

Forecasting Share Prices: A Good Practice Or A Waste of Time

* *Mayank V. Bhatt*
** *Nishchit N. Sheth*
*** *Tushar N. Patel*

INTRODUCTION

Today, financial markets are extremely volatile by nature and hence, the risk factor is an important concern for all the investors who want to invest their money in the stock market. Is there any measure or criteria to forecast the next day stock price? Does any model exist in the market which can forecast the next day stock price exactly? This study is carried out to generate a general, sector wise forecasting model for all the existing BSE 30 companies and examines their price variation pattern with respect to the BSE Index.

OBJECTIVES OF THE RESEARCH

1. To build a general, sector wise forecasting model for all the BSE 30 companies including BSE Index.
2. To check the forecasting accuracy of the model.
3. To examine variation patterns of different companies with respect to BSE index in different time periods.

DATA & SAMPLE

Data was collected from BSE database. Period of data collection is 1st January, 2008 to 12th January, 2009. The total sample size is of 259 continuous observations (Close Stock Prices).

REVIEW OF LITERATURE

Nusrat Ahmad (2009) has studied about the Linkage between stock market and Manufacturing sector. Jadhav A.M. and Chakrapani V.C. (2009), Der-Ann Hsu, Miller R.B. and Wichern D.W. (1974) and Eugene F. Fam (1965) have studied the behavior of the Stock market prices. Yaffee R.A. and Monnie McGee (2000) have written a good book on "Introduction to Time series Analysis and Forecasting with Applications of SAS and SPSS".

METHODOLOGY

To carry out statistical analysis, spread sheet and SPSS software have been used. To check the consistency of the model, the data set is divided into 7 different time periods like Yearly (01.Jan, 2008 to 15. Jan, 2009), Half Yearly HY1 (01.Jan, 2008 to 04. Jul, 2008), HY2 (07.Jul, 2008 to 15. Jan, 2009)) and Quarterly (Q4-08 (01.Jan, 2008 to 02. Apr, 2008), Q1-09 (03.Apr, 2008 to 04. Jul, 2008), Q2-09 (07.Jul, 2008 to 01. Oct, 2008), Q3-09 (03.Oct, 2008 to 15. Jan, 2009)).

To identify Index based companies (i.e. variation pattern of stock prices of different companies is similar to the variation pattern of the BSE Index), Factor Analysis is carried out on BSE 30 Companies with respect to the BSE Index. After this, companies are divided into three major groups. The group consistency of BSE 30 companies to remain in a same group is also studied with respect to different time periods.

To forecast the share price of BSE 30 companies and BSE Index, Auto Regressive Integrated Moving Average (here after it is referred as ARIMA) models are built. A common 7 days forecasting period is selected for all the companies. These models are compared for their forecasting accuracies. The model accuracies are measured with respect to R^2 , RMSE, MAPE, and MAE.

MODEL STATISTICS

AUTOREGRESSIVE INTEGRATED MOVING AVERAGE (ARIMA)

In statistics, an **autoregressive integrated moving average (ARIMA)** model is a generalization of an

* *Lecturer*, MQPM, Department of Statistics, Sardar Patel University, Vallabh Vidyanagar – 388120, Gujarat
Email: mayankbhatt_2003@yahoo.co.in

** *Management Student*, Master in Quality and Productivity Management, Department of Statistics, Sardar Patel University, Vallabh Vidyanagar – 388120, Gujarat

*** *Management Student*, Master in Quality and Productivity Management, Department of Statistics, Sardar Patel University, Vallabh Vidyanagar – 388120, Gujarat

autoregressive moving average or (ARMA) model. These models are fitted to time series data either to better understand the data or to predict future points in the series. The model is generally referred to as an ARIMA (p, d, q) model where $p, d,$ and q are integers greater than or equal to zero and refer to the order of the autoregressive, integrated, and moving average parts of the model respectively.

MODEL ACCURACY STATISTICS

ROOT MEAN SQUARE ERROR (RMSE)

The square root of mean square error is a measure of how much a dependent series varies from its model-predicted level, expressed in the same units as the dependent series.

$$RMSE = \sqrt{e^2/n} \quad (1.1)$$

MEAN ABSOLUTE PERCENTAGE ERROR (MAPE)

Mean Absolute Percentage Error. A measure of how much a dependent series varies from its model-predicted level. It is independent of the units used and can, therefore, be used to compare series with different units.

$$MAPE = \frac{100}{n} \sum_{i=1}^n \left| \frac{e_i}{X_i} \right| \quad (1.2)$$

MEAN ABSOLUTE ERROR (MAE)

Measures how much the series varies from its model-predicted level. MAE is reported in the original series units.

$$MAE = \sum_{i=1}^n |e_i|/n \quad (1.3)$$

RESULTS AND DISCUSSION

Table 1: Forecasting Models for Housing Sector

COMPANY	BSE	ACC	Jaiprakash	DLF
SECTOR	SENSEX	Housing	Housing	Housing
YEARLY DATA	ARIMA(0,1,0)(0,0,0)	ARIMA(0,1,0)(0,0,0)	ARIMA(0,1,1)(0,0,1)	ARIMA(0,1,0)(0,0,0)
HY1	WINTER'S ADDITIVE	ARIMA(0,1,0)(1,0,1)	ARIMA(0,1,0)(1,0,0)	ARIMA(0,1,4)(0,0,0)
HY2	SIMPLE	SIMPLE	SIMPLE SEASONAL	ARIMA(0,1,0)(0,0,0)
Q4-08 DATA	ARIMA(0,1,0)(0,0,0)	ARIMA(0,1,0)(0,0,0)	ARIMA(0,1,0)(1,0,0)	ARIMA(0,1,0)(1,0,0)
Q1-09 DATA	ARIMA(0,1,0)(0,1,1)	ARIMA(0,1,0)(0,0,0)	WINTER'S ADDITIVE	ARIMA(0,1,0)(0,0,0)
Q2-09 DATA	SIMPLE SEASONAL	ARIMA(0,1,0)(0,0,0)	SIMPLE SEASONAL	SIMPLE SEASONAL
Q3-09 DATA	ARIMA(0,1,0)(0,0,0)	SIMPLE	SIMPLE SEASONAL	ARIMA(0,1,0)(0,0,0)

Table 1 shows different ARIMA models built by using data sets of different time intervals in housing sector related companies. In the share market, usually, it is believed that within one sector of companies, they have a similar kind of price variation pattern. By this, one can expect a common model to exist for a particular sector. From the above table 1, it is observed that it is hard to identify or develop a common model for this sector. Even for individual companies, Jaiprakash & DLF, the model is not remaining constant with respect to different time periods except ACC.

Forecasting model for ACC for Yearly and Quarterly remains constant i.e. ARIMA (0,1,0). It shows the consistency and predictability of ACC share price. Hence, it is suggested that one can invest with some future investment plan in ACC.

Table 2: Identification of Index Based Companies (Housing Sector)

Table 2A: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.950
Bartlett's Test of Sphericity	Approx. Chi-Square	18941.963
	Df	465
	Sig.	.000

Table 2B: Rotated Component Matrix (a)

	Component		
	G1	G2	G3
BSE_Close	.803	.539	.192
ACC_Close	.900	.261	.114
JP_Close	.875	.307	.265
DLF_Close	.901	.276	.282

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Table 2C: Group Membership With Respect To The BSE Index (Housing Sector)

	BSE	ACC	Jaiprakash	DLF
	SENSEX	Housing Related	Housing Related	Housing Related
Yearly Data	G1	G1	G1	G1
HY1	G1	G1	G1	G1
HY2	G1	G2	G1	G1
Q4-08 Data	G1	G2	G1	G1
Q1-09 Data	G1	G1	G1	G1
Q2-09 Data	G2	G1	G2	G2
Q3-09 Data	G1	G1	G1	G2

To identify Index based companies (i.e. variation pattern of stock prices of different companies is similar to the variation pattern of the BSE Index), Factor Analysis is carried out on BSE 30 Companies with respect to BSE Index. From the table 2B, it is observed that three groups exist in the market. It is also inferred from the table 2B that ACC, JP and DLF have the same price variation pattern with respect to BSE index, hence, they fall under the same group G1. Factor analysis is also carried out for the different time periods to study the changes in group membership with respect to change in time period. From the table 2C, it is observed that group membership does not remain same; it changes with different time periods.

Table 3: A Measure of Forecasting Model Accuracy (Housing Sector):

TIME PERIOD	ERROR	ACC	Jaiprakash	DLF
YEARLY DATA	RMSE	17.928	9.373	22.46
	MAPE	2.253*	4.499	3.701
	MAE	13.572	7.061	16.991
	R SQUARE	0.984	0.992	0.991
HY1	RMSE	17.372	13.446	27.045
	MAPE	1.771*	3.893	2.925
	MAE	13.016	10.217	20.307
	R SQUARE	0.973	0.975	0.981
HY2	RMSE	16.999	6.679	18.249
	MAPE	2.539*	5.138	4.276
	MAE	12.983	5.325	14.362
	R SQUARE	0.943	0.978	0.976
Q4-08 DATA	RMSE	18.934	19.691	38.981
	MAPE	1.779*	4.969	3.769
	MAE	14.302	14.971	30.615
	R SQUARE	0.942	0.95	0.949
Q1-09 DATA	RMSE	10.927	7.557	15.826
	MAPE	1.281*	2.751	2.352
	MAE	8.523	5.867	12.696
	R SQUARE	0.987	0.967	0.971
Q2-09 DATA	RMSE	14.017	7.088	18.325
	MAPE	1.856*	3.575	3.076
	MAE	10.647	5.584	14.34
	R SQUARE	0.823	0.879	0.878
Q3-09 DATA	RMSE	19.512	6.176	17.41
	MAPE	3.212*	6.556	5.36
	MAE	15.24	4.946	13.798
	R SQUARE	0.884	0.817	0.847

* Minimum Values

To check the model forecasting accuracy, the authors have calculated the RMSE, MAPE, MAE and R-square. Out of these model accuracies, the authors have selected MAPE as model performance criterion. MAPE provides an indication of how large the forecast errors are in comparison to actual values of the series. From the table 3, it is inferred that ACC has the lowest (2.253) MAPE. It is also found that with respect to different time slots, the MAPE for ACC remains the lowest in this sector. Jaiprakash has the highest (4.499) MAPE in this sector.

Table 4: Forecasting Models For THE FMCG Sector

COMPANY	BSE	ITC	HUL
SECTOR	SENSEX	FMCG	FMCG
YEARLY DATA	ARIMA(0,1,0)(0,0,0)	ARIMA(1,1,1)(1,0,1)	SIMPLE
HY1	WINTER'S ADDITIVE	ARIMA(0,1,0)(0,0,0)	ARIMA(0,1,0)(0,0,0)
HY2	SIMPLE	SIMPLE SEASONAL	ARIMA(0,1,0)(0,0,0)
Q4-08 DATA	ARIMA(0,1,0)(0,0,0)	ARIMA(0,1,0)(0,0,0)	SIMPLE
Q1-09 DATA	ARIMA(0,1,0)(0,1,1)	WINTER'S ADDITIVE	ARIMA(0,1,0)(1,0,0)
Q2-09 DATA	SIMPLE SEASONAL	ARIMA(0,1,0)(0,0,0)	WINTER'S ADDITIVE
Q3-09 DATA	ARIMA(0,1,0)(0,0,0)	SIMPLE SEASONAL	SIMPLE SEASONAL

From the table 4 it is observed that it is hard to identify or develop a common model for this sector. For the individual companies ITC & HUL, the model does not remain constant with respect to different time periods.

Table 5: Identification of Index Based Companies (FMCG Sector)

Table 5A: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.950
Bartlett's Test of Sphericity	Approx. Chi-Square	18941.963
	Df	465
	Sig.	.000

Table 5B :Rotated Component Matrix(a)

	Component		
	G1	G2	G3
BSE_Close	.803	.539	.192
ITC_Close	0.652	0.626	-0.157
HUL_Close	-0.094	0.025	-0.931

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Table 5C: Group Membership With Respect To The BSE Index (FMCG Sector)

	BSE	ITC	HUL
	SENSEX	FMCG	FMCG
YEARLY Data	G1	G1	G3
HY1	G1	G2	G3
HY2	G1	G2	G2
Q4-08 Data	G1	G1	G2
Q1-09 Data	G1	G1	G1
Q2-09 Data	G2	G1	G1
Q3-09 Data	G1	G3	G3

From the table 5B it is observed that three groups exist in the Market. It is also inferred from the table 5B that ITC has the same price variation pattern with respect to BSE index, hence, they fall under the same group G1, but HUL has no same price variation pattern with respect to BSE index. From the table 5C it is observed that group membership does not remain the same, it changes with different time periods.



Table 6: A Measure of Forecasting Model Accuracy (FMCG Sector)

TIME PERIOD	ERROR	ITC	HUL
YEARLY DATA	RMSE	4.717	5.714
	MAPE	1.895	1.879*
	MAE	3.585	4.311
	R SQUARE	0.936	0.872
HY1	RMSE	5.169	5.469
	MAPE	1.99	1.927*
	MAE	4.048	4.305
	R SQUARE	0.846	0.889
HY2	RMSE	4.214	4.445
	MAPE	1.83	1.39*
	MAE	3.208	3.333
	R SQUARE	0.867	0.862
Q4-08 DATA	RMSE	5.555	6.686
	MAPE	2.191*	2.473
	MAE	4.409	5.326
	R SQUARE	0.796	0.779
Q1-09 DATA	RMSE	4.347	3.827
	MAPE	1.586	1.237*
	MAE	3.297	2.89
	R SQUARE	0.892	0.923
Q2-09 DATA	RMSE	3.817	3.431
	MAPE	1.523	1.446*
	MAE	2.797	2.721
	R SQUARE	0.782	0.929
Q3-09 DATA	RMSE	4.285	6.773
	MAPE	1.988*	2.128
	MAE	3.354	5.057
	R SQUARE	0.709	0.653

* Minimum Values

From the table 6 it is inferred that HUL has the lowest (1.879) MAPE. It is also found that with respect to different time slots, the MAPE for HUL remains the lowest except in the last period i.e. Q3-09 in this sector.

From the table7 it is observed that it is hard to identify or develop a common model for this sector. Even for individual companies ONGC & RIL, the model does not remain constant with respect to different time periods.

From the table 8B it is observed that three groups exist in the market. It is also inferred from the table 8B that ONGC and RIL have the same price variation pattern with respect to BSE index, hence they fall under the same group G1. From the table 8C it is observed that group membership of ONGC remains the same with respect to different time periods.

From the table 9 it is inferred that ONGC has the lowest (2.262) MAPE. It is also found that with respect to different time slots, the MAPE for ONGC remains the lowest in this sector, except in the period HY1 & Q4-08.

Table 7: Forecasting Models For Oil & Gas Sector

COMPANY	BSE	ONGC	RIL
SECTOR	SENSEX	Oil & Gas	Oil & Gas
YEARLY DATA	ARIMA(0,1,0)(0,0,0)	ARIMA(0,1,0)(1,0,1)	ARIMA(1,1,0)(0,0,0)
HY1	WINTER'S ADDITIVE	ARIMA(0,1,3)(0,0,0)	ARIMA(0,1,4)(0,0,0)
HY2	SIMPLE	ARIMA(0,1,0)(1,0,1)	SIMPLE SEASONAL
Q4-08 DATA	ARIMA(0,1,0)(0,0,0)	ARIMA(0,1,0)(0,0,0)	ARIMA(0,1,0)(0,0,0)
Q1-09 DATA	ARIMA(0,1,0)(0,1,1)	ARIMA(0,1,0)(0,0,1)	SIMPLE SEASONAL
Q2-09 DATA	SIMPLE SEASONAL	SIMPLE SEASONAL	SIMPLE SEASONAL
Q3-09 DATA	ARIMA(0,1,0)(0,0,0)	ARIMA(0,1,0)(0,0,0)	ARIMA(0,1,0)(0,0,0)

Table 8: Identification of Index Based Companies: (Oil & Gas Sector)

Table 8A: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.950
Bartlett's Test of Sphericity	Approx. Chi-Square	18941.963
	Df	465
	Sig.	.000

Table 8B: Rotated Component Matrix (a)

	Component		
	G1	G2	G3
BSE_Close	.803	.539	.192
ONGC_Close	0.839	0.241	-0.260
RIL_Close	0.747	0.625	0.090

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Table 8C: Group Membership With Respect To The BSE Index (Oil & Gas Sector)

	BSE	ONGC	RIL
	SENSEX	Oil & Gas	Oil & Gas
YEARLY DATA	G1	G1	G1
HY1	G1	G1	G1
HY2	G1	G1	G1
Q4-08 DATA	G1	G1	G1
Q1-09 DATA	G1	G1	G1
Q2-09 DATA	G2	G1	G2
Q3-09 DATA	G1	G1	G1

Table 9: A Measure of Forecasting Model Accuracy (Oil & Gas Sector)

TIME PERIOD	ERROR	ONGC	RIL
YEARLY DATA	RMSE	27.576	67.695
	MAPE	2.262*	2.849
	MAE	20.54	54.186
	R SQUARE	0.971	0.985
HY1	RMSE	30.956	62.949
	MAPE	2.173	1.995*
	MAE	21.491	48.896
	R SQUARE	0.934	0.937
HY2	RMSE	24.114	63.192
	MAPE	2.217*	3.304
	MAE	18.961	50.589
	R SQUARE	0.978	0.98
Q4-08 DATA	RMSE	34.656	73.684
	MAPE	2.527	2.254*

Q4-08 DATA	MAE	26.519	56.711
	R SQUARE	0.918	0.934
Q1-09 DATA	RMSE	16.849	52.441
	MAPE	1.379*	1.719
	MAE	12.609	40.918
	R SQUARE	0.961	0.928
Q2-09 DATA	RMSE	24.63	54.049
	MAPE	1.872*	2.09
	MAE	18.895	43.845
	R SQUARE	0.877	0.814
Q3-09 DATA	RMSE	23.316	66.876
	MAPE	2.523*	3.849
	MAE	18.489	50.306
	R SQUARE	0.94	0.874

* Minimum Values

FINDINGS

The findings of the study are as follows:

1. In the Housing sector, forecasting model for ACC is performing well. It is also found that the model is consistent across the different time periods.
2. No consistent model could be developed in the FMCG and Oil & Gas sector.
3. HUL and ONGC have good model accuracy (MAPE) in FMCG and Oil & Gas sectors respectively.
4. It is easy to build an individual model with good accuracy, but it is very hard to develop a sector wise common model.

CONCLUSION

From this study, it is concluded that it is very difficult to develop a common model for a particular sector, which can be applied to any company that exists in this sector. Through this study, the researchers have demonstrated that the accuracy of the forecasting model is largely affected by selection of time period and length. Researchers who are working in this area (forecasting) should focus on "sufficient length and appropriate time period of forecasting model such that their MAPE will be minimum".

FUTURE RESEARCH

One possible solution of the above discussion would be partitioning the data base and developing a part wise model and then selecting the model which has minimum forecasting error.

BIBLIOGRAPHY

Journals

1. Nusrat Ahmad (2009), "Linkage between Stock Market and Manufacturing Sector in India A Time Series Analysis", The ICFAI Journal of Applied Finance.
2. Jadhav Aditya Mohan and Chakrapani Venkata Chaturvedula (2009)," Model Forecasting Volatility in Indian Stock Market: The volatility Index, The ICFAI Journa-l of Applied Finance.
3. Der-Ann Hsu, Robert B. Miller and Dean W. Wichern (Mar., 1974), pp. 108-113, "On the Stable Paretian Behavior of Stock-Market Prices". Journal of the American Statistical Association.
4. Eugene F.Fama (Jan., 1965), pp. 34-105," The Behavior of Stock-Market Prices" The Journal of Business,Vol. 38, No.1(Jan.,1965),pp. 34-105.

BOOKS

1. Robert A. Yaffee and Monnie McGee (2000). "Introduction to Time Series Anlaysia and Forecasting with Applications of SAS and SPSS". Academic Press, Inc. California.

WEBSITES

- 1) <http://investing.businessweek.com>
- 2) <http://finance.yahoo.com>
- 3) <http://bseindia.com>
- 4) www.wikipedia.com
- 5) www.google.com



INDIAN JOURNAL OF FINANCE

SUBSCRIPTION FORM

Subscription Charges:

Period	Rate	Discount	Amount Payable
One Year (12 issues)	Rs. 1000/-	Nil	Rs. 1000/-
Two Years (24 issues)	Rs. 2000/-	Rs. 100/-	Rs. 1900/-
Three Years (36 issues)	Rs. 3000/-	Rs. 200/-	Rs. 2800/-
Five Years (60 issues)	Rs. 5000/-	Rs. 400/-	Rs. 4600/-

Subscription Details:

Amount:

- Rs. 1000/-
 Rs. 1900/-
 Rs. 2800/-
 Rs. 4600/-

Subscription Period: _____ to _____

Payment Details:

M.O/Demand Draft/ Cheque No: _____ **dated** _____

in favor of **INDIAN JOURNAL OF FINANCE**, payable at New Delhi.

(Outstation cheques are not accepted. Only payable at par cheques are accepted)

Subscriber No. (Renewal): _____

Delivery Details:

Name: _____

Address: _____

_____ **Pin** _____

Send Your Subscription to :

Meenakshi Gilani
Subscription Manager
Indian Journal of Finance
Y-21, Hauz Khas
New Delhi-110016

Telephone: 011-32547238, 011-42654857

Url : <http://www.indianjournaloffinance.co.in>

Email: meenakshi.gilani@indianjournaloffinance.co.in

Email: editor@indianjournaloffinance.co.in



PRABANDHAN: INDIAN JOURNAL OF MANAGEMENT

SUBSCRIPTION FORM

Subscription Charges:

Period	Rate	Discount	Amount Payable
One Year (12 issues)	Rs. 1000/-	Nil	Rs. 1000/-
Two Years (24 issues)	Rs. 2000/-	Rs. 100/-	Rs. 1900/-
Three Years (36 issues)	Rs. 3000/-	Rs. 200/-	Rs. 2800/-
Five Years (60 issues)	Rs. 5000/-	Rs. 400/-	Rs. 4600/-

Subscription Details:

Amount:

- Rs. 1000/-
 Rs. 1900/-
 Rs. 2800/-
 Rs. 4600/-

Subscription Period: _____ to _____

Payment Details:

M.O/Demand Draft/Cheque No: _____ dated _____

in favor of **INDIAN JOURNAL OF MANAGEMENT**, payable at New Delhi.

(Outstation cheques are not accepted. Only payable at par cheques are accepted)

Subscriber No. (Renewal): _____

Delivery Details:

Name: _____

Address: _____

_____ Pin _____

Send Your Subscription to :

Meenakshi Gilani
Subscription Manager
Indian Journal of Management
Y-21, Hauz Khas
New Delhi-110016

Telephone : 011-32547238, 011- 42654857

Url : <http://www.indianjournalofmanagement.com>

Email: meenakshi.gilani@indianjournalofmanagement.com

Email: editor@indianjournalofmanagement.com



INDIAN JOURNAL OF MARKETING

SUBSCRIPTION FORM

Subscription Charges:

Period	Rate	Discount	Amount Payable
One Year (12 issues)	Rs. 1000/-	Nil	Rs. 1000/-
Two Years (24 issues)	Rs. 2000/-	Rs. 100/-	Rs. 1900/-
Three Years (36 issues)	Rs. 3000/-	Rs. 200/-	Rs. 2800/-
Five Years (60 issues)	Rs. 5000/-	Rs. 400/-	Rs. 4600/-

Subscription Details:

Amount:

- Rs. 1000/-
- Rs. 1900/-
- Rs. 2800/-
- Rs. 4600/-

Subscription Period: _____ to _____

Payment Details:

M.O/Demand Draft/ Cheque No: _____ **dated** _____

in favor of **INDIAN JOURNAL OF MARKETING**, payable at New Delhi.

(Outstation cheques are not accepted. Only payable at par cheques are accepted)

Subscriber No. (Renewal): _____

Delivery Details:

Name: _____

Address: _____

_____ Pin _____

Send Your Subscription to :

Meenakshi Gilani
Subscription Manager
Indian Journal of Marketing
Y-21, Hauz Khas
New Delhi-110016

Telephone: 011-42654857, 011-32547238

Url : <http://www.indianjournalofmarketing.com>

Email : meenakshi.gilani@indianjournalofmarketing.com

Email : editor@indianjournalofmarketing.com