Technologies de l'Information et. Management des Entreprises (TIME), Ecole Nationale Supérieure d'Informatique et. d'Analyse des Systèmes, Mohammed V University (Rabat, Morocco). Email: manouar@ensias.ma*

ABSTRACT

Clients of Islamic banks (IB) expect strong social involvement from their bank. However, these banks' social endeavors through Corporate Social Responsibility (CSR) have been below clients' expectations and what has been achieved by conventional banks. In order to embed social and ethical orientation into the fabric of Islamic banks, managers should not only involve clients in CSR strategic choices but also make use of reliable decision tools to assess the performance of CSR on financial performance indicators. Both challenges have of course to consider the specificities of Islamic banking. This paper proposes a decision-making framework to help IB implement CSR. It involves clients in determining the fields of the CSR action of the bank and in linking social investments to the banks' financial objectives.

Keywords: Corporate social responsibility; Islamic Banking; AHP; DEMATEL; System dynamics.

1. INTRODUCTION

The European_Commission (2016) defines Corporate Social Responsibility (CSR) as "the responsibility of enterprises for their impact on society. Companies can become socially responsible by following the law and

integrating social, environmental, ethical, consumer and human rights concerns into their business strategy and operations". CSR, also known as Corporate Responsibility (CR), Corporate citizenship or Corporate responsibility & sustainability (KPMG, 2013) is growing in interest internationally. Indeed, almost three in five companies included CSR indicators in their annual report in 2015, compared with only one in five in 2011. Furthermore, almost three quarters of the largest 100 national companies and more than 90% of the world largest 250 companies report in corporate responsibility (KPMG, 2015). To support this growth, many standards have been developed such as G4 Sustainability Reporting by the Global Reporting Initiative and ISO 26000 and ISO 14001 by International Organization for Standardization.

The motives behind corporations' interest in CSR could be strategic or profit maximizing −when the firm undertakes CSR initiatives to be rewarded in the marketplace, for example, by increased demand for its products, altruistic −when the firm does not expect financial reward in return of its CSR initiatives, or defensive−when the firm seeks to avoid external pressure from interest groups and activists that can affect market performance (Baron, 2001). Today, CSR is progressively moving from the periphery to the core, as companies increasingly seek to bring together societal and financial performance (EY, 2013). Kramer (2011) argues that this "shared value" paradigm will not only drive the next wave of innovation and productivity growth but will also blur the line between non-profit and for-profit organizations. This trend is confirmed by an international survey conducted by IBM_Institute_for_Business_Value (2008) that shows that 68% of business leaders are focusing on CSR activities to create new revenue streams and that 54% believe that their companies' CSR activities are already giving them an advantage over their top competitors.

Customers are obviously key in the success of any CSR strategy and should therefore be actively involved in this process. The European Commission finds that 70 %, 59% and 49% of Indians, Americans and Europeans, respectively, believe they should take the lead role in influencing the actions of companies through their buying behavior (European_Commission, 2013). Despite the key role and importance of customers, companies' CSR endeavors look disappointing so far. In Europe, only 36% of citizens feel informed about companies' socially responsible behavior although 79% of them are interested in what companies do in this field. Internationally, while 24% of business leaders acknowledge that they understand customer CSR concerns well, only 17% collaborate with customers on CSR initiatives (IBM_Institute_for_Business_Value, 2008).

With a global CR reporting rate higher than 75 percent (KPMG, 2015), the financial sector is active in CSR. According to McDonald (2015), the sector's emphasis on CSR is part of a long-term strategy to improve the tarnished image of banks in the last financial crisis. Despite these efforts, only 35% of Europeans consider the finance and banking sectors to be the least likely to behave in responsible ways towards society (European_Commission, 2013).

As far as leveraging CSR as a competitive advantage goes, there are different and sometimes contradicting views regarding the quantification of the relationship between profit maximizing CSR strategies and profitability in the banking sector (McDonald, 2015). This quantification is critical because managers are typically judged and rewarded on financial performance. The challenge in clarifying the return on investment of CSR initiatives stems from the standardization of social performance indicators, from the difficulty of isolating the effect of social initiatives on financials keeping everything else constant (Tsoutsoura, 2004) and, finally, from the mismatch between the long and short term orientations of social investment and financial indicators respectively (Peloza, 2009).

Islamic Banks were relatively less harmed than their conventional counterparts by the 2008 financial crisis because their business model, which associates financial flows with business and trade transactions,

insulated these banks from speculative and excessive leverage (Ahmed, 2010). From a CSR standpoint, historically, Islamic banks' initiatives have been rather weak or poor (Asutay, 2007, Maali et. al., 2006). Islamic banks' performance in this field is even lower than conventional banks (Mohd Nor, 2012). Rahman and Saimi (2015) and Nobanee and Ellili (2016) also point out to the low levels of disclosures for Islamic banks with respect to ethics and the concept of Corporate Social Responsibility. This CSR failure (Asutay, 2012) seems paradoxical because Islamic law, a cornerstone of Islamic banks' identity, strongly emphasizes, among others, the principles of social justice and beneficence (Maali et. al., 2006). Islamic banks' attitude vis-à-vis CSR also contradicts the demands of customers who expect those banks to be strongly active on this front (Maali et. al., 2006, Wajdi Dusuki and Irwani Abdullah, 2007).

Consequently, in order to embed social orientation into the fabric of Islamic banks, managers should not only close the gap with their conventional counterparts but also address two challenges mentioned earlier. Firstly, they need to involve clients in CSR strategic choices. Secondly, they have to make use of reliable decision tools to assess the performance of CSR on financial performance indicators. Both challenges have of course to take into account the specificities of Islamic banking.

This paper proposes a decision model framework to address the above challenges. The framework relies on Analytic Hierarchy Process (AHP) and Decision-Making Trial and Evaluation Laboratory (DEMATEL) decision methods and can be simulated on a dynamics software system.

This paper is organized as follows: In **Section 2**, we describe the problem and then we detail in **Section 3** our framework. We build a simulation model, and present, in **Section 4**, the simulation results. **Section 5** closes with some conclusions and research perspectives.

2. PROBLEM DESCRIPTION

We consider an Islamic bank that intends to undertake profit maximizing CSR initiatives while involving clients in the process. The bank seeks to use a decision-aid tool to help managers select the CSR measures which are most preferred to customers and which most strongly impact upon profitability. Based on this selection, managers are able to allocate the CSR budget accordingly.

2.1. Involving Clients

Socially responsible companies are likely to be viewed more favorably by consumers than less socially responsible companies (McDonald and Rundle-Thiele, 2008). Adopting a customer-centric approach is therefore critical for transforming CSR as a strategic advantage in the banking sector (McDonald, 2015). The customer-centric approach needs to take into account the hierarchy of customer-preferred CSR initiatives in regards to their impact on retail banking customer satisfaction. This hierarchy can change across cultures (Auger et. al., 2007).

However, as presented earlier, clients would like not only to get better informed about banks' CSR initiatives but also to influence the bank's initiatives in this field. Hence, how can the bank involve clients in defining CSR strategy upstream to increase their satisfaction and therefore the strategy's chances of success?

2.2. Relating CSR Investments to Financial Objectives

From the bank managers' perspective, assessing the impact of social performance indicators (SPI) on financial performance indicators (FPI) is complex. First, there are too many key performance indicators

to choose from when constructing dashboards to monitor the CSR strategy (Peloza, 2009). Second, the causal relationship between SPI and FPI is multifaceted. Preston and O'bannon (1997) identified several hypotheses regarding social and financial performance relationship, including:

- The social impact hypothesis: When social performance positively influence financial performance. Such a relationship was highlighted in the banking sector by Margolis et. al., (2007), Tsoutsoura (2004) and Wu and Shen (2013);
- The slack resources hypothesis: When socially responsible firms are at disadvantage compared to less socially responsible firms because social activities involve financial costs. Makni et. al., (2009) found such a relationship when empirically analyzing a sample of publicly held Canadian firms;
- Available funds hypothesis: When the performance of social activities depends on the financial performance of the firm in the previous period. Such a relationship was found by Scholtens (2008) who analyzed a sample of US firms covering the period 1991–2004;
- The synergy hypothesis: When social and financial performance both affect one another. Such a relationship was found by Ameer and Othman (2012) when assessing the performance of the top 100 sustainable global companies in 2008.

Third, the SPI and FPI are not related directly but rather through mediating indicators. For instance, staff diversity initiatives lead to higher productivity and enhanced firm's image, which, in turn increase sales and profits. Capturing the mediation process is essential for understanding how social initiatives generate business value and for developing leading indicators to assess this value early in the process (Peloza, 2009).

Thereby, how can banks builds comprehensive dashboards that tackle the above challenges and allow managers to assess and adjust their social strategy?

3. FRAMEWORK CONCEPTION

The proposed framework is based on a four-step process: First, the priorities for CSR fields to be invested are determined employing pooled customer inputs. Second, a performance management dashboard is constructed based on established cause-effect relationships. Then, the decision investment strategy is made through a combination of results from both CSR pooled priorities and causal relationships. Finally, budget allocation is set and the management dashboard is put into action through a dynamic simulation using System Dynamics (SD) (Figure 2.1).

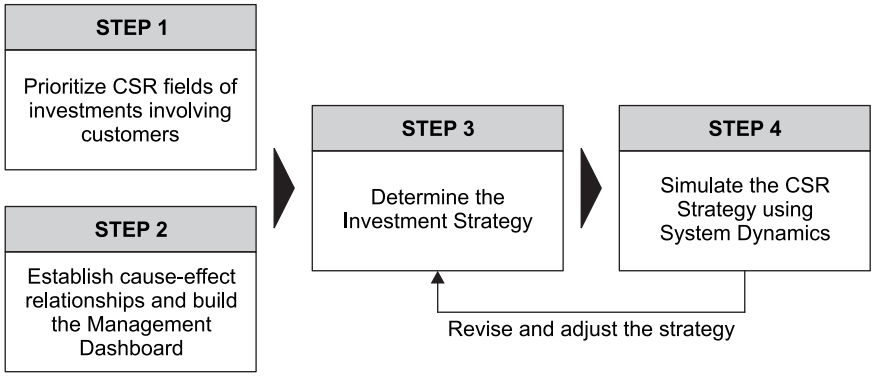

Figure 2.1: Process of developing the Decision Model

3.1. Prioritizing CSR Fields

In the proposed framework, the Islamic bank uses benchmarks and market studies to identify a selection of potential fields for CSR initiatives. Then, a representative sample of clients is asked to prioritize those fields through experiments using Analytic Hierarchy Process (AHP) method. Based on a combination of AHP resulting priorities and the bank's managers' priorities, the bank allocates the corresponding budget for CSR projects. This involvement in CSR strategy, discussed by Morsing and Schultz (2006), aims at developing and promoting positive support from customers.

3.1.1. AHP Method

The Analytic Hierarchy Process was introduced in the early 1980s by Thomas L. Saaty as a method of measurement based on paired comparisons to derive ratio scales in a decision making problem (Saaty, 1987). The comparisons can be either discrete or continuous and are used to reflect the strength of relative criteria preferences. In its general form, AHP method requires the use of a hierarchy of criteria, sub-criteria, and alternatives.

First, criteria are rated using paired comparisons according to Saaty's fundamental scale (Saaty, 1987) (Table 2.1). A matrix of pairwise comparisons C is generated to obtain local derived scales for every criterion. The matrix is filled out by comparing how much each criterion is preferred over the others on a scale from 1/9 (indicating not at all preferred) to 9 (indicating definitely strongly preferred). Since those are paired comparisons, the matrix has reciprocal numbers with respect to the diagonal, which is represented by unity numbers indicating that each element is equally preferred to itself.

Second, the columns of matrix C are normalized by dividing each column element by the column sum such that the resulting matrix (A) columns sum up exactly to unity. The local derived scales represent the Eigenvector, which is obtained by averaging out each row of normalized matrix A.

However, the calculation at this point of the principal Eigenvector does not necessarily mean that it is the optimal solution for the problem. It is necessary to check the matrix's consistency with respect to the comparisons initially introduced. A matrix is said to be consistent if transitivity of judgment is respected, that is $c_{ij}c_{jk} = c_{ik}$, $\forall\ i, j, k$ (Saaty, 1987). More generally, Saaty (1987) proposes to use the consistency ratio (CR) as a means of judging overall consistency of the model. This ratio is obtained by calculating the principal Eigenvalue λ_{max} (Eq. 1):

$$\sum_{j=1}^{n} c_{ij}\, w_j = \lambda_{max}\, w_i$$

and

$$\sum_{i=1}^{n}\sum_{j=1}^{n} c_{ij}\, w_j = \sum_{j=1}^{n}\left(\sum_{i=1}^{n} c_{ij}\right) w_j = \sum_{i=1}^{n} \lambda_{max}\, w_i = \lambda_{max} \quad (1)$$

The consistency index (CI) of a matrix of comparison is given by (Eq. 2):

$$CI = (\lambda_{max} - n)/(n - 1) \quad (2)$$

To calculate the consistency ratio (CR), Eq. 3 is used:

$$CR = CI/RI \quad (3)$$

where RI is the random consistency index (RI) obtained from the average consistency index calculated over a sample of 500 randomly generated reciprocal matrices. Saaty (1987) summarized RI calculation

findings in Table 2.2. If the calculated CR is less than or equal to 0.1 then the Egein value and Eigenvector are acceptable and can be used as a final solution, otherwise, the solution is rejected unless the pairwise comparisons are revisited and carefully reconsidered.

3.1.2. Using "Pooled" AHP to Set Customer Priorities

In the proposed framework, the Islamic bank chooses a representative sample of customers who are invited to fill out respectively pairwise comparison matrices. A computerized calculation sheet can be used to help for immediate consistency ratio calculation, and to allow the user to instantly correct the inconsistency. Furthermore, online technological platforms can be utilized to permit distant connection of customers and to optimize data collection and transfer to a centralized database.

After all Eigen vectors are calculated and validated, results from all customers are pooled into the bank's data server. Then, the average weight for each alternative field is calculated using the arithmetic mean of AHP resulting weights. The final vector represents the ultimate priority weights of the CSR investment fields (Figure 2.2).

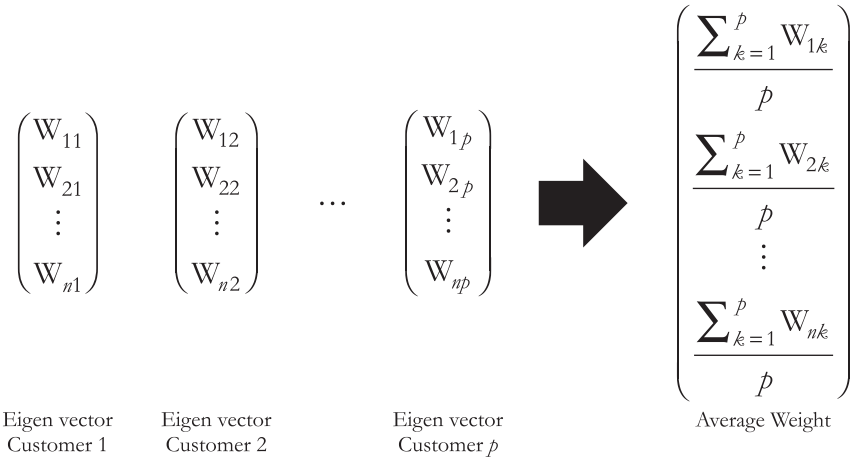

Figure 2.2: Calculation of the "pooled" priority weights for *n* CSR fields by *p* customers

Analyzing CSR disclosures of Islamic banks across seven countries (Table 2.3) demonstrated that the more frequent perspectives are Customers, Employees, Environment and Community. In the illustrative framework presented in Section 4, clients 'preferences are based on the perspectives cited above.

3.2. Linking CSR Programs to the Bottom Line

3.2.1. Designing the Dashboard's Structure

Once investment priorities are defined based on customers' evaluations, the bank is able to choose initiatives within each field of investment to construct a management dashboard for the CSR strategy.

First, we design the dashboard's overall structure (Figure 2.6). This structure is adapted from the works of Peloza (2009) and Schreck (2011). The dashboard comprises three indicator blocks[1]:

[1]The set of indicators used herein is not exhaustive nor is it based on a quantitative or qualitative selection method. It is purely indicative and serves as an illustration for the method we would like to present.

Social indicators : We include a selection of social indicators deemed important or fairly important by Islamic banks' managers based on Bani et. al., (2015) research. In addition, we also add the correspondence to the Global Reporting Initiative reporting standard (GR4) for the financial sector ;

Financial indicators: A selection of market and accounting based metrics frequently used ;

Mediating effect indicators: A selection of indicators that ensure the jointure between social and financial indicators.

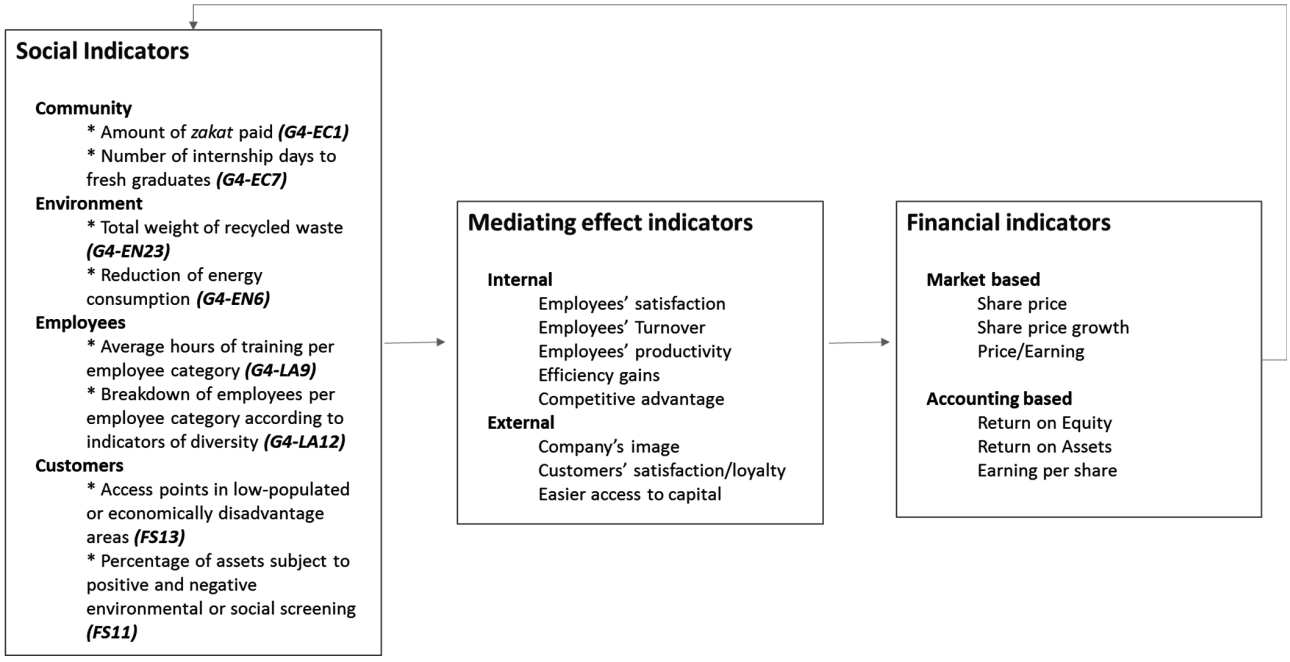

Figure 2.3: Structure of the Dashboard

Next, we model the linkages between indicators in order to understand the interrelation between social initiatives and financial performance. To do so, we use Decision-Making Trial and Evaluation Laboratory (DEMATEL) method.

3.2.2. Building Cause-Effect Relationships

(A) DEMATEL Method: DEMATEL method is a multi criteria decision 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 (Govindan et. al., 2014, Shaik and Abdul-Kader, 2014, Horng et. al., 2013, Hsu et. al., 2013, Chen et. al., 2011, Tsai et. al., 2010, Lin and Tzeng, 2009, Tsai and Chou, 2009, Yang et. al., 2008). In its original version, the DEMATEL method can be summarized as follows (Yang et. al., 2008):

First, the pairwise impact matrices of n indicators are collected from a group of p experts following a comparison scale as shown in Table 2.4.

Let $X(k) = [x_{ij}(k)]_{n \times n}$ denote the $n \times n$ answer matrix of expert k. The $n \times n$ average matrix A ($A = [a_{ij}]_{n \times n}$) is then calculated by averaging out the experts' scores as in Eq. 4:

$$a_{ij} = \frac{\sum_{k=1}^{p} x_{ij}(k)}{p} \tag{4}$$

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. (5) and (6). The resulting matrix is the normalized initial direct matrix D.

$$D = \lambda \times A \tag{5}$$

$$\lambda = \min\left[\frac{1}{\max 1 \le i \le n \sum_{j=1}^{n} \left| a_{ij} \right|}, \frac{1}{\max 1 \le j \le n \sum_{i=1}^{n} \left| a_{ij} \right|}\right] \tag{6}$$

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 $T = [t_{ij}]_{n \times n}$ to the inverse matrix $T = D \times (I - D)^{-1}$ as $\lim_{m \to \infty} D^m = [0]_{n \times n}$ (Eq. 7).

$$\begin{aligned} T &= D + D^2 + D^3 + \ldots + D^m \\ &= D(I + D + D^2 + \ldots + D^{m-1})(I - D)(I - D)^{-1} \\ &= D(I - D)^{-1} \end{aligned} \tag{7}$$

where I denotes the identity matrix.

However, this method has been contested in the study conducted by Lee, Tzeng, et. al., (Lee et. al., 2013) who argued that the normalized initial direct-indirect matrix D does not necessarily converge to the null matrix, meaning that $\lim_{m \to \infty} D^m = [0]_{n \times n}$ 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. 8):

$$\lambda' = \frac{1}{\max\left(\max 1 \le i \le n \sum_{j=1}^{n} \left| a_{ij} \right|, \varepsilon + \max 1 \le j \le n \sum_{i=1}^{n} \left| a_{ij} \right|\right)} \tag{8}$$

In this research, normalizing factor λ' is used as in Eq. 9 where ε is a very small positive number. With this modification, the original DEMATEL is corrected for, and the total influence matrix T converges to the inverse matrix (Eq. 4). In addition, vectors R and C are defined such that:

$$R = [r_i]_{n \times 1} = \left[\sum_{j=1}^{n} t_{ij}\right]_{n \times 1} \tag{9}$$

$$C = [c_j]_{1 \times n} = \left[\sum_{i=1}^{n} t_{ij}\right]_{1 \times n}$$

The sum r_i of the i^{th} row of matrix T denotes the total direct and indirect influence that factor i exerts on all other factors, while the sum of the j^{th} column of matrix T, c_j, shows the direct and indirect influence that factor j has received from all other factors 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. A directed graph representing the interrelations between factors is drawn on the plan (R + C, R – C). This graph is denoted as the Impact Relation Map (IRM)

(B) Employing DEMATEL to Construct the Dashboard: A group of managers within the company is asked to give their respective evaluations of the pairwise impacts between indicators. Each manager is asked to fill out four influence matrices corresponding to the four CSR fields of investments depicted in Figure 2.3, the objective being to define causal relationships between the given social indicators and the mediating and financial indicators. Figure 2.4 illustrates an example of the impact relation matrix for the environment field.

Environment Indicators
E_1: Recycled Waste
E_2: Energy Consumption

Mediating Indicators
M_1: Employee Satisfaction
M_2: Employee Productivity
M_3: Bank Reputation
M_4: Customer Satisfaction

Financial Indicators
F_1: Share Price growth
F_2: Return on Assets

	E_1	E_2	M_1	M_2	M_3	M_4	F_1	F_2
E_1	0							
E_2		0						
M_1			0					
M_2				0				
M_3					0			
M_4						0		
F_1							0	
F_2								0

Figure 2.4: Illustrative structure of the influence matrix for the Environment field

Next, DEMATEL method is deployed to derive the total influences exerted among indicators of all fields. The resulting impact relationships permit to construct an IRM per field, which can translate into the management dashboard (Figure 2.5).

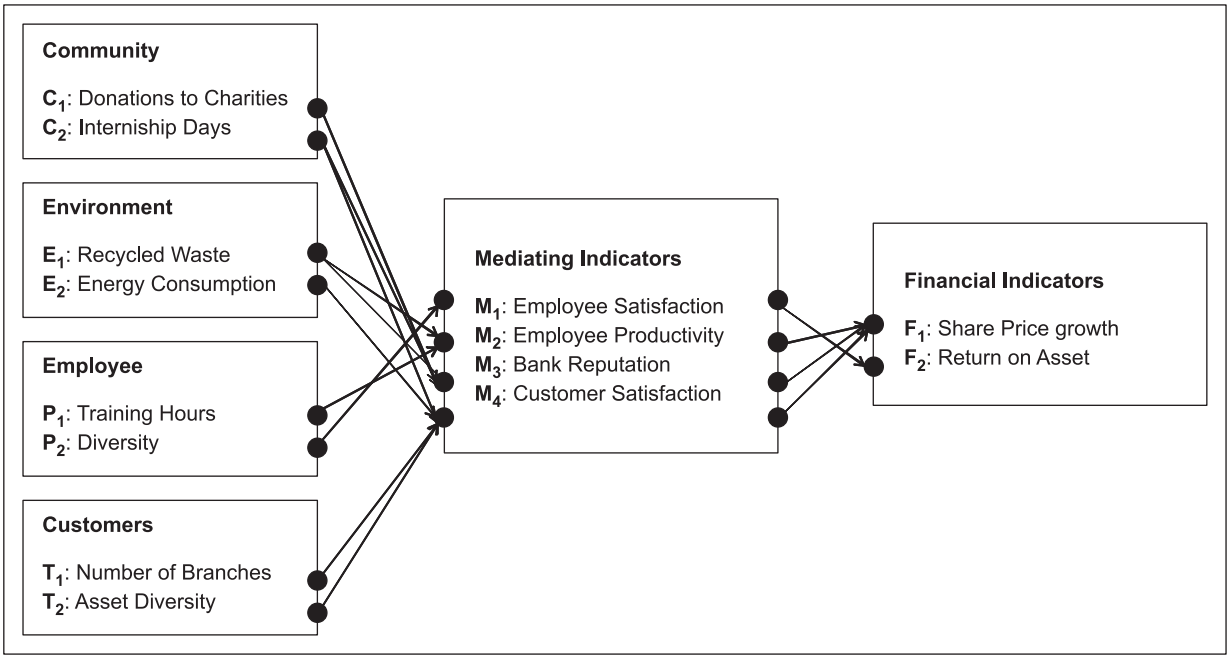

Figure 2.5: Deriving the management dashboard from the consolidated DEMATEL impacts

The resulting dashboard depicts the indicators (or initiatives) which most significantly impact upon the financial results. More importantly, thanks to DEMATEL, we are able to quantify the amount of this impact, and pinpoint, therefore, the profit-maximizing initiatives.

3.3. Deciding on the Investment Allocation Strategy

The CSR investment strategy is based on determining the investment combined priorities to derive the corresponding budget allocation. Because the bank seeks to simultaneously satisfy its customers' needs and shareholders' objectives, the decision has to be made based on both inputs.

In this model, we suggest calibrating DEMATEL cause-effect values using a weighted average combination of customers' priorities −AHP resulting weights− and managers' preferences. In other terms, for each project, the impact value, resulting from the total direct-indirect matrix, is multiplied by the weighted average combination (Eq. 10). This combination is in fact used directly as the new budget allocation.

Assuming that the bank's managers follow the simple strategy of equal budget allocation for the various CSR projects, let α represent the weight of the equalization strategy in the new combined weighting, and N the number of projects. The budget allocation distribution is given by Eq. 10.

$$C = \left(\alpha \times \frac{1}{N}\right) + \left((1-\alpha) \times \text{AHP weight}\right) \tag{10}$$

The resulting combined impact weight per CSR project is then calculated as follows (Eq. 11).

$$\text{New Combined Impact per Project} = \frac{\text{DEMATEL impact} \times C}{(1/N)} \tag{11}$$

3.4. Checking the Strategy: The System Dynamics Model

3.4.1. System Dynamics

System Dynamics (SD) is a concept aimed at conceptualizing the complex interrelations between elements of a system and assessing how these elements progress within and impact upon the system over time. SD modeling is based on the concept of Causal Loop Diagrams (CLD), which is a graphic representation of the relationships and feedback loops among the elements of a system. In a feedback loop, a component may impact upon another one and cause it to change. The impact is transferred to other components along the loop, causing the change to occur back into the originating component (Hannon and Ruth, 1994). By modeling the feedback loops on a simulation software using appropriate variables and equations, it is possible to view the results of the intricate links created in the system and to simulate the future behavior of each component in the model. Another central concept of the SD approach is the stock-flow diagram. Stocks represent the accumulations within the system, either tangible or intangible, while flows symbolize the rate of change in the system.

3.4.2. Constructing the Causal Loop Diagram (CLD)

We suggest constructing the SD's CLD based on DEMATEL outcomes employing the construction method presented by Chaker et. al., (2015). In this method, the authors consolidate the total impacts

received by factors in DEMATEL's total direct-indirect matrix and use them as weights for parameters in the equations involved in the CLD. In our model, we make an adjustment by calibrating these weights using a combination of customers' and managers' preferences.

4. ILLUSTRATIVE SIMULATION

In this section, we build an illustrative example of the proposed model. Hypothetical values for CSR fields' priorities and DEMATEL total influence matrices are set. The CLD is derived based on these matrices, and the system dynamics simulation model is constructed and run on Vensim PLE software.

4.1. The Simulation Model

4.1.1. Assumptions

To construct the model, we make the following illustrative assumptions:

Table 2.1
Importance of CSR fields based on Customers preferences (AHP results)

CSR Field	*Customers' Preferred Allocation*	*Ranking*
Community (C_1, C_2)	70%	1st
Customers (T_1, T_2)	15%	2nd
Environment (E_1, E_2)	10%	3rd
Employees (P_1, P_2)	5%	4rth

Table 2.2
Impact of CSR programs based on managers' inputs (DEMATEL results)

Indicators	*Aggregated Impact on Mediating Variables*
C_1	0.1
C_2	0.05
E_1	0.15
E_2	0.08
P_1	0.21
P_2	0.14
T_1	0.27
T_2	0.19

4.1.2. Making the Investment Decision

At this point, it is possible to calculate the new priority weights that take into account both customers' preferences and profit maximizing considerations. The new priority ranks are calculated as a calibrated calculation of DEMATEL impacts using AHP weights (Eq. 10). In this simulation, we assume that AHP importance rakings per field are evenly distributed amongst the programs within that field. For instance,

if the overall AHP importance given by customers to the field Community is 70%, then each of the two programs within this field is assumed to have 35% importance.

The obtained ranks serve as budget allocation weights that will be integrated into the stock-flow chart equations of the SD model.

Table 2.3
Calculation of the new weights based on both customers' and manages' inputs

Indicators	*Customers' Preferred Allocation (%)*	*Manager's Equal Allocation (%)*	*DEMATEL cause-effect Impacts*	*New Combined Impacts ($\alpha = 0.5$)*
C_1	35	12.5	0.1	0.19
C_2	35	12.5	0.05	0.10
E_1	5	12.5	0.15	0.11
E_2	5	12.5	0.08	0.06
P_1	2.5	12.5	0.21	0.13
P_2	2.5	12.5	0.14	0.08
T_1	7.5	12.5	0.27	0.22
T_2	7.5	12.5	0.19	0.15

4.1.3. Implementation

The simulated model is a plain simplification of the complex reality. We do not aim here to model exhaustively the interrelations arising in the system, but we are rather mostly interested in assessing the impact of introducing customers' preferences −featuring a new weight distribution− into this model, and in analyzing how this input can shape outputs. Therefore, it is important to note that equations in the model are based on illustrative figures and best judgment rather than experimental results established by research. In addition, for the sake of avoiding additional complexity, most equations are assumed linear except for goal-gap loops. Three simulation scenarios are run:

- **Scenario 1 ($\alpha = 1$):** Called *"Managers Only"* scenario, it features an equal budget allocation assuming DEMATEL cause-effect impacts established by the bank's managers.
- **Scenario 2 ($\alpha = 0$):** Called *"Customers Only"* scenario where budget is allocated based exclusively on customers' preferences.
- **Scenario 3 ($\alpha = 0.5$):** Called *"Combined"* scenario whereby the new allocation takes into account the weighted average of both managers (equal allocation) and customers (exclusive AHP weights). Note that for this combination, the bank can decide on any value for α between 0 and 1.

It is important to note that while the weights in equations change by scenario, everything else in the model is kept constant, the objective being, as mentioned above, to assess how the model behaves in the presence vs. the absence of customers' evaluations. The model's stock-flow chart is represented on Figure 2.6.

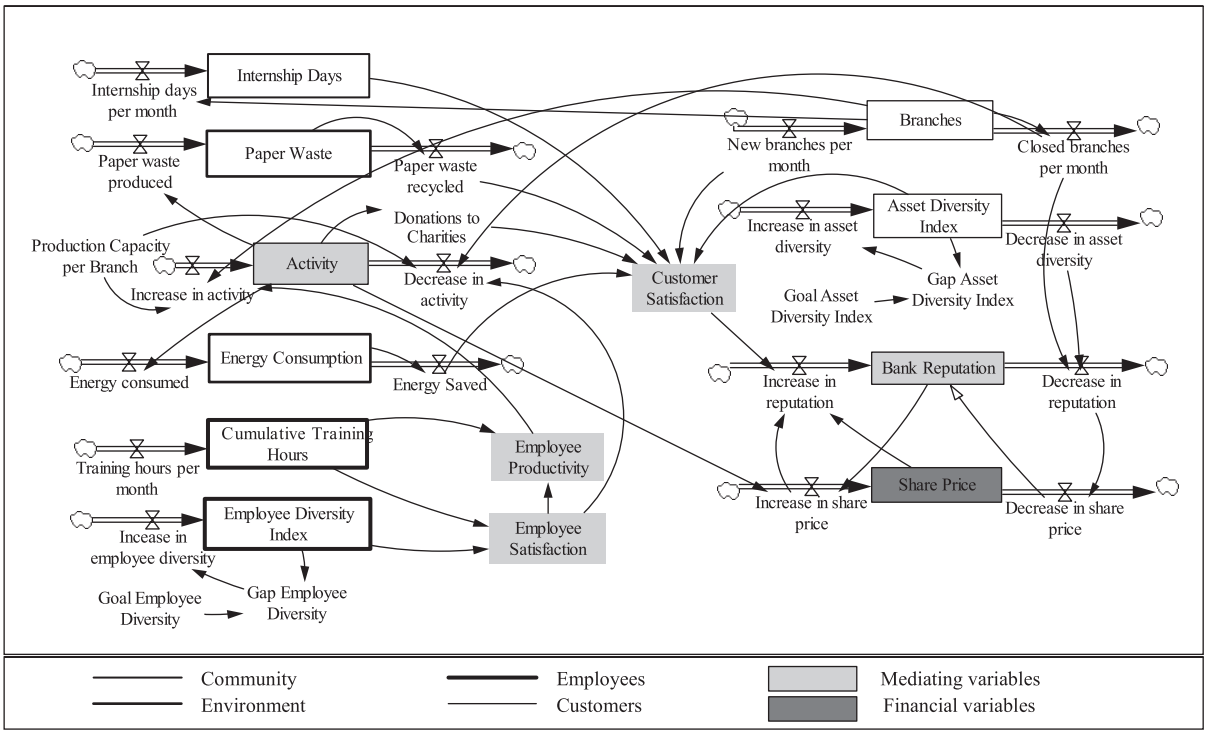

Figure 2.6: Stock-Flow chart of the model

4.2. Outputs and Discussion

4.2.1. Modeling Outputs

Calculations in Table 2.3 show that the resulting priority ranking presents an interesting mix between customers' preferences and managers' priorities. The resulting combination between AHP weights and DEMATEL weights succeeds in capturing the top projects, which yield the highest amount of importance for both parties (Table 2.4). In other terms, the few factors which yield at least 80% of satisfaction for customers and managers separately are represented −to a significant extent− in the top 80% of the combined satisfaction. In fact, based on the numerical example presented above, the newly calculated ranking covers 100 % of customers' top 80% priorities, and 85% of managers' top 80% priorities. Hence, this new combined ranking methodology addresses effectively the needs of the two stakeholder types.

Table 2.4
Top drivers of importance in the simulated model

	For Customers Only	*For Managers Only*	*For Customers and Managers Combined*
Top 80% Drivers of Importance	Rank 1, 2: Community (C_1, C_2)	Rank 1: Customers (T_1)	Rank 1: Customers (T_1)
	Rank 3, 4: Customers (T_1, T_2)	Rank 2: Employees (P_1)	Rank 2: Community (C_1)
		Rank 3: Customers (T_2)	Rank 3: Customers (T_2)
		Rank 4: Environment (E_1)	Rank 4: Employees (P_1)
		Rank 5: Employees (P_2)	Rank 5: Environment (E_1)
			Rank 6: Community (C_2)

4.2.2. Simulation Outputs

The simulation is run for 120 periods (months) representing 10 years of activity of the bank. For the simulation example at hand, results show that taking into account customers' viewpoint regarding investment in CSR projects leads to a significant variation in both production variables and intermediary variables (Figure 2.7).

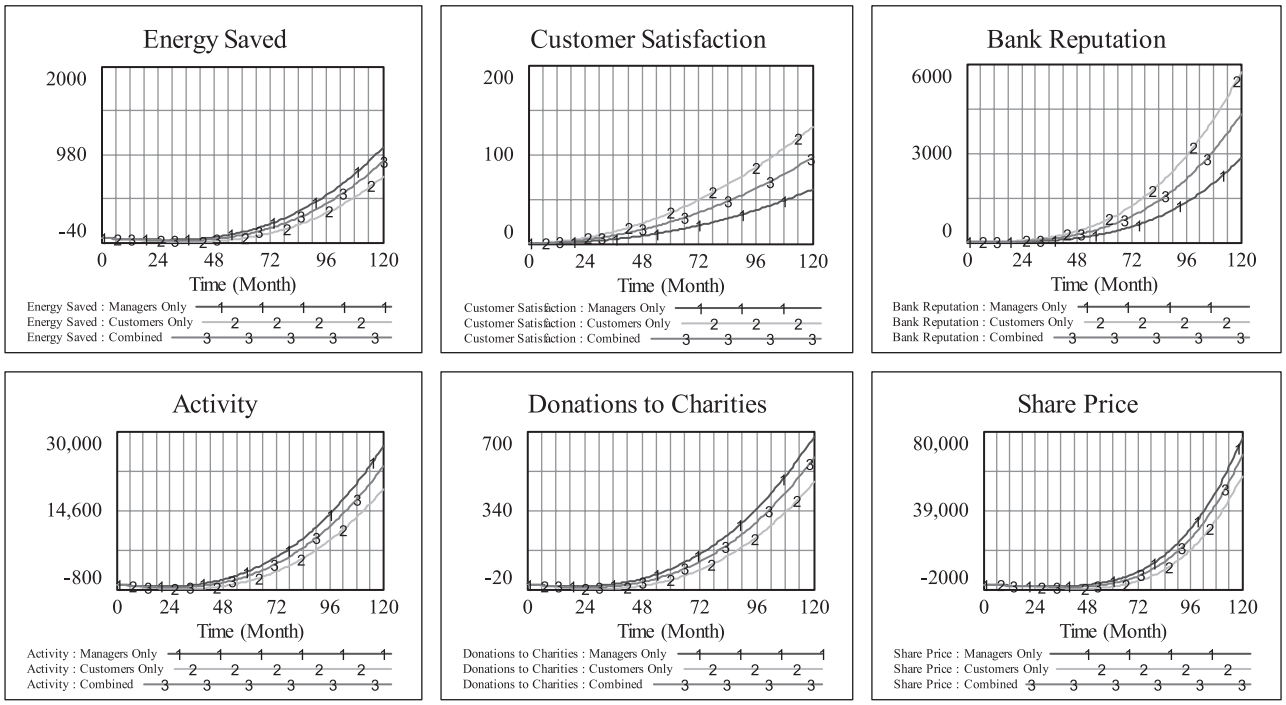

Figure 2.7: Illustrative outputs of the simulation

The outputs above show that although production-related variables (eg. Activity, Donations to charities) are higher when budget is equally distributed across CSR projects (scenario 1) than when it takes into account, to various extents, customers' preferences (scenarios 2 and 3), this order is immediately inversed for intermediary variables as soon as customers' preferences are considered. More particularly, *Customer Satisfaction* and *Reputation* are highest under scenario 2 and lowest under scenario 1. This is not quite surprising since factors, which maximize these variables, are strongest under scenario 2 −when customers' preferences account exclusively for budget allocation, than under scenario 1 −when these preferences are not at all considered. As for the financial variable *Share Price*, its shape is tightly dependent on the strength of the relationship it has with *Reputation* and *Activity* as it is a weighted combination of both. We note as well that the curve of the combined scenario (scenario 3) falls naturally in the middle of the two curves representing the other two scenarios. This is explained by the middle α value chosen for this simulation ($\alpha = 0.5$).

All in all, if the outputs above remain inconclusive because data is illustrative only, it is nonetheless important to mention that, in a real experiment, this model is able to inform the bank's decision makers about the expected performance of their organization under various scenarios. As a result, they can decide on the extent to which they want to take into account their customers' viewpoints regarding CSR projects investments, namely by choosing the allocation threshold α^* which maximizes outputs.

If taken at face value, the proposed model is important for at least three considerations. Firstly, the model allows the bank to take into account the choices of one of its most important stakeholders; its customers. Secondly, the model is constructed based on an iterative process, which offers the bank the ability to simulate, revise and adjust decisions based on outputs. Thirdly, the model helps management to track variables' evolutions over time and depict any unexpected patterns beforehand, which is highly valuable in strategic decision-making.

5. CONCLUSIONS, LIMITS AND PERSPECTIVES

This paper addresses CSR investment decision making for an Islamic bank. Given the rising importance of customers as key stakeholders in the firm's CSR strategy, we aim to understand the extent to which customers' preferences impact upon the bank's investment strategy. More particularly, we describe, through a simplified model, the dynamics that take place when social projects are linked to financial outputs via mediating variables as far as choosing CSR projects is concerned.

We construct a model that helps to appraise the impact of introducing customers' preferences on the firm's outputs. We combine two widely accepted decision-making techniques; DEMATEL and AHP to determine the cause-effect relations between input, intermediary, and output variables. We simulate variables' behavior over time using System Dynamics modeling, and track this behavior under three scenarios: *Managers* scenario where the model is constructed based on an equal budget allocation across projects; *Customers* scenario whereby customers' preferences serve as budget allocation weights; and *Combined* scenario where budget allocation is a weighted average of the equalization strategy and customers' preferences.

We use hypothetical data and launch a simulation for a period of 10 years. Illustrative results show that the model displays various growth patterns depending on the extent to which customers' preferences are taken into account. When everything else is kept constant, the only variation in cause-effect priorities, which translates budget allocation weights, leads to an important change in the bank's performance trends. This leads to the following key conclusions:

1. Taking into consideration customers' priorities helps to calibrate forecasts made internally by the bank's management;
2. The proposed calibration methodology successfully addresses customers' preferences and managers' priorities;
3. Implementing the proposed modeling method on a simulation platform allows to predict unexpected patterns and therefore be better prepared for the future.

This research presents the main limitation of being implemented with hypothetical data. Results can be considered meaningful only if they are drawn from empirical experiments.

Another challenge of the proposed method lies in the representativeness of the customer sample. In order to successfully capture customers' perspective, the sample has to be carefully chosen to obtain an appropriate representation of reality.

Finally, we see that the most compelling perspective for this work is conducting an experimental case study on an established Islamic bank that seeks to strengthen or reconfigure its CSR strategy by making new investments. This model would then be a powerful tool for decision-making.

6. APPENDIX

Table 2.5
The Fundamental Scale (Saaty, 1987)

Intensity of Importance on an absolute scale	*Definition*	*Explanation*
1	Equal importance	Two activities contribute equally to the objective
3	Moderate importance of one over the other	Experience and judgment strongly favor one activity over another
5	Essential or strong importance	Experience and judgment strongly favor one activity over another
7	Very strong importance	An activity is strongly favored and its dominance demonstrated in practice
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation
2, 4, 6, 8	Intermediate values between the two adjacent judgments	When compromise is needed
Reciprocals	If activity *i* has one of the above numbers assigned to it when compared with activity *j*, then *j* has the reciprocal value when compared with *i*	

Table 2.6
Random consistency index (RI) (Saaty, 1987)

n	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Random consistency index (RI)	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

Table 2.7
List of CSR domains for a selection of Islamic banks in seven countries

Countries	*Islamic banks*	*List of CSR domains*
Bahrain	BIsB	• Industry Sponsorships • Developing Bahraini nationals • Increasing the awareness of Islam • Improving the well-being of the local community
Egypt	ADIB	• Education • Health • Community
International	AL RAJHI Bank	• Banking Products • Internal Policies • Human resources • Education • Health care • Housing

Countries	*Islamic banks*	*List of CSR domains*
International	KFH	• Principles • Clients • Employees • Community • Environment
International	Al Baraka	• Philanthropy • Qard Hasan • Economic Opportunities & Social Investments
Malaysia	Maybank, AmBank and Bank Islam	• Community • Environment • Workplace • Marketplace
Malaysia	Hong Leong Group	• Integration into Business Strategy • Environment and Ethics • Community Embedment and Philanthropy • Staff Engagement and Development • Unified Group Contribution • Group Sustainability Reporting
Malaysia	Alliance Bank	• Strengthening the Customers • Investing In the Employees • Caring and Responsive Employer • Caring for the Community • Caring for the Environment
Saudi Arabia	NCB	• Orphans • Entrepreneurs • Productive families • Voluntary work
Turkey	Turkiye Finans	• Customers • Employees • Environment • Community
United Arab Emirates	Dubai Islamic Bank	• Zakat • Qard hassan (interest free loans)
United Arab Emirates	AL HILAL Bank	• Economic performance • Environmental performance • Employment practices • Product and service responsibility • Society

Table 2.8
Comparison scale of DEMATEL technique

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

References

Ahmed, A. 2010, Global financial crisis: an Islamic finance perspective. *International Journal of Islamic and Middle Eastern Finance and Management,* 3, 306-320.

Ameer, R. & Othman, R. 2012, Sustainability practices and corporate financial performance: A study based on the top global corporations. *Journal of Business Ethics,* 108, 61-79.

Asutay, M. 2007, Conceptualisation of the second best solution in overcoming the social failure of Islamic finance: Examining the overpowering of homoislamicus by homoeconomicus. *IIUM Journal in Economics and Management,* 15, 167-195.

Asutay, M. 2012, Conceptualising and locating the social failure of Islamic Finance: aspirations of Islamic moral economy vs. the realities of Islamic finance. *Asian and African Area Studies,* 11, 93-113.

Auger, P., Devinney, T.M. & Louviere, J. J. 2007, Using best–worst scaling methodology to investigate consumer ethical beliefs across countries. *Journal of Business Ethics,* 70, 299-326.

Bani, H., Ariffin, N.M. & Rahman, A.R.A. 2015, The corporate social performance indicators for Islamic banks: The manager's perception. *Ethics, Governance and Regulation in Islamic Finance*, 105.

Baron, D.P. 2001, Private politics, corporate social responsibility, and integrated strategy. *Journal of Economics & Management Strategy,* 10, 7-45.

Chaker, F., EL Manouar, A. & Janati Idrissi, M.A. 2015, Towards a system dynamics modeling method based on DEMATEL. *International Journal of Computer Science & Information Technology*, 7.

Chen, F.-H., Hsu, T.-S. & Tzeng, G.-H. 2011, A balanced scorecard approach to establish a performance evaluation and relationship model for hot spring hotels based on a hybrid MCDM model combining DEMATEL and ANP. *International Journal of Hospitality Management,* 30, 908-932.

European_commission 2013, How companies influence our society: citizens' view. *Flash Eurobarometer.*

European_commission. 2016, *Corporate Social Responsibility (CSR)* [Online]. Available: http://ec.europa.eu/growth/industry/corporate-social-responsibility_en [Accessed 16/08/2016 2016].

EY 2013, 2013 Six growing trends in corporate sustainability.

Govindan, K., Kannan, D. & Shankar, K.M. 2014, Evaluating the drivers of corporate social responsibility in the mining industry with multi-criteria approach: A multi-stakeholder perspective. *Journal of Cleaner Production*, 1-19.

Hannon, B. & Ruth, M. 1994, *Dynamic Modelling,* New York, USA, Springer-Verlag.

Horng, J.-S., Liu, C.-H., Chou, S.-F. & Tsai, C.-Y. 2013, Creativity as a critical criterion for future restaurant space design: Developing a novel model with DEMATEL application. *International Journal of Hospitality Management,* 33, 96-105.

Hsu, C.-W., Kuo, T.-C., Chen, S.-H. & Hu, A.H. 2013, Using DEMATEL to develop a carbon management model of supplier selection in green supply chain management. *Journal of Cleaner Production,* 56, 164-172.

Ibm_institute_for_business_value 2008. Attaining sustainable growth through corporate social responsibility. 20.

KPMG 2013, The KPMG Survey of Corporate Responsibility Reporting 2013. KPMG International.

KPMG 2015, The KPMG Survey of Corporate Responsibility Reporting 2015. KPMG International.

Kramer, M.R. 2011, Creating shared value. *Harvard business review,* 89, 62-77.

Lee, H.-S., Tzeng, G.-H., Yeih, W., Wang, Y.-J. & Yang, S.-C. 2013, Revised DEMATEL: Resolving the Infeasibility of DEMATEL. *Applied Mathematical Modelling,* 37, 6746-6757.

Lin, C.-L. & Tzeng, G.-H. 2009, A value-created system of science (technology) park by using DEMATEL. *Expert Systems with Applications,* 36**,** 9683–9697.

Maali, B., Casson, P. & Napier, C. 2006, Social reporting by Islamic banks. *Abacus,* 42, 266-289.

Makni, R., Francoeur, C. & Bellavance, F. 2009, Causality between corporate social performance and financial performance: Evidence from Canadian firms. *Journal of Business Ethics,* 89, 409-422.

Margolis, J.D., Elfenbein, H.A. & Walsh, J.P. 2007, Does it pay to be good? A meta-analysis and redirection of research on the relationship between corporate social and financial performance. *Ann Arbor,* 1001, 48109-1234.

McDonald, L.M. 2015, Corporate Social Responsibility (CSR) in banking: what we know, what we don't know, and what we should know.

McDonald, L.M. & Rundle-Thiele, S. 2008, Corporate social responsibility and bank customer satisfaction: a research agenda. *International Journal of Bank Marketing,* 26, 170-182.

Mohd Nor, S. 2012, Integrating moral in a dynamic model of corporate social responsibility in Islamic Economics and Finance.

Morsing, M. & Schultz, M. 2006, Corporate social responsibility communication: stakeholder information, response and involvement strategies. *Business Ethics: A European Review,* 15, 323-338.

Nobanee, H. & Ellili, N. 2016, Corporate sustainability disclosure in annual reports: Evidence from UAE banks: Islamic versus conventional. *Renewable and Sustainable Energy Reviews,* 55, 1336-1341.

Peloza, J. 2009, The challenge of measuring financial impacts from investments in corporate social performance. *Journal of Management*.

Preston, L.E. & O'Bannon, D.P. 1997, The corporate social-financial performance relationship. *Business and society,* 36, 419.

Rahman, R.A. & Saimi, N.S. 2015, Determinants of ethical identity disclosure among Malaysian and Bahrain Islamic banks. *Ethics, Governance and Regulation in Islamic Finance*, 9.

Saaty, R.W. 1987, The analytic hierarchy process—what it is and how it is used. *Mathematical Modelling,* 9, 161-176.

Scholtens, B. 2008, A note on the interaction between corporate social responsibility and financial performance. *Ecological economics,* 68, 46-55.

Schreck, P. 2011, Reviewing the business case for corporate social responsibility: New evidence and analysis. *Journal of Business Ethics,* 103, 167-188.

Shaik, M.N. & Abdul-Kader, W. 2014, Comprehensive performance measurement and causal-effect decision making model for reverse logistics enterprise *Computers & Industrial Engineering,* 68, 87-103.

Tsai, W.-H. & Chou, W.-C. 2009, Selecting management systems for sustainable development in SMEs: A novel hybrid model based on DEMATEL, ANP, and ZOGP. *Expert Systems with Applications,* 36, 1444-1458.

Tsai, W.-H., Hsu, J.-L., Chen, C.-H., Lin, W.-R. & Chen, S.-P. 2010, An integrated approach for selecting corporate social responsibility programs and costs evaluation in the international tourist hotel. *International Journal of Hospitality Management,* 29, 385-396.

Tsoutsoura, M. 2004, Corporate social responsibility and financial performance. *Center for responsible business.*

Wajdi Dusuki, A. & Irwani Abdullah, N. 2007, Why do Malaysian customers patronise Islamic banks? *International Journal of Bank Marketing,* 25, 142-160.

Wu, M.-W. & Shen, C.-H. 2013, Corporate social responsibility in the banking industry: Motives and financial performance. *Journal of Banking & Finance*, 37, 3529-3547.

Yang, Y.-P. O., Shieh, H.-M., LEU, J.-D. & Tzeng, G.-H. 2008, A Novel Hybrid MCDM Model Combined with DEMATEL and ANP with Applications *International Journal of Operations Research*, 5, 160-168.