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Application of Artificial Neural Networks to Recognize the Relationship Between Corporate Social Responsibility and Financial Performance

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Abstract: The purpose of the present research is to investigate the application of artificial neural networks to recognize the relationship between companies' social responsibility and their financial performance. The data were collected from 20 companies active in the field of pharmaceutical products in Tehran and East Azarbaijan Stock Exchange. The responders to the social responsibility questionnaire consist of the managers of these companies (5 managers from each company). This questionnaire is based on Likert's 5-item scale and measures the 5 dimensions of social responsibility. For gathering information about financial performance, size and risk, we have used financial documents of the firms. Multi-layer perceptron (MLP) neural networks with hyperbolic tangent function trained by feed forward training algorithm were utilized to build the recognition model. The result reveals that the recognition accuracy of the test on the model is greater than that expected by chance. Meanwhile, a set of contribution weights representing the general importance of each independent variable was produced. The advantages of using the model are highlighted. The authors believe that the model is useful and suitable to design internal and external organizational strategies.

Key words: Social Responsibility · Financial · MLP · Neural Networks · Risk

INTRODUCTION

Nowadays, most experts believe that for reasons such as privatization and transfer of economical power from governments to organizations and thereby, diminishing of the governments, governments do not have the necessary resources and power to solve the social and environmental problems, so organizations should help them in this regard. In addition, companies' social responsibility is a 50-year concept introduced first in 1953 by "Havard Bowen". Today, however, because of the numerous social and environmental problems, this concept has regained importance. Corporate Social Responsibility (CSR) has emerged in recent years as both an important academic construct and a pressing corporate agenda item [1]. Firms have been found to engage in socially responsible behaviors not only to fulfill external obligations such as regulatory compliance and stakeholder demands, but also due to enlightened-self interest considerations such as increased competitiveness and improved stock market performance. From a marketing perspective, the firm's economic benefits from CSR have been documented in its link to consumers' positive product and brand evaluations, brand choice and brand recommendations. As socially responsible investors typically invest in these sustainable companies, the performance of socially responsible companies is a key element in their financial performance. We will investigate the interaction between the corporate social responsibility of a company and its financial performance. For this purpose, we have investigated the relationship between the components of social responsibility and the financial performance of the pharmaceutical products manufacturing companies active in the stock market of Tehran and East Azarbaijan provinces. The components of social responsibility are corporation, society, Local community, business behavior, environment, work condition and corporate governance [2].

Investigating this relationship by using traditional statistical methods lacks accuracy and generalizability. Therefore, in this research the artificial neural networks, which have high rates of accuracy and generalizability, have been used. On the whole, the purpose of this research is to investigate the application of artificial

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neural networks to recognize the relationship between the social responsibility and financial performance of corporations.

Literature Review: Academics' consideration of the notion of corporate social responsibility has been in existence since the 1950s, proliferating in the 1970s [3] and gaining increasing currency in the 1990s and the new millennium [4]. Definitions of social responsibility typically link the construct of social responsibility to increased ethical behavior. For example, Watts and Holme (1999) define social responsibility as follows: ''Corporate social responsibility is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large" [5].

Holmqvist (2009) definition of CSR as the organization's status and activities with respect to its perceived societal obligations provides a useful starting point that has also been adopted in subsequent research on CSR in marketing [6]. According to the stakeholder theory [7], CSR activities may enhance brand image, not only for customers, but also for employees and other stakeholders. Therefore, such activities can subsequently enhance customers 'satisfaction, employees' morale and retention rates and relationships with governments. With a growing concern for corporate social responsibility (CSR), leading companies in various industries, driven by companies' stakeholders, consumers, societies and governments, are accelerating initiatives to demonstrate their CSR commitments.

Numerous studies have examined motivations for environmental responsibility [8] as well as the motivations for social responsibility and there is increasing trend in looking at corporate social and environmental responsibility (CSER) in union. Corporate Social Responsibility (CSR) can be defined as "the voluntary integration, by companies, of social and environmental concerns in their commercial operations and in their relationships with interested parties'' [9]. Likewise, reporting on environmental and social matters has been prevalent for several decades with further growth over the past decade or so.

The relation between CSR and financial performance has been investigated in theoretical and empirical studies by researchers on CSR. Argenti (2004) presented an in-depth case study of Starbuck's collaboration with several NGOs, deriving lessons for successful business-NGO partnerships [10]. Rondinelli and London (2002) presented several examples from business practice to support their analysis of benefits from cross-sectoral environmental collaborations [11]. Although most of these studies do not explicitly focus on the business case for CSR, they often provide valuable insights into CSR benefits.

Orlitzky *et al*., (2003) performed a meta-analysis of 52 studies in search of the relationship between corporate social performance and corporate financial performance. The results confirm that socially responsible investing pays off. The relationship is strongest for the social dimension within corporate social performance [12].

Most of the above studies have made use of the traditional methods of data analysis such as regression, numerical taxonomy, etc. For example, Youn and Gu (2010) mentioned that the widely used traditional mathematical and statistical data analysis techniques, such as regression analysis, numerical taxonomy or factor analysis are not sufficiently powerful for the task of detecting interesting conceptual patterns or revealing structure in a collection of observations [13]. They could be used to learn complex patterns of information and generalize the learned information [14]. The artificial neural networks method can be used as an alternative. Artificial neural networks (ANNs) are distributed and parallel information systems which simulate the human brain to process information. ANNs simulate human cognition by modeling the inherent parallelism of neural circuits in the brain using mathematical models of how the circuits function [15].

Since early 1980, there has been an explosive growth in pure and applied research related to neural networks. During this period, the multilayer feed-forward neural networks was introduced and immediately found wide application in many fields [16]. The use of ANNs has gained popularity in business and marketing that have helped to solve many problems, including market segmentation, sales forecasting, direct marketing, new product development and target marketing [17-25]. The ANNs approach has been applied more recently to consumer satisfaction and loyalty analyses [26-28]. Grønholdt and Martensen (2005) applied ANNs in customer satisfaction analysis to identify existing patterns in the data and synergies between the drivers of satisfaction [29]. Many researchers are devoted to the study of using ANNs in marketing. Ville (1996) applied ANNs to explore consumer behavior for market segmentation and advertising [30].

Nasri (2010) studied the application of artificial neural networks in predicting risk management models. He used the artificial neural networks as an instrument to facilitate decision-making. The results of the research showed that the artificial neural networks have sufficient predicting accuracy [31]. Soroush *et al*., (2009) reviewed the application of artificial neural networks in supply chain management and their future. In their research, the artificial neural networks technique has been used to predict demand. The researchers concluded that artificial neural network can be applied as a useful instrument for prediction [32].

Zahavi and Levin (1997) utilized different kinds of neural network structure to create prediction model in marketing [24]. Fish *et al*., (1995) used the back propagation neural networks to segment target markets [33]. Crooks and Ted (1995) utilized ANNs to train data of consumer behavior for predicting potential customers to avoid un-target advertisement [34]. Kim *et al*., (2005) applied artificial neural networks guided by genetic algorithms to target households for providing a particular product or service [23]. Although the result lost the advantage in interpretability, it was still more accurate than Principal component analysis in targeting households.

Classification and recognition problems have been identified as the most commonly cited applications of artificial neural networks such as predicting bankruptcy and loan default and modeling consumer choice and advertising responses [19, 22, 35, 24, 25]. Kaefer *et al*., (2005) utilized the neural network (NN) to classify variables for determining the most profitable time in a purchasing history to classify and target prospective consumers new to their categories [36]. Artificial neural networks are different from other traditional statistical methods; they require only minimum knowledge to the problem's structure [37]. Because the network develops an internal relationship between the variables, prior knowledge of the statistical distribution of the data is not required [14]. Therefore, all these make artificial neural networks particularly suitable to complex classification problems in which the mapping rationale is either fuzzy, inconsistent, or completely unknown. Consequently, most business applications can be classified under fuzzy classifications.

In the present article, artificial neural networks technique has been used to investigate the relationship between corporate social responsibility and corporate financial performance.

Method: From the viewpoint of purpose, this study is an applied-developmental research because the results of it can be used to develop and promote the welfare of human life. Since this study seeks to identify the relationship between two variables, the "research method" is of correlation type. The research population consists of all the companies accepted to the stock exchange, which are active in the field of pharmaceutical products in Tehran and East Azarbaijan. The list of these companies, along with their measured variable, has been given in Table (1). Due to the fact that all the companies in the statistical population from March, 2007 to September, 2007 have been studied, there was no need for sample size calculation and sampling. In the present research model, there are two main variables and we seek to determine the relationship between them. The variables are:

- *Social responsibility.*
- *Financial Performance.*

In order to measure the financial performance variable, The ROA[1] criterion is used, which is calculated by using the ratio of "net profit to the total assets". The necessary information to calculate this criterion is taken from organizations' financial documents (See Appendix-financial data of the companies).

The two moderating variables in this study are the risk and the size of the organization. Organization risk variable is measured by using the benchmark "ratio of debts to the total assets" and the variable of organization size is measured by using the criterion "total number of the personnel. In the present research, the secondary data have been gathered through library study and the financial documents of the organizations (for the financial performance and moderating variables). In order to collect the basic data about the independent variable of social responsibility (and its 5 dimensions), a questionnaire was used. The questionnaire that has been used to measure the variable CSR consists of 27 question based on Likert's 5-point (completely agree-completely disagree) spectrum.

In order to assess the validity of the questionnaire, in addition to getting comments from the experienced academic members in the field of business and administration, research methodology and statistics, we consulted with some of the senior managers of the organizations and the questionnaire validity was confirmed by them.

[1]Return on Assets(ROA)

Table 1: List of the companies and their measured variables

Variables	CSR and dimensions								
Companies	CSR	C.G	S.L.C	B.B	E	W.C	ROA	Size	Risk
Hakim pharmaceutics	499	59	105	117	137	81	0.09	339	0.92
Abureihan	513	58	106	124	132	93	0.12	348	0.65
Chimi Daru	418	45	82	97	110	84	0.30	300	0.44
Daru pakhsh primary material manufacture	505	57	109	111	136	92	0.35	292	0.84
Sina Daru	443	65	77	110	119	72	0.28	349	0.44
Razak pharmaceutic laboratories	417	48	79	97	115	78	0.17	316	0.74
Tehran Daru	387	49	70	102	104	62	0.05	195	0.86
Tehran Chimie	395	54	68	96	103	74	0.06	200	0.86
Daru pakhsh Factories	417	54	73	101	122	67	0.14	1029	0.71
Osveh Pharmaceutics	425	55	82	113	112	63	0.32	355	0.41
Jaber ebn Hayyan pharmaceutics	335	42	62	81	97	53	0.27	508	0.49
Rooz Daru	467	53	81	113	124	96	0.28	249	0.39
Daru pakhsh pharmaceutics chemistry	484	51	91	111	136	95	0.13	157	0.67
Dr. Ahadi pharmaceutics	285	32	62	64	76	51	0.20	193	0.39
Kosar pharmaceutics	297	34	55	72	81	55	0.17	274	0.54
Loghman Hygienic pharmaceutics	296	33	49	77	80	57	0.08	230	0.79
Pars Daru	503	52	92	121	138	100	0.07	237	0.79
Iran Injectional products	494	60	88	110	141	95	0.18	283	0.63
Iran Daru	273	31	50	67	71	54	0.24	199	0.64
Zahravi pharmaceutics	530	61	107	114	147	101	0.24	257	0.62

Table 2: Cronbach's alpha values of variables

Potential variable	Number of measuring variables	Cronbach α value
Work Condition	5	0.840
Environment	8	0.848
Business Behavior	6	0.818
Society And Local Community	5	0.816
Corporate Governance	3	0.840
Total	27	0.938

According to Nunnally (1978), the value higher than 0.7 indicates a considerably high reliability [38]. Cuieford (1965) also points out that the Cronbach's α value higher than 0.7 indicates high reliability, the value between 0.7 and 0.35 means acceptable reliability and the value lower than 0.35 means the reliability should be rejected [39].

In order to meet the reliability of the questionnaire, the questionnaire was first distributed in a pilot phase among 10% of the respondents (total number of respondents is 100) and Cronbach's alpha coefficient in the pilot phase was 0.818. In Table (2) the final value of Cronbach's alpha is shown.

After collecting the whole data and distributing the questionnaires among 100 respondents (20 sample companies and 5 respondents for each company), Cronbach's alpha coefficient was calculated 0.938.

Data Analysis Method

The Neural Network Recognition Model: Artificial neural networks (ANNs) are inherently non-linear models that recognize patterns and make classifications accordingly. Therefore, they are widely used in classification problems because of their capability of approximating unknown functional relationships and hence are not constrained to predefined functional forms [35, 25]. Dasgupta *et al*., (1994) found that the back propagation model of ANNs performs better than other model in classification [40]. The ANNs models that have the most success in classification problems are feed-forward multilayer networks [41]. Therefore, Multi-layer feed-forward neural networks with hyperbolic tangent function training by back-propagation training algorithm were utilized to build the recognition model for recognizing the relation between the corporate social responsibility of a company and its financial performance.

Supervised learning was applied in many business applications. The network is presented with different datasets where each was explicitly associated with a specific outcome such as 'good financial performance' and 'bad financial performance'.

To analyze the data after collecting the questionnaires relating to CSR and extracting the corporate financial data, neural network toolbox of spss16 software was used.

The training method used in this study is "batch", that is, it updates the synaptic weights only after passing all training data records and uses information from all records in the training dataset. Batch training is often preferred because it directly minimizes the total error; however, batch training may need to update the weights many times until one of the stopping rules is met and hence may need many data passes. It is most useful for "smaller" datasets.

The training data set is necessary for training neural network. In order to recognize the pattern well, a larger training data set should be created carefully to contain examples of more of the possible signal patterns. After sets of patterns are trained, companies that have good financial performance could be recognized. Although larger number of processing unit in hidden layer will result in smaller error rate, it will take more time for converge. On the contrary, smaller number of processing unit in hidden layer will take shorter time for converge, but error rate will be higher. 5, 10, 15 and 20 processing units are evaluated individually in the research. Afterwards, each of their performance is compared. The best result was obtained with the highest R squared value (R^2) value. The R squared value [42] was used to compare the outputs of test runs in the research. R^2 is a measure of how well the outputs (i.e., the dependent variable) of the network are described by the inputs (i.e., independent variables). R^2 Can be used to measure the average fitness of the forecast values and target values. In addition, the correlation coefficients between the forecast time series and target time series are used to judge the fitness trend of the two series. If the fitness between each pair of points and their trend is good, one of the best models of being tested is obtained. R^2 is obtained by Eq. (1):

$$R^2 = \frac{\sum_K (X_K - \hat{X}_K)^2}{\sum_K (X_K - \bar{X}_K)^2} = \frac{1}{\sigma^2}\frac{1}{M}\sum_K (X_K - \hat{X}_K)^2 \quad (1)$$

Where X_K is the target value; $\bar{x}_K$ The mean of x_K; $\hat{x}_K$ is the forecasting value produced by the neural network; σ^2 is the variance of the data set; M is the number of subjects. R^2 And error rate of classification are used to select the optimum learning constant. Momentum constant is used to improve the changing value caused by the oscillating in the convergence process. The changing value may result in a local Minimum. Learning constants of 0.1, 0.2, 0.5, 1.0, 2.0, 5.0 and 10.0 were tested individually to minimize error function in the research. Meanwhile, momentum constant, 0.0, 0.1, 0.3, 0.5, 0.7, 0.9 were used to train network for choosing a better ANNs model. Subjects were divided into an 80% / 20% training / testing subjects. This is well in line with most studies in the neural network literature [25]. 100 subjects were used to train and test the classification model. 82 subjects were used for model training and 18 subjects were applied to test and evaluate the predictive accuracy of the ANNs models. Meanwhile, ten randomly selected training / testing subject combinations were used to reduce sampling error and report the average prediction rate over the 10 trials.

To identify the range of financial performance for companies, in the neural network output layer, the maximum and minimum required ROA sample should be specified, the highest and lowest amount of which are 0.35 and 0.05. Thus, the relative average ROA is:

$$(0.35 - 0.05)/2 = 0.15$$

However, companies whose ROA is higher than this value have good financial performance and companies whose ROA is less than this amount are considered to have bad financial performance. Moderating variables of the organization size, which are obtained by measuring the number of the personnel and the risk variable, which is obtained by measuring “total debt to total assets”, along with the 5 dimensions of corporate social responsibility, is placed in the output layer of the artificial neural network. Figure (1) shows the neural network structure used in this study.

Data Test Result: After reviewing and analyzing the data, the best result to design the appropriate neural network with one hidden layer and 14 hidden units was obtained. Of 100 subjects, 82 were used for training the neural network. As can be seen in Table (3) the percentage of correct classification (hit ratio) for the training data is 97.56%, (32 + 48)/82. And the percentage of correct classification to test data is 83.3%(5 +10)/18. The hit ratio is obtained from equation (2).

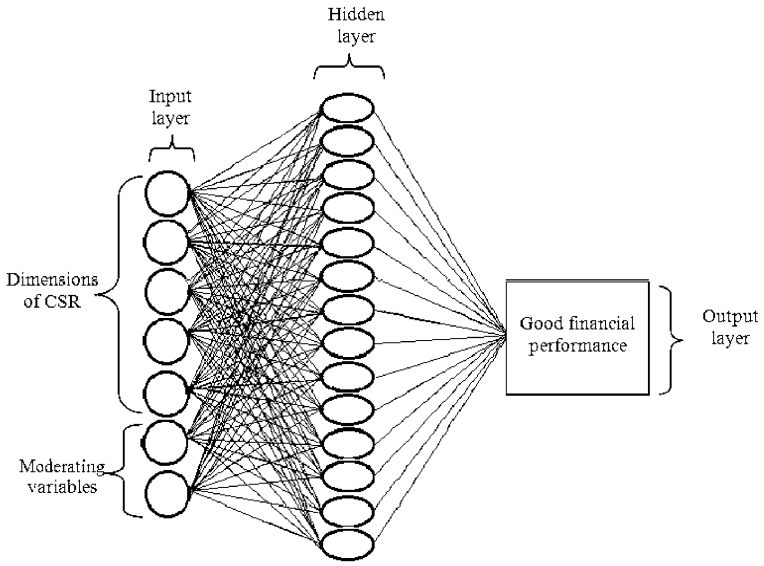

Fig. 1: Neural network structure in this study

Table 3: Hit rate of the model

Classification				
		Predicted		
Misrecognition rate = 0.0832		0	1	Percent Correct
Training	0	32	1	96.96%
	1	1	48	97.95%
	Overall Percent	40.2%	59.8%	97.56%
Testing	0	5	2	71.4%
	1	0	11	100%
	Overall Percent	27.8%	72.2%	88.89%

Dependent Variable: ROA

Table 4: Importance of each variable in predicting

Attributes	Variable	Variable description	Importance
Dimensions of CSR	WC	Work Condition	0.094
	E	Environment	0.133
	BB	Business Behavior	0.119
	SLC	Society And Local Community	0.150
	CG	Corporate Governance	0.104
Moderating variables	WF	Work force(size)	0.196
	RD	Risk L.R.D	0.203

$$\text{Hit ratio: } \left(\sum_{K=1}^{G} CN_K\right) \Big/ M, \qquad (2)$$

Where M is the number of subjects; G is the number of clusters; CN_K is the correct number of subjects of each cluster K.

Eighteen subjects were used to test the recognition model. The recognition rate of the testing subjects is 88.89%. That is, the classification accuracy is greater than that expected by chance. Thus, this is a valuable or useful model that supports predictions of the dependent variable. According to the result, the non-linear neural network model is good on the recognition. The correct recognition rate of the research is 97.56%. It reveals that the model is reliable. A set of contribution weights representing the general importance of each independent variable was produced as shown in Table 4.

The contributions of these individual variables include their importance within the interactions in the hidden units. A significant strength of neural network is the ability to evaluate the interaction effect between the independent variables and dependent variables. The contribution weights were highest for the variables of RD (0.203), WF (0.196) and SLC (0.150). The lowest contribution weights were for variables of E (0.133), BB (0.119), CG (0.104) and WC (0.094).

Table (4) shows the name of the input variables and the weight contribution of each in predicting the dependent variables which include the five dimensions of social responsibility and two moderating variables, the size and risk of the organization. The model has one output variable which indicates the good financial performance.

DISCUSSION AND CONCLUSION

Financial Performance and the Human Resource Training: The rating on human resources regards the continuous improvement of employment conditions, evaluation of job skills and employability. The improvement of industrial relations is also a subject of this domain. The social dialogue between management and employees is the most important factor here.

According to the study of human resources operating or working conditions, the least important dimension in social responsibility is associated with corporate financial performance. Of course, the lowness of this factor in predicting the dependent variable, financial performance, does not diminish its role as a major factor in corporate social responsibility. As shown in Table 4, the contribution of this factor in predicting the dependent variable, namely the company's financial performance is 0.094.

Financial Performance and the Environment Rating: The rating for the environment domain is mainly based on the way the company considers the impact of its activities on the environment. Based on the definition of Vigeo institution, the environment dimension of the social responsibility includes attention to environmental protection in manufacturing processes, attention to environmental protection in the distribution process, efficient use of scarce resources and recycling goods. Contribution of the operating environment variables in predicting financial performance of companies is 0.133, indicating that this crucial factor has a key role in predicting the dependent variable of the model. And the results of the model suggest that companies should pay attention to this factor to better financial performance and gain higher profits.

Financial Performance of the Customer and Supplier Rating: A socially responsible company has to look at the needs and demands of its clients and suppliers. A flexible and transparent attitude towards them will result in a high rating for this domain. An adaptation of the supply chain to social and environmental factors and the information around the products can lead towards better client relations. A clear business contract strategy can result in easier relations with the suppliers.

As can be seen in Table 4, the business operating behavior factor, which is also known as the behavior of the organization toward the customers and suppliers, has an important role in increasing the financial efficiency of the companies. The contribution of this factor in predicting the dependent variable is 0.119, which indicates that the kind of the behavior that the organization shows toward the customers and suppliers can improve the company's financial performance.

Financial Performance of the Society and Community Rating: With regard to the society and community domain, the rating is based on the way the company integrates the interests of the community and the territories in which it operates. The community involvement looks at the contribution of the company towards the community, such as public causes and local employment training.

Society and local community are one of the important aspects of the social responsibility with regard to the companies' financial performance. This factor which has a share of 0.15 in predicting the dependent variable, directs the organizations in increasing the convergence of their profits of the society in order to increase their financial performance.

Financial Performance of the Corporate Governance Rating: The corporate governance domain rates the transparency and the efficiency of governance towards shareholders and other stakeholders.

This factor has a contribution rate of 0.104 in predicting the dependent variable (the financial performance of the company). Its role indicates that transparency and efficiency of the board of directors of a company toward their shareholders and other beneficiaries can play an important part in increasing the companies' financial performance.

Moderating Variables

The Organization Size: The Number of human resources in a company has a very important role in its financial performance. In this research, the size factor has the second important contribution in predicting the dependent variable. The human resource with the contribution rate of 0.196 indicates that the organization size can have a great influence on the financial performance of the companies and direct the managers when they employ new personnel or use the human resources.

The Organization Risk: In this research, the organization risk refers to the ratio of debts to the total assets. The contribution rate of 0.203 of this factor indicates that it has the most important role in predicting the companies' financial performance. Of course, with regard to the fact that this is a financial variable, such a result is not unexpected. Organizations that have lower debt ratio have higher ROA and vice versa, organizations that have higher debt ratio have lower ROA.

The purpose of this study is to investigate the use of artificial neural networks in identifying the relationship between the companies' social responsibility and their financial performance. The correct rate of classification is 97.56%, which clearly indicates the ability of the model to predict the dependent variable.

Among the studies conducted concerning the present research, the following confirm the results obtained from this research. In other words, they have also similar results (i.e., the positive relationship between social responsibility and the financial performance of the companies): The research carried out by Balabantits *et al*., (1998) as well as that of Inouse and Lee (2010) indicates the positive relationship between companies' social responsibility and their financial performance at a low significance level [43, 44]. The studies done by Husted and Allen (2007), Lin *et al*., (2009) and Mittal *et al*., (2008) also indicate the positive relationship between the variables at an average significance level [45, 46, 47]. Finally, the research carried out by Neal and Cochran (2008) shows the positive relationship between these variables at a high significance level [48]. On the other hand, the following studies have proved that there is either no relationship or a negative relationship between social responsibility and the company's financial performance. In other words, their findings are in contrast with the findings of the present research. In a study done by scholtens (2008), a contradictory relationship was found between corporate social responsibility and corporate financial performance at an average significance level [49]. Also, in a research done by Aras *et al*., (2009), no relationship was found at an average significance level between the companies' social responsibility and their financial performance [50].

The accuracy is too high to seem random, so it can introduce the model as a useful and reliable one. Finally, a set of common weights shows the general importance of each independent variable at a certain time. Based on the obtained results, it was proved that the artificial neural networks are useful for identifying the available data patterns. The advantages of using this model are fully explained. The authors believe that the model is useful and convenient as an analytical tool for designing the organizational strategy for corporate managers. Furthermore, a strong identification mechanism helps to know what is going on between the input and output. The result of the present study reveals that the proposed method can provide an innovative model, since this method is not fully compatible with a specific case.

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Appendix-financial data of the companies

	Total Assets	Total debt	Net profit
Hakim pharmaceutics	160434106733	146845764374	13993454693
Abureihan	216973418868	142023268723	25994560883
Chimi Daru	304020686882	134092264130	92504750659
Daru pakhsh primary material manufacture	392859000000	328172000000	135874000000
Sina Daru	229229000000	101149000000	64197000000
Razak pharmaceutic laboratories	490901000000	363016000000	82014000000
Tehran Daru	173831039053	150307496039	8117551696
Tehran Chimie	542882258447	467014154742	32168149183
Daru pakhsh Factories	924568071700	655878599505	126955535650
Osveh Pharmaceutics	155069718186	63620922838	49639104452
Jaber ebn Hayyan pharmaceutics	578994184293	286409309632	158364491877
Rooz Daru	182376990146	72563757509	50388735799
Daru pakhsh pharmaceutics chemistry	190583000000	128272000000	24612000000
Dr. Ahadi pharmaceutics	194542259416	76349709937	38007550578
Kosar pharmaceutics	336044688751	182077534099	58146576619
Loghman Hygienic pharmaceutics	276494640726	217148156460	22620962946
Pars Daru	2237632000000	1767869000000	159462000000
Iran Injectional products	144469650749	90547556315	26654233719
Iran Daru	115027002872	73375898684	27057188465
Zahravi pharmaceutics	306333350965	190343554049	73736158508